

# **RNA-Seq Report (Version 1.1.1)**

RSEQREP analysis of PBMC and B cell gene expression profiles in  
healthy humans in response to influenza vaccination

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# 1 Synopsis

The RNA experiment for this study comprises peripheral blood mononuclear cells (PBMCs) and B-cell samples from 5 subjects collected prior to Trivalent Influenza Vaccine (TIV) vaccination (Day 0) and at 10 time points post TIV vaccination (Days 1-10). Overall, the RNA-Seq dataset comprised 110 samples (<https://www.nature.com/articles/srep02327>, GEO: GSE45764).

## 2 Methods

### 2.1 RNA-Seq experiment

RNA was extracted with the Qiagen RNeasy micro kit. Concentrations were determined by UV spectrophotometry (Nanodrop) and integrity of ribosomal RNA was confirmed with the Agilent Bioanalyzer. Barcoded sequencing libraries were prepared with Illumina TruSeq RNA kits as recommended by Illumina, using 100 ng total RNA as input. All samples from an individual subject were sequenced in the same run using an Illumina Genome Analyzer IIx (22 samples per 8 lanes). CASAVA programs (Illumina, version 1.7) were used to demultiplex samples according to barcode.

### 2.2 RNA-Seq data preprocessing and data qc

The human reference genome assembly, gene models, and associated gene annotation information in the form of a Gene Transfer Format (GTF) were obtained from the ENSEMBL database (Version 87). The genomic reference was built by merging all human chromosomes. Sequence reads were aligned to the reference transcriptome/genome using the *STAR* splice-aware read aligner (Version 2.5.2a). Ensembl gene models were used to guide the alignment process. For each sample, the quality of reference alignments was evaluated using the *RSeQC* software (Version 2.6.4). Quality measures were summarized in tabular form, univariate boxplots, and multivariate starplots.

Gene expression quantification was carried out on the gene level using the `featureCounts` function as implemented in the *Subread* software (Version 1.5.3). Reads that overlapped with multiple genes or mapped to multiple genomic locations on the reference genome were excluded. Systematic sample differences in sequencing coverage were corrected for by calculating scaling factors for each sample using the trimmed mean of M-values (TMM) method as implemented in the *edgeR* R package (Version 3.18.1). Post-normalization, Mt-rRNA, Mt-tRNA, Mt-tRNA-pseudogene, tRNA, rRNA, rRNA-pseudogene, tRNA-pseudogene genes based on ENSEMBL GTF annotations were excluded from the final read count results (**Table 1**). TMM normalization was executed across all samples to evaluate global gene expression patterns, systematic effects, and outliers. Following outlier removal, TMM-normalization was rerun separately for each specimen type. The resulting normalized data was used for all downstream specimen type-specific analyses.

For data visualizations and multivariate analyses, TMM-normalized moderated  $\log_2$  counts per million (LCPM) were computed using the *edgeR* R package. To avoid taking the  $\log_2$  of zero values, a TMM-scaled count of 0.5 was added to each gene. Subject-specific  $\log_2$  fold changes from pre-treatment were calculated for each subject and post-treatment time point by subtracting the pre-treatment LCPM value from the respective post-treatment LCPM value.

Genes with maximum expression levels across all samples per specimen type that did not exceed the specified cut off of 3 LCPM were considered to be lowly expressed and were excluded from downstream analysis. To guide the cut-off selection, reverse cumulative distribution functions summarizing the percentage of genes whose maximum LCPM

exceeded a certain LCPM cut off were plotted for each specimen type (**Figure 13**). Filtered TMM-normalized LCPM were standardized (z-score: mean=0, variance=1) and LCPM distributions across samples were inspected for outliers and systematic effects using principal component analysis, multidimensional scaling, and hierarchical clustering analysis. Identified outliers were excluded from downstream analysis.

### 2.2.1 Identification of differentially expressed genes

Negative binomial generalized linear models as implemented in the edgeR software were applied to identify differentially expressed (DE) genes after exclusion of outlying samples and lowly expressed genes. TMM-adjusted total read counts per sample were included in the models as an offset to account for systematic sample differences. For each specimen type, DE gene analysis was carried per post-treatment time point (Day 1, Day 2, Day 3, Day 4, Day 5, Day 6, Day 7, Day 8, Day 9, Day 10) in relation to pre-treatment. Each model included coefficients to estimate subject and pre- vs. post-treatment effects, i.e. a subject and a time factor. The subject effect for estimating subject-specific pre-treatment levels was added to account for paired samples from the same subject. The statistical significance of the post- vs. pre-treatment effect was evaluated using a likelihood ratio test. To control for testing multiple genes, the false-discovery rate (FDR) based on the Benjamini-Hochberg procedure as implemented in the *p.adjust* R function was applied for each model. Genes with a pre-treatment fold change of  $\geq 1.5$  and FDR-adjusted p-value  $< 0.05$  were considered to be DE genes. DE gene results were tabulated and treatment effects in terms of overall  $\log_2$  fold changes and FDR-adjusted p-values were summarized for each specimen type and post-treatment time point using MA plots and Volcano plots. Overlap in DE genes between post-treatment time points and/or specimen types was assessed using Venn diagrams and/or UpSet plots.

### 2.2.2 Determination of co-expressed gene clusters

Unsupervised multiscale bootstrap resampling as implemented in the *pvclust* R package (Version 2.0-0) was carried out for each specimen type and post-treatment time point to identify robust clusters of co-expressed genes with correlated  $\log_2$  fold change responses. Genes identified as DE for any post-treatment time point were included as part of this analysis. Bootstrap resampling was based on uncentered pearson correlation distances between  $\log_2$  fold change responses in combination with the complete linkage clustering algorithm using varying dataset sizes. For each dataset size bin, 1000 bootstrap samples were obtained, and *pvclust* bootstrap probabilities and unbiased p-values were calculated. An unbiased p-value cut-off of  $\geq 0.95$  was applied to determine significant clusters. The maximum distance to form a significant cluster was set to 0.5. Clusters that were formed at a larger distance were excluded. Gene cluster dendrograms were visualized and cluster information was tabulated. For gene clusters with correlated responses across all post-treatment time points (Day 1, Day 2, Day 3, Day 4, Day 5, Day 6, Day 7, Day 8, Day 9, Day 10), pre-treatment fold change time trends across all time points were provided.

### 2.2.3 Pathway enrichment analysis

Pathway enrichment analysis was carried out separately for specimen type and post-treatment time point using gene sets listed in **Table 49**. The enrichment analysis was conducted using the *GOseq* software (Version 1.28.0) which adjusts for RNA-Seq gene length bias. Gene length information was obtained from the Ensembl database using the *biomaRt* R package (Version 2.32.1, Ensembl Version 87). Gene length was defined as the length of the longest transcript per gene including untranslated regions and coding sequence. *GOseq* probability weighting functions were estimated for each specimen type and post-treatment time point based on the respective DE gene results. Null distributions were estimated using *GOseq*'s random sampling option ( $10^4$  randomizations were applied). To account for testing multiple gene sets,

gene sets with a FDR-adjusted p-value  $< 0.1$  were considered to be significantly enriched. In addition, the Jaccard index (to assess agreement between DE genes and gene sets) and enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ) for each gene set was calculated. Pathway enrichment trends over time were visualized using heatmap and radar plots. Overlap in enriched pathways between post-treatment time points and/or specimen types was assessed using Venn diagrams and/or UpSet plots.

## 2.3 Software

Data was analyzed using the *R statistical programming language* (version 3.4.1 (2017-06-30)) and *R Bioconductor* packages. This report was generated using the *knitr* R package (Version 1.17) and *LaTeX* typesetting software (Version TeX Live 2012/Debian). The operating used was *Ubuntu* (Version 16.04.2 LTS). Additional software along with version information is listed in the respective method sections and in **Table 134**.

# 3 Results

## 3.1 Figures



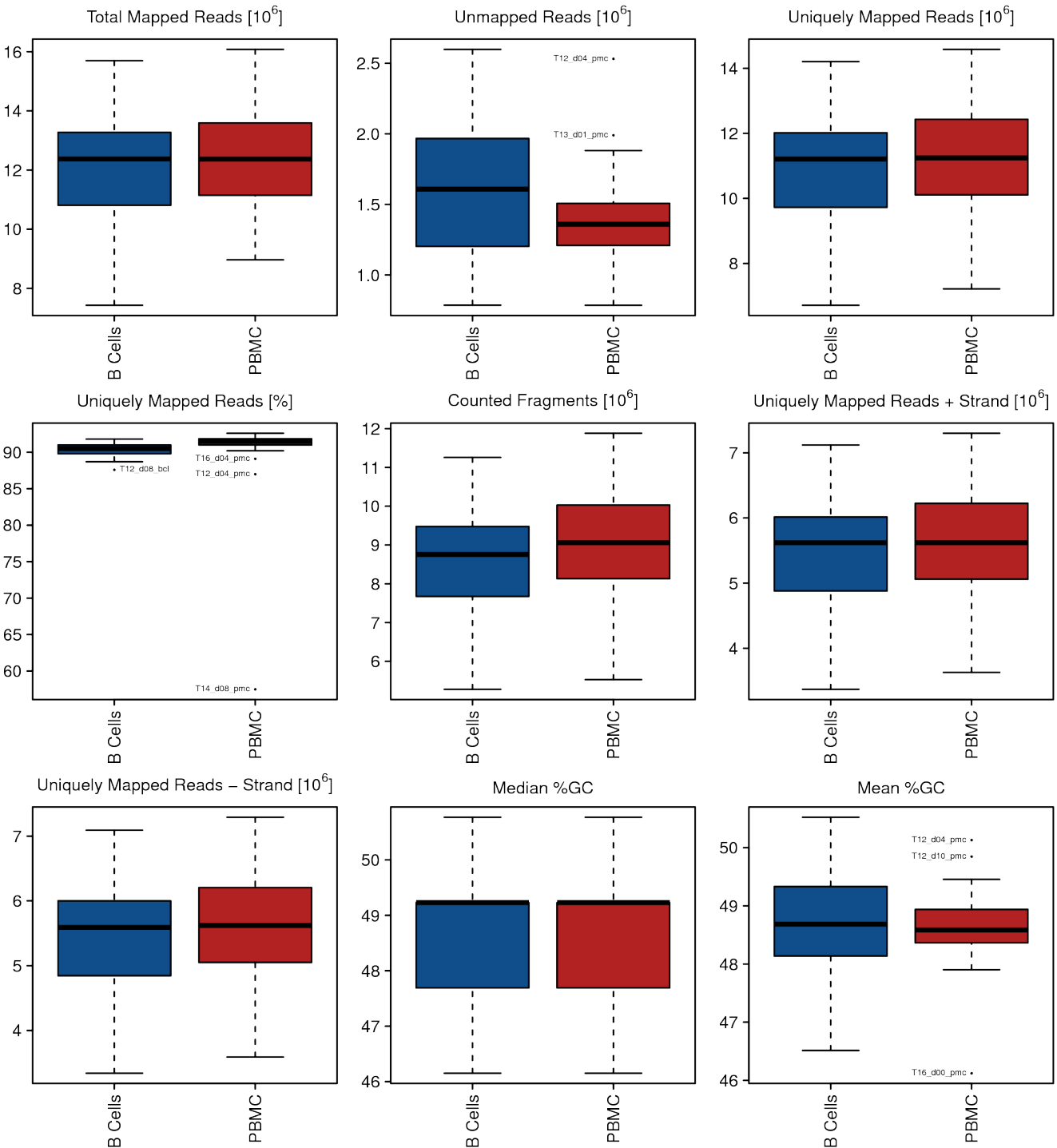


Figure 1: Boxplots of human reference genome alignment genome statistics (All specimen types).

# B Cells

## Reference Alignment Statistics

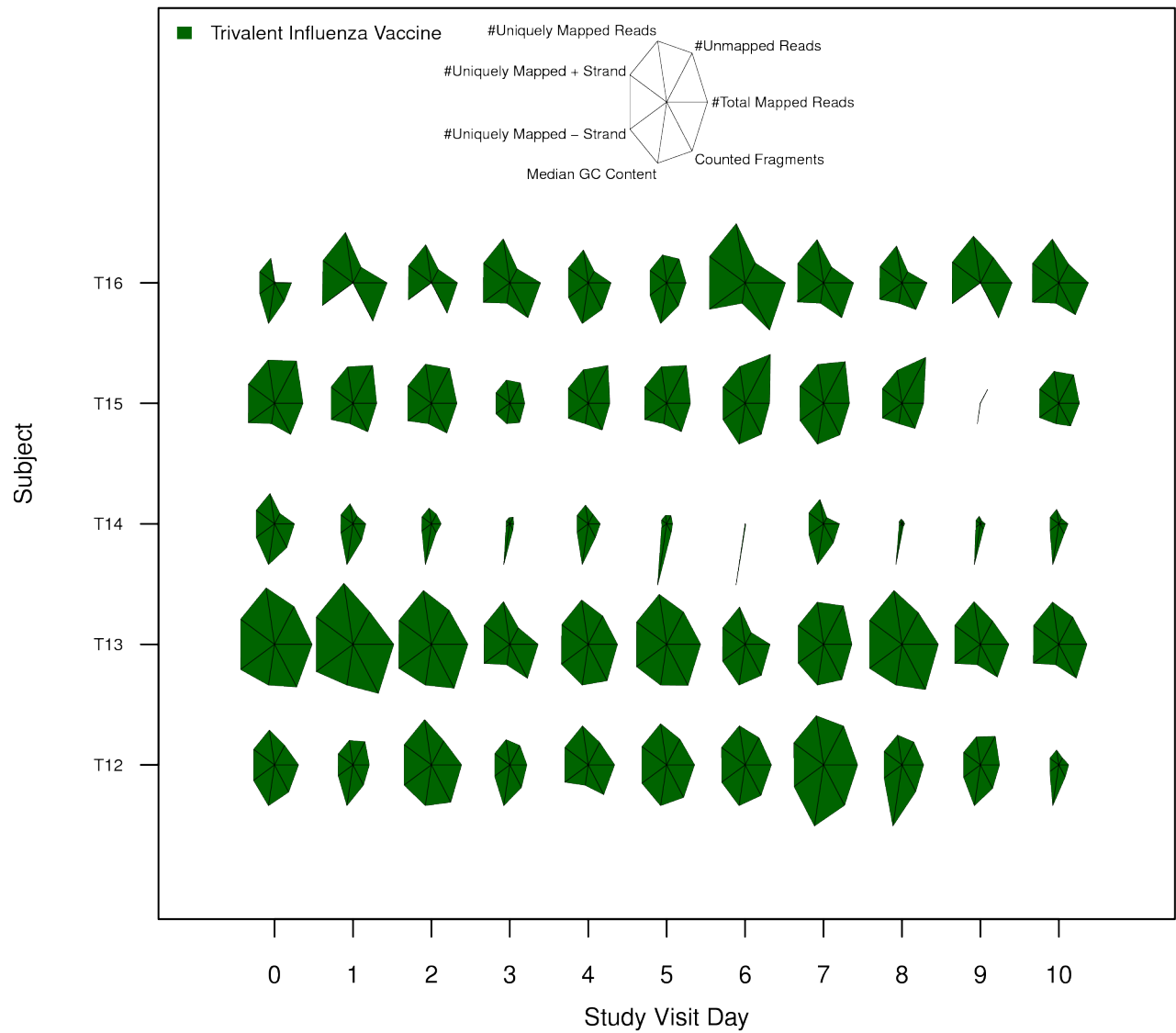


Figure 2: Starplots of human reference genome alignment statistics (B Cells).

# PBMC

## Reference Alignment Statistics

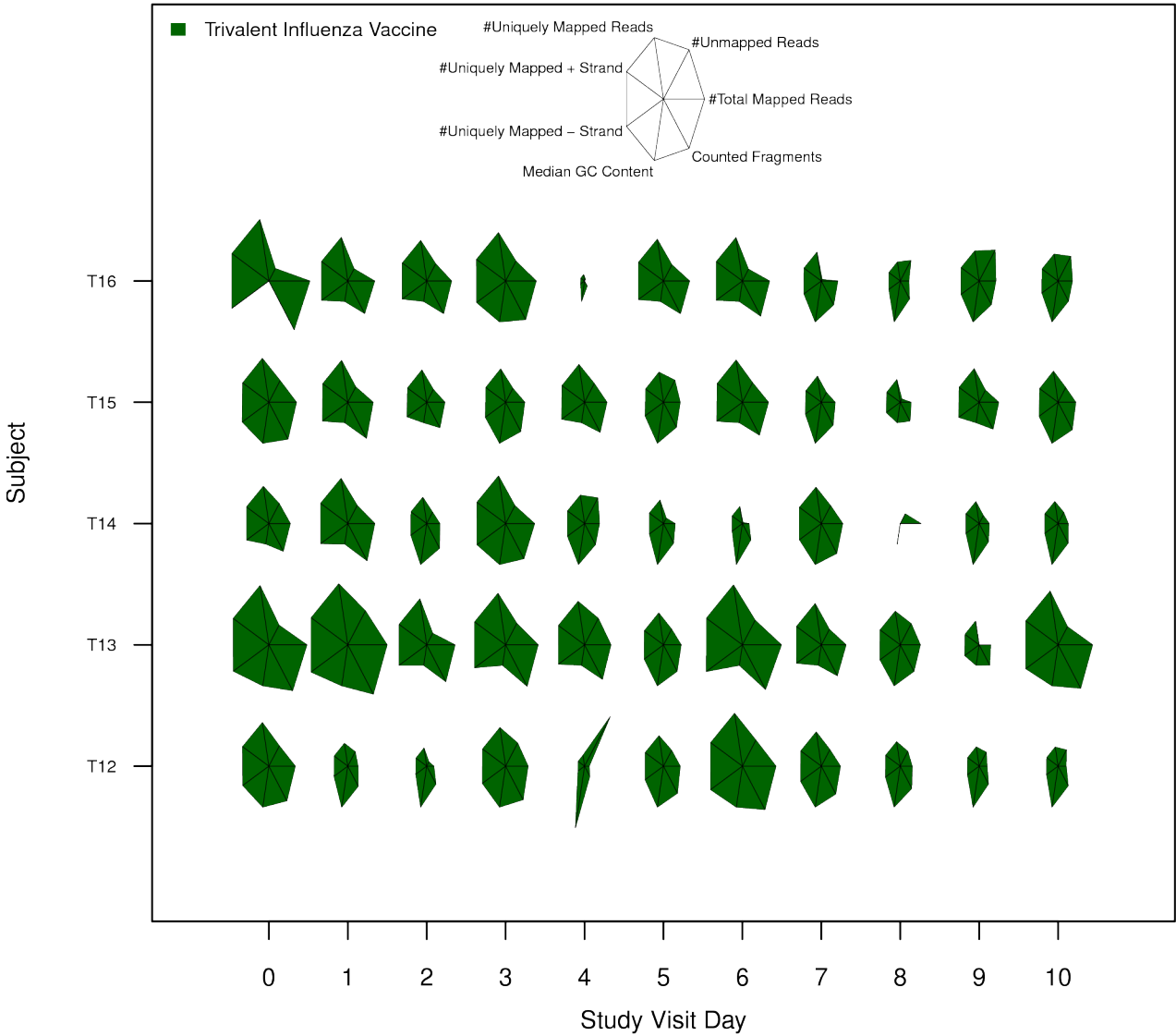


Figure 3: Starplots of human reference genome alignment statistics (PBMC).

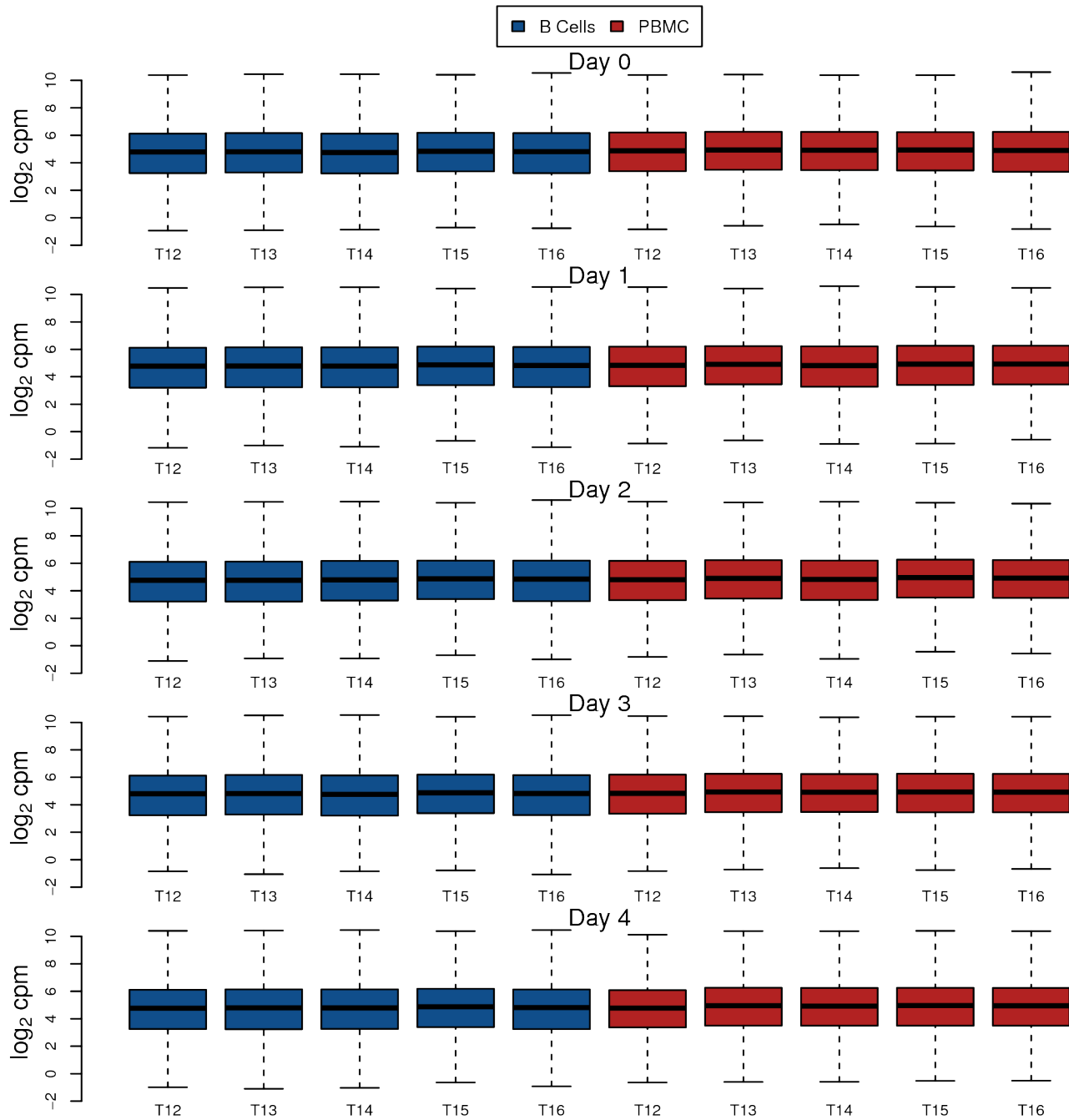


Figure 4: Boxplots of  $\log_2$  counts per million before TMM normalization 1 of 3 (All specimen types).

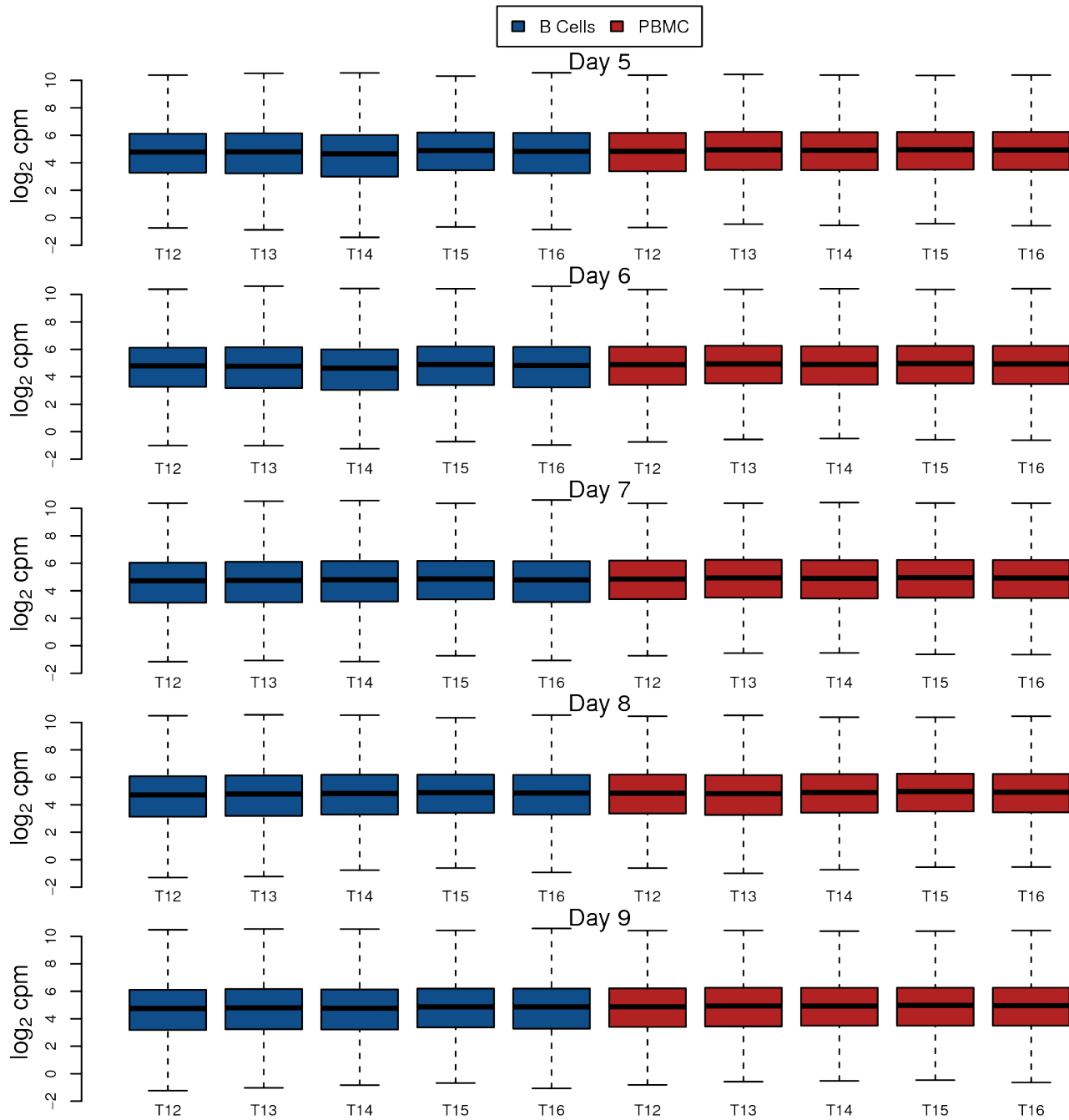


Figure 5: Boxplots of  $\log_2$  counts per million before TMM normalization 2 of 3 (All specimen types).

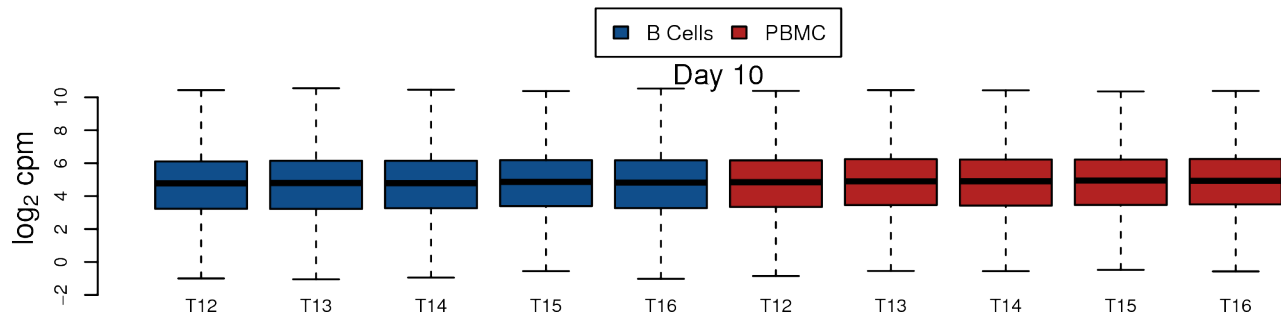


Figure 6: Boxplots of  $\log_2$  counts per million before TMM normalization 3 of 3 (All specimen types).

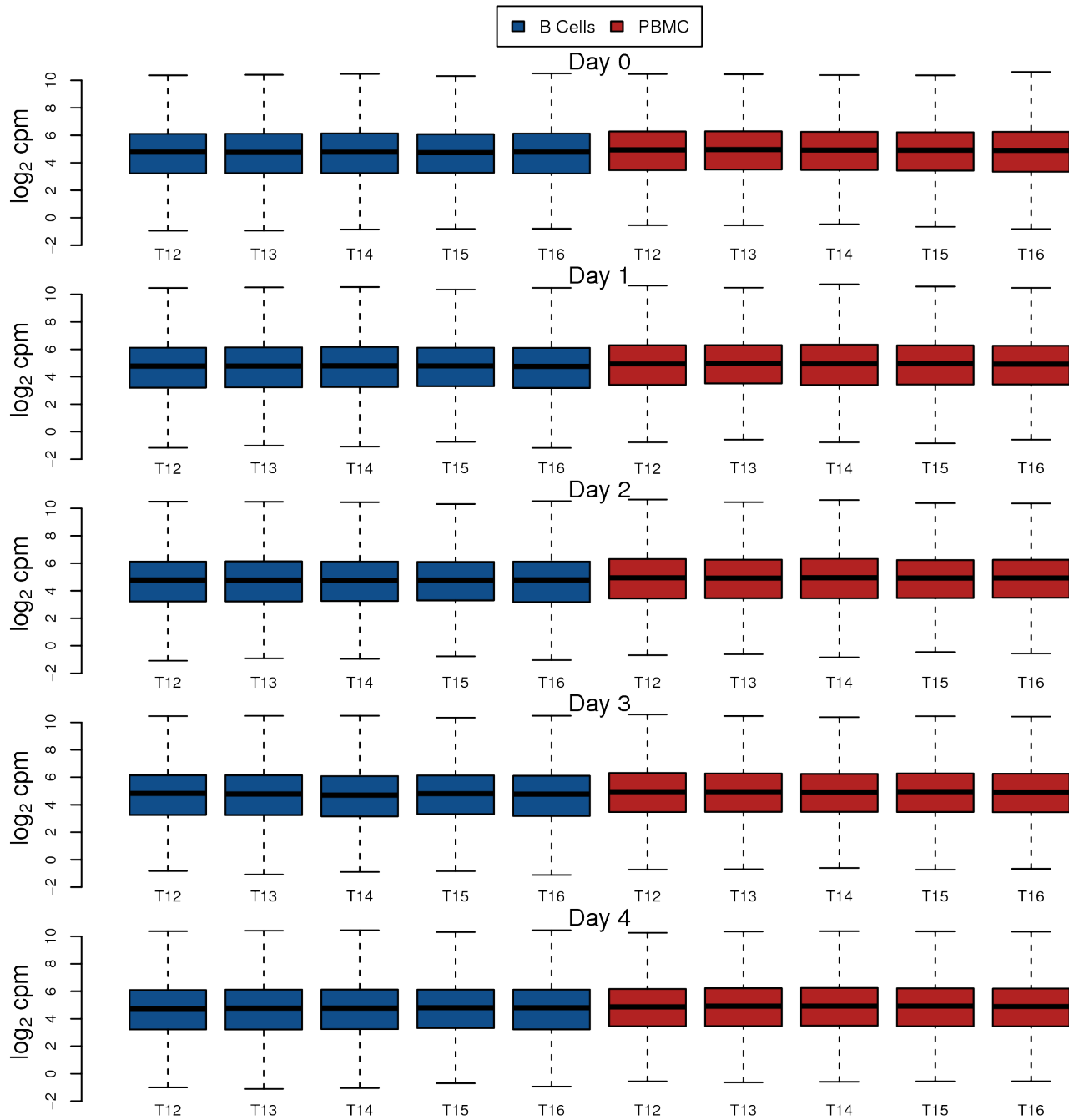


Figure 7: Boxplots of  $\log_2$  counts per million after TMM normalization 1 of 3 (All specimen types).

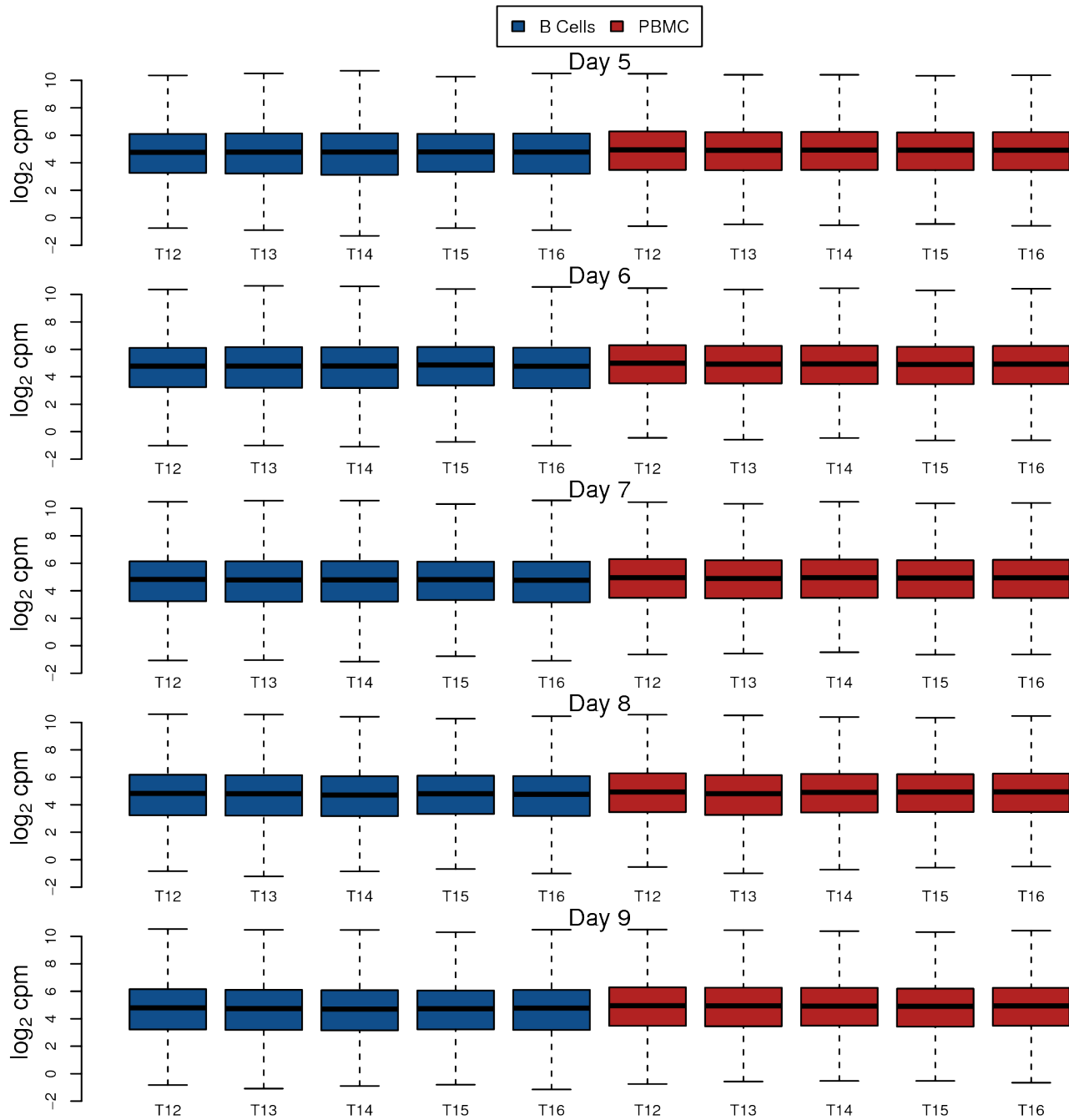


Figure 8: Boxplots of  $\log_2$  counts per million after TMM normalization 2 of 3 (All specimen types).



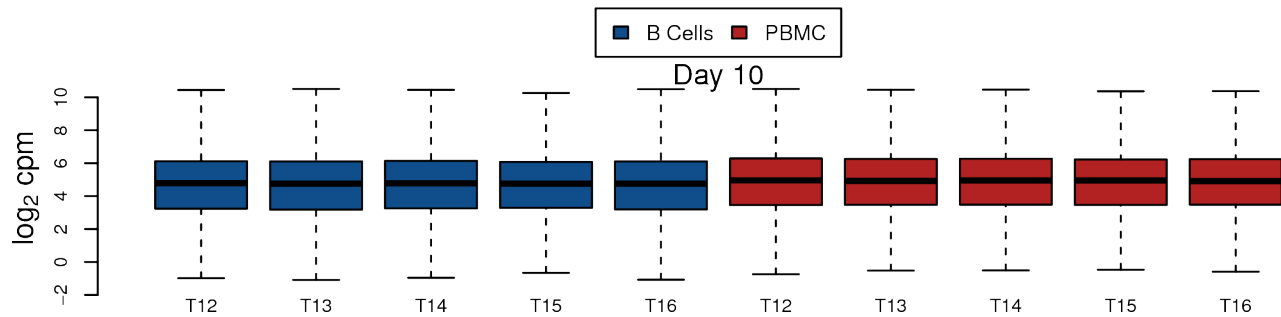
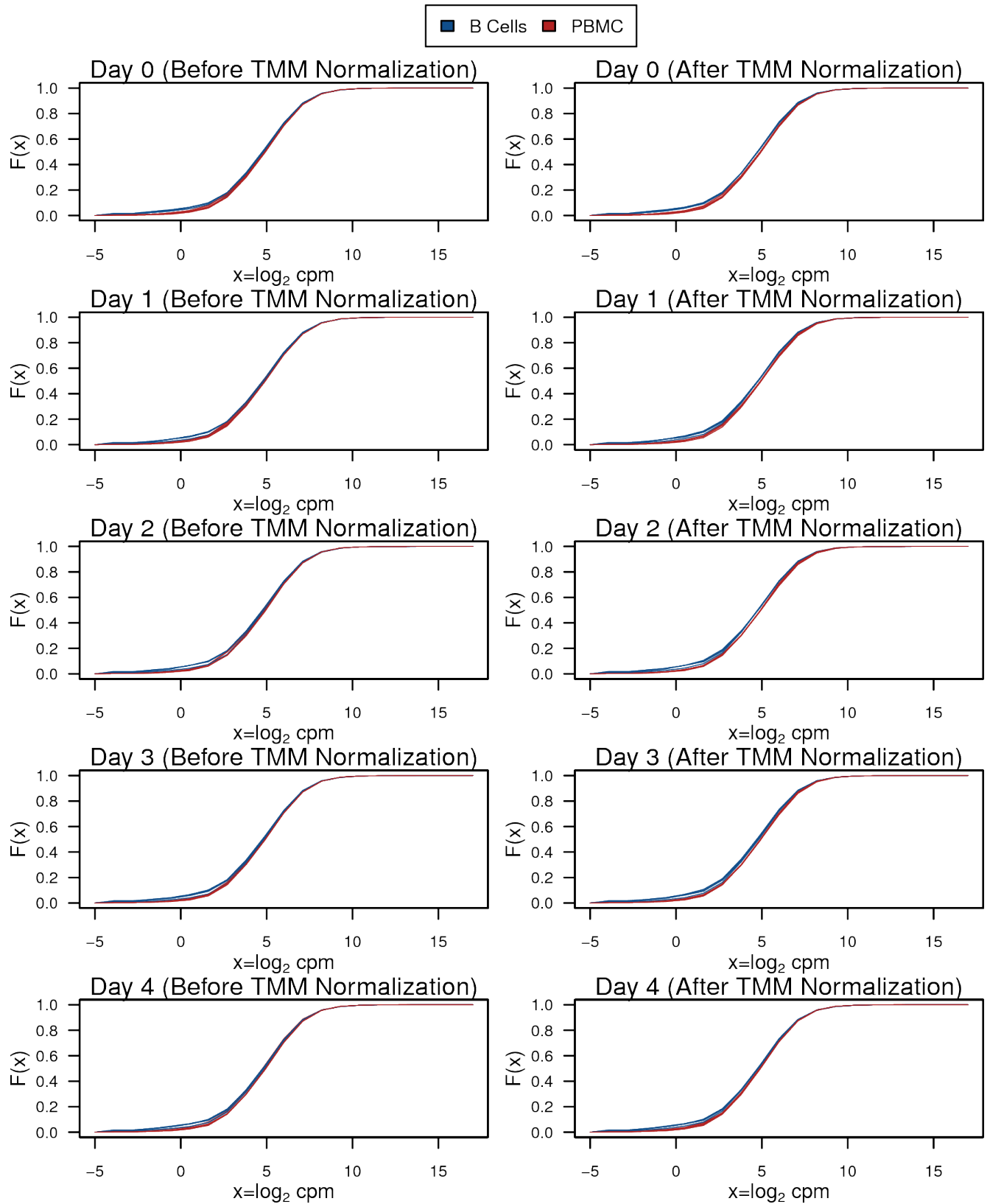
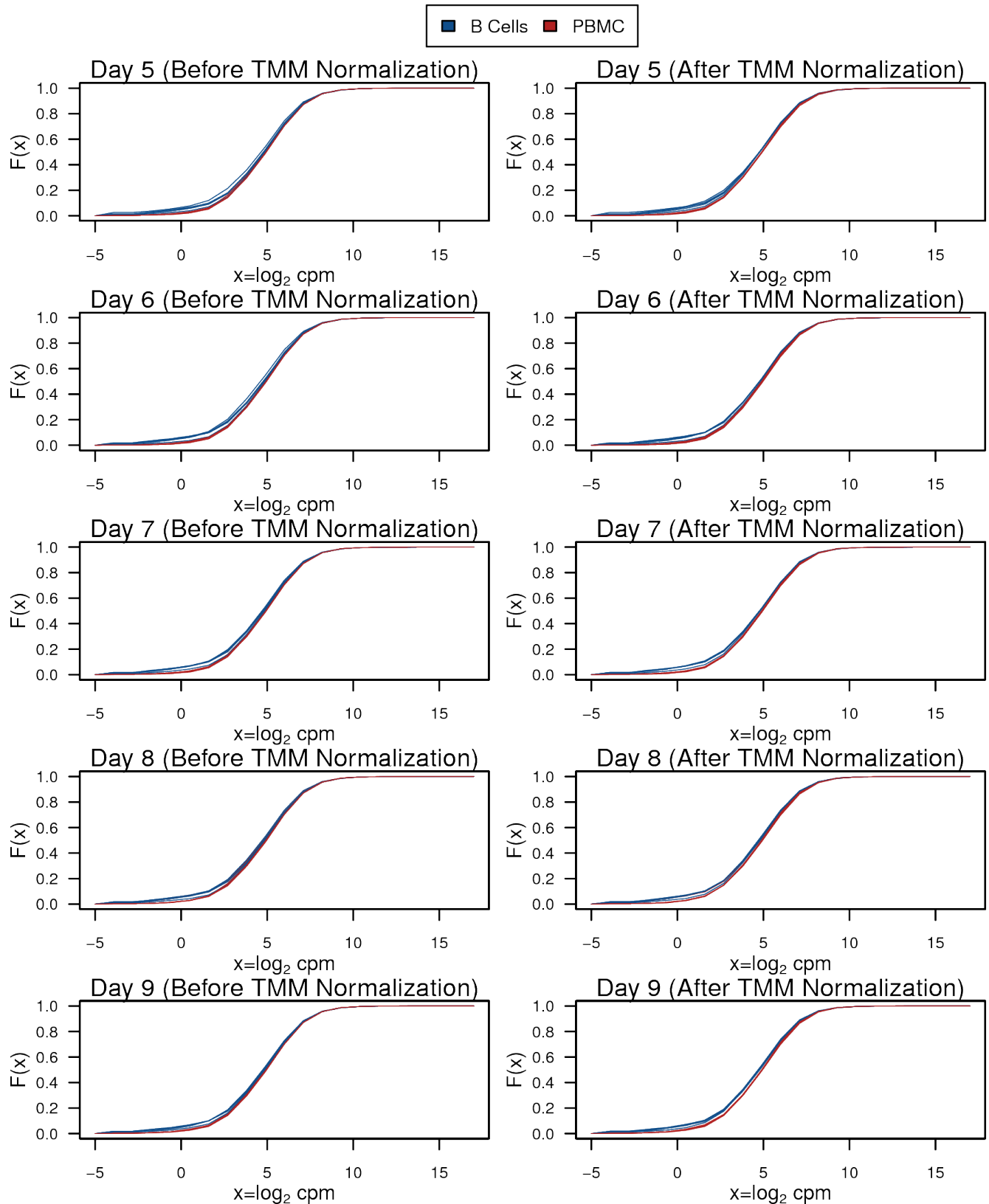


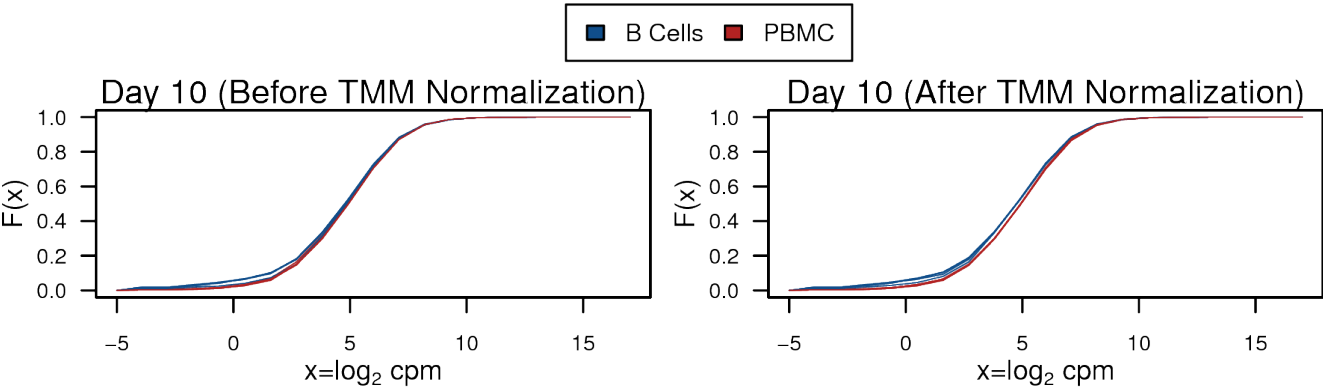
Figure 9: Boxplots of  $\log_2$  counts per million after TMM normalization 3 of 3 (All specimen types).



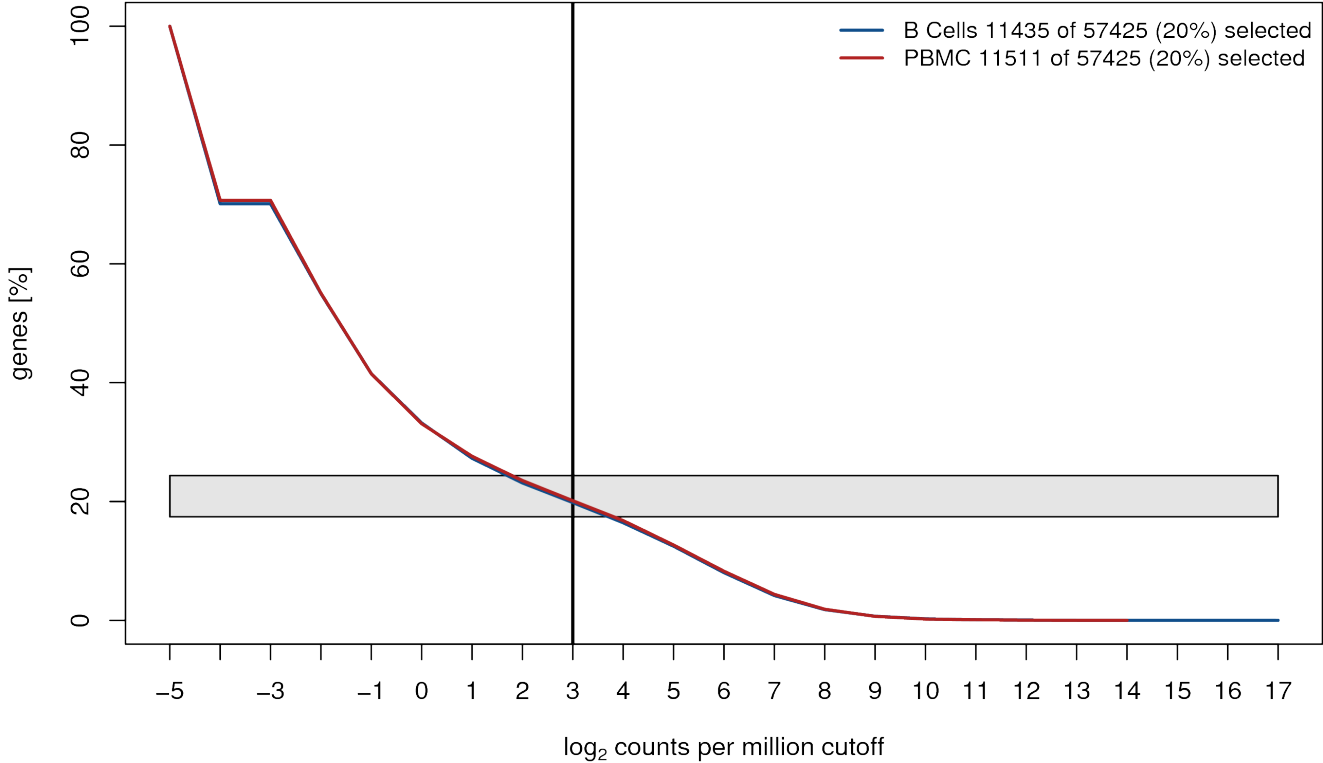
**Figure 10:** Empirical cumulative distribution function plots of  $\log_2$  counts per million before and after TMM normalization 1 of 3 (All specimen types).



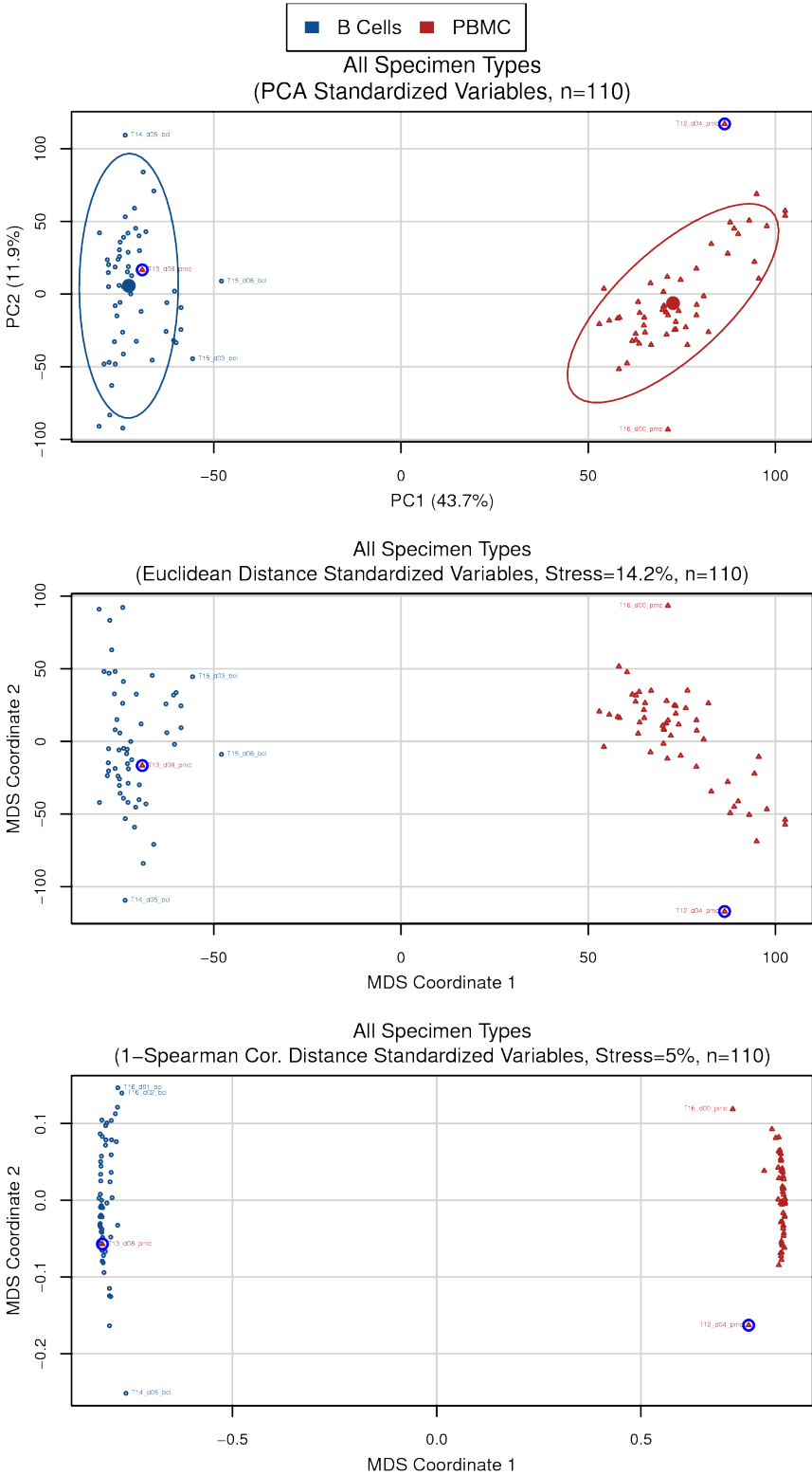
**Figure 11:** Empirical cumulative distribution function plots of  $\log_2$  counts per million before and after TMM normalization 2 of 3 (All specimen types).



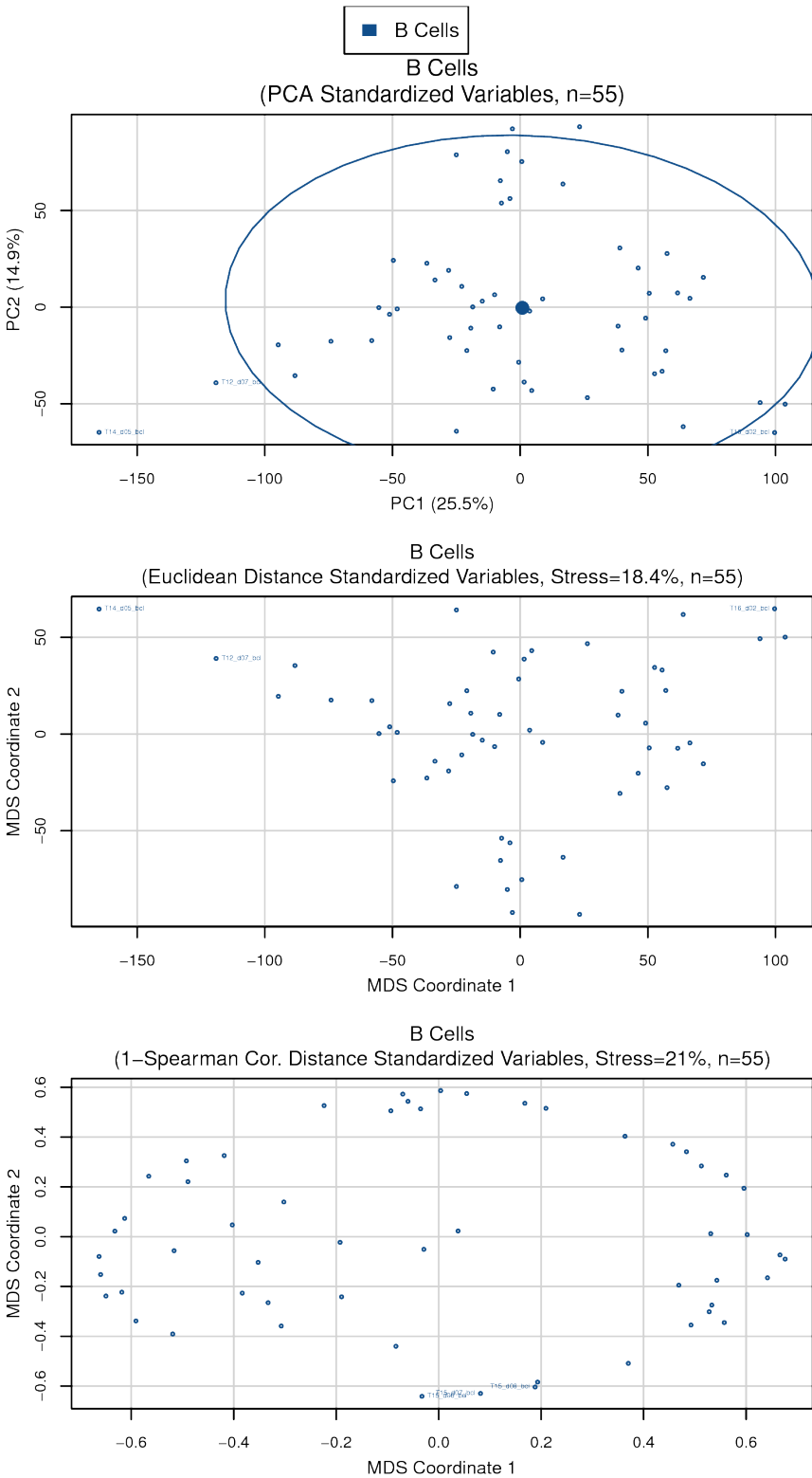
**Figure 12:** Empirical cumulative distribution function plots of  $\log_2$  counts per million before and after TMM normalization 3 of 3 (All specimen types).



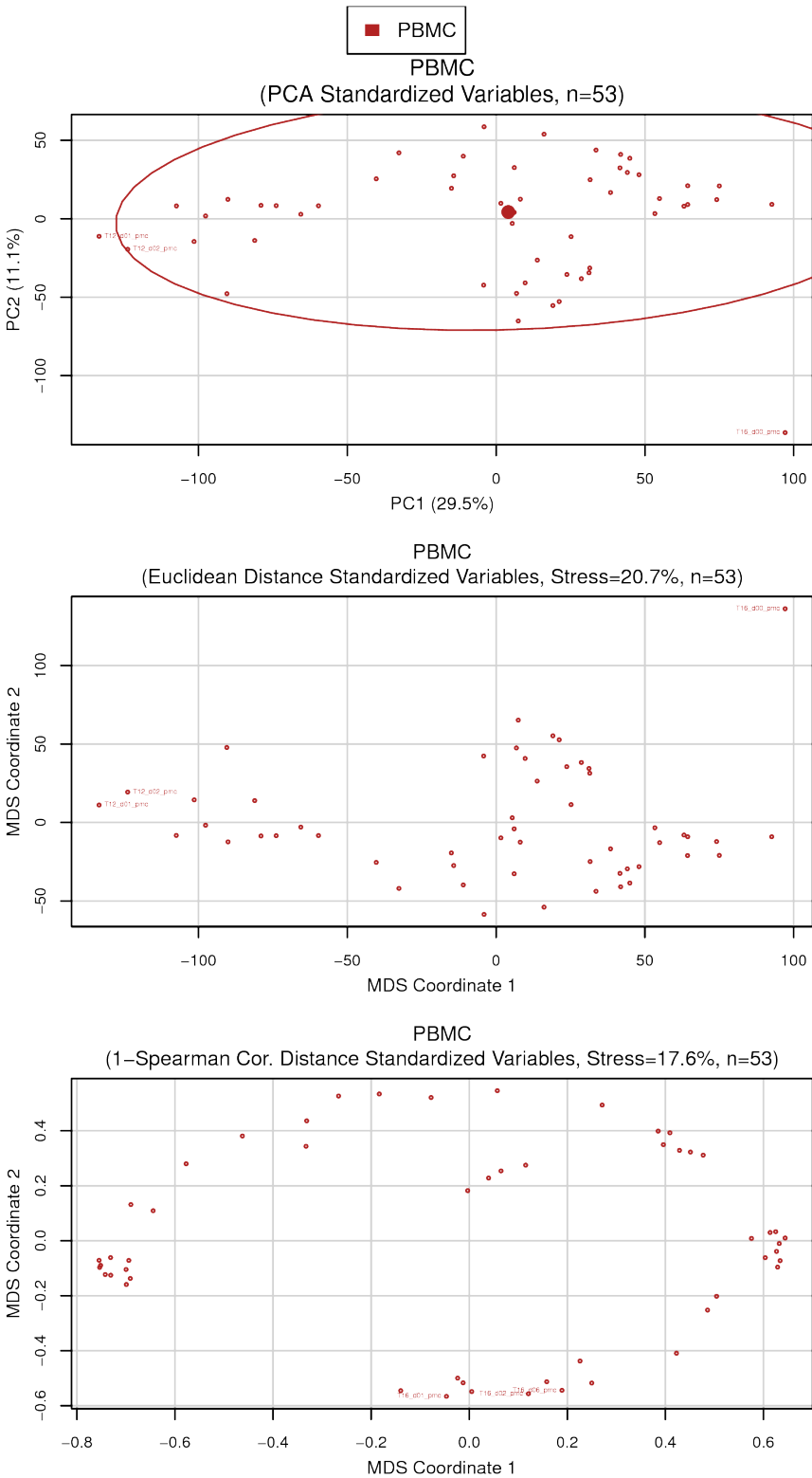
**Figure 13:** Reverse empirical cumulative distribution function plots of maximum gene expression levels across study samples (All specimen types). The x-axis represents the  $\log_2$  count per million cut off for identifying lowly expressed genes. The y-axis shows the percentage of all genes whose maximum gene expression level across all study samples exceeds the respective cut off. The grey box indicates the target range of genes to be selected (between 10000 and 14000 genes). The black vertical lines represent the specified cut off (3  $\log_2$  counts per million).



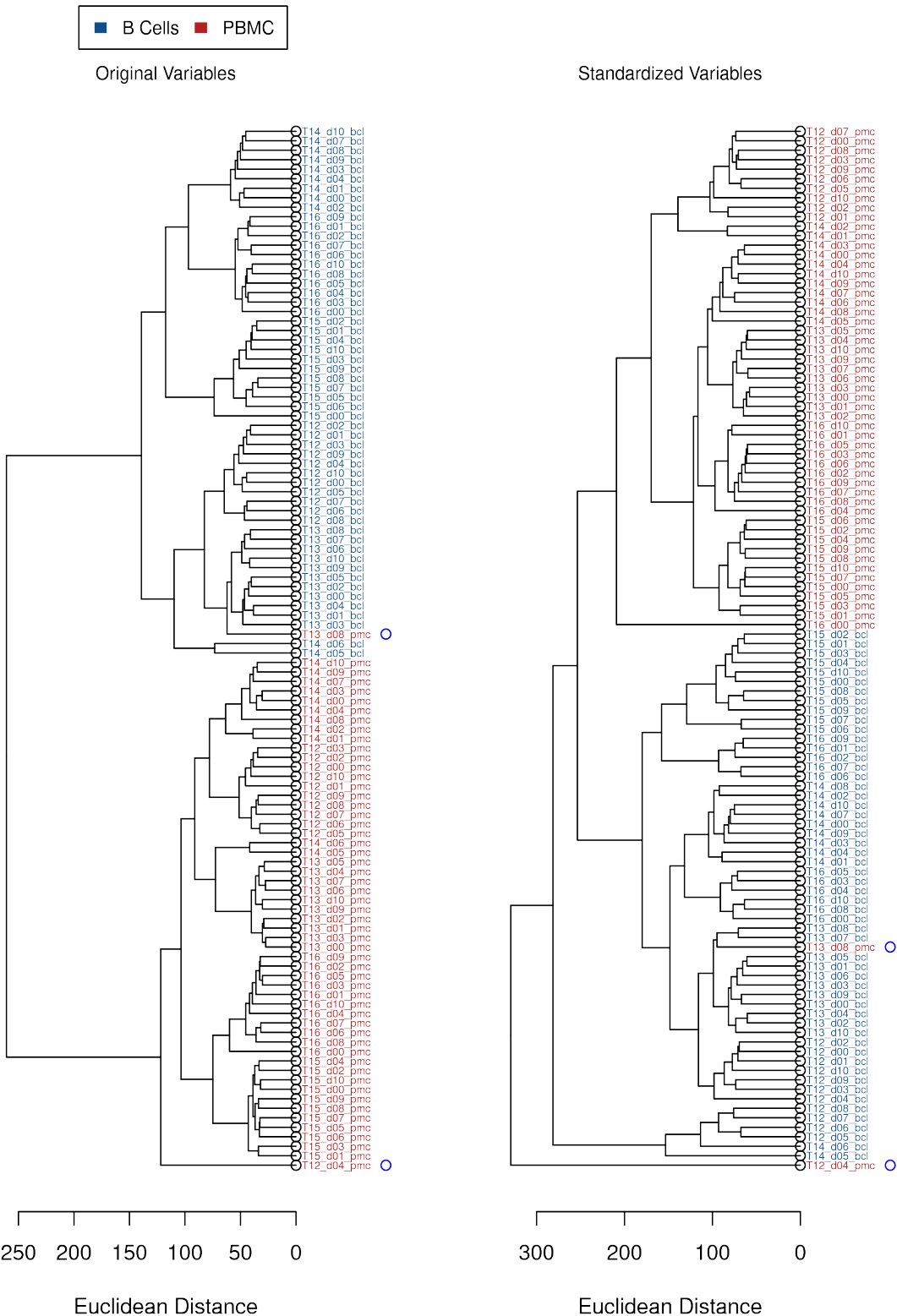
**Figure 14:** PCA and non-metric multidimensional scaling biplots (All Specimen Types). PCA biplots with bivariate 95% confidence ellipses for standardized variables are shown at the top. Non-metric MDS results for standardized variables and pairwise differences based on Euclidean distance are shown in the middle. Non-metric MDS results for original variables based on 1-Spearman correlation distance are shown at the bottom. Labels for the four most outlying samples per laboratory based on maximum Mahalanobis distance are shown. Strong outliers are highlighted in blue.



**Figure 15:** PCA and non-metric multidimensional scaling biplots (B Cells). PCA biplots with bivariate 95% confidence ellipses for standardized variables are shown at the top. Non-metric MDS results for standardized variables and pairwise differences based on Euclidean distance are shown in the middle. Non-metric MDS results for original variables based on 1-Spearman correlation distance are shown at the bottom. Labels for the four most outlying samples per laboratory based on maximum Mahalanobis distance are shown. Strong outliers are highlighted in blue.

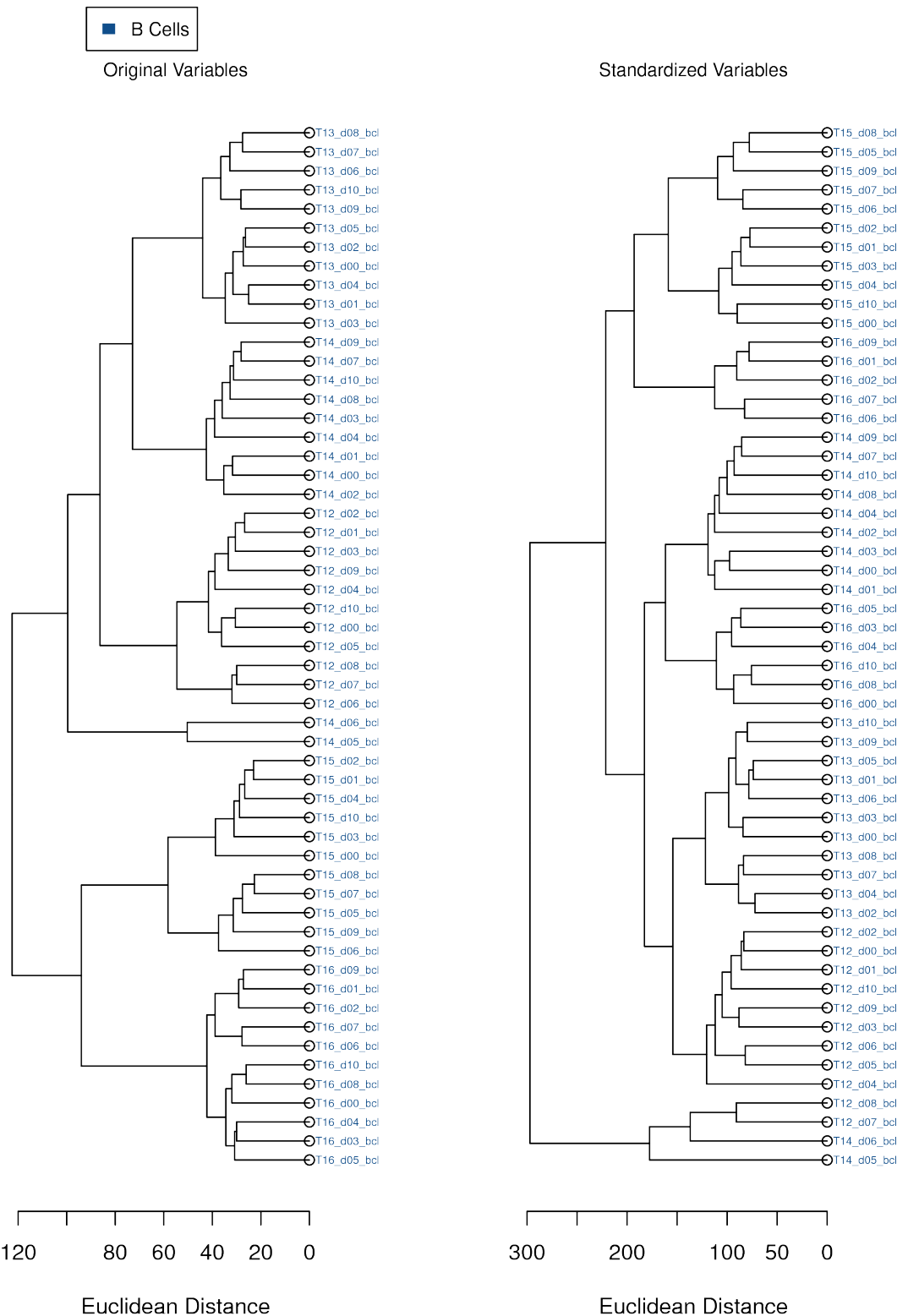


**Figure 16:** PCA and non-metric multidimensional scaling biplots (PBMC). PCA biplots with bivariate 95% confidence ellipses for standardized variables are shown at the top. Non-metric MDS results for standardized variables and pairwise differences based on Euclidean distance are shown in the middle. Non-metric MDS results for original variables based on 1-Spearman correlation distance are shown at the bottom. Labels for the four most outlying samples per laboratory based on maximum Mahalanobis distance are shown. Strong outliers are highlighted in blue.

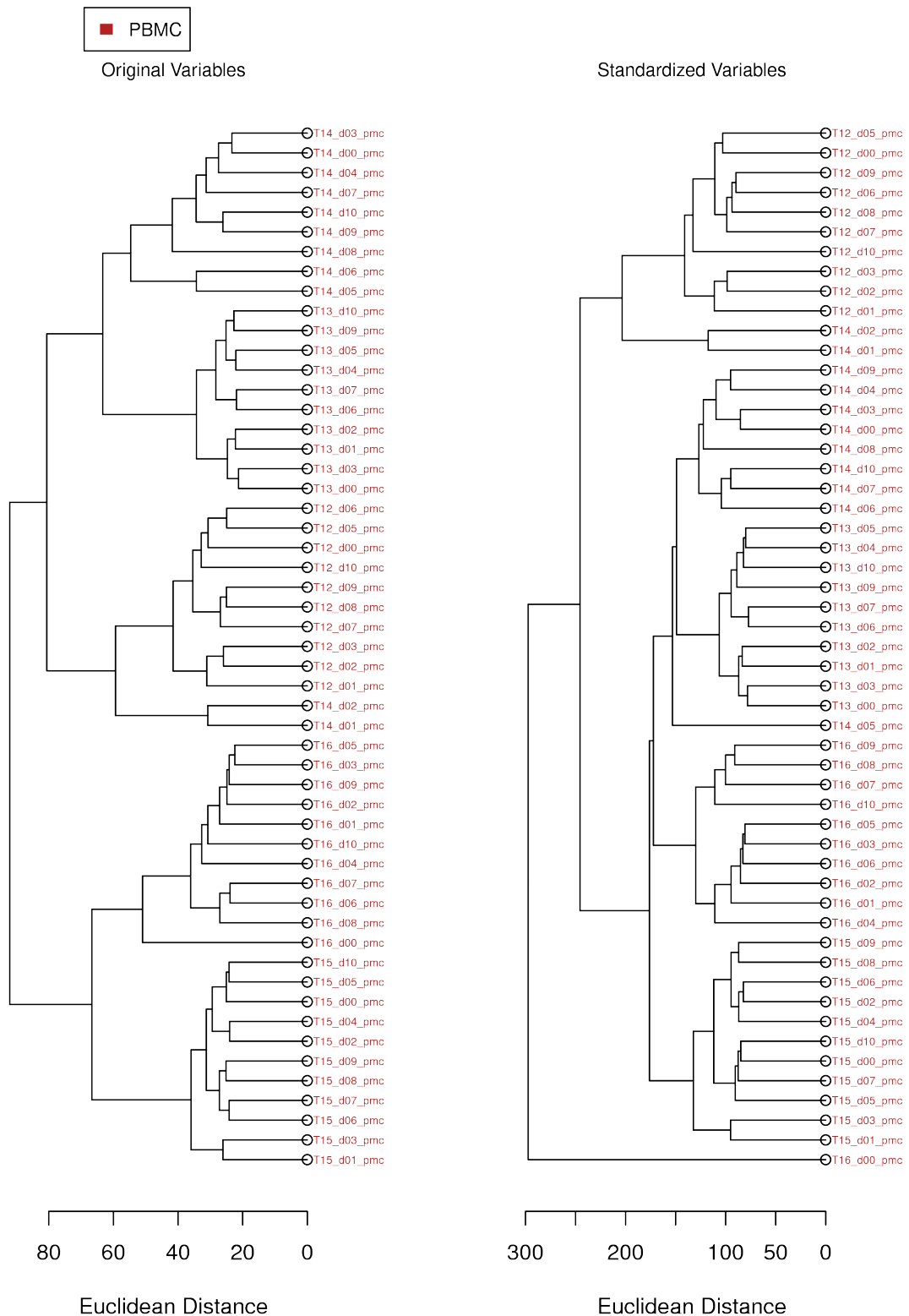


**Figure 17:** Hierarchical clustering plots (All Specimen Types). Euclidean distances hierarchically clustered using the complete linkage clustering algorithm. Outliers are marked by a blue circle next to the sample ID.

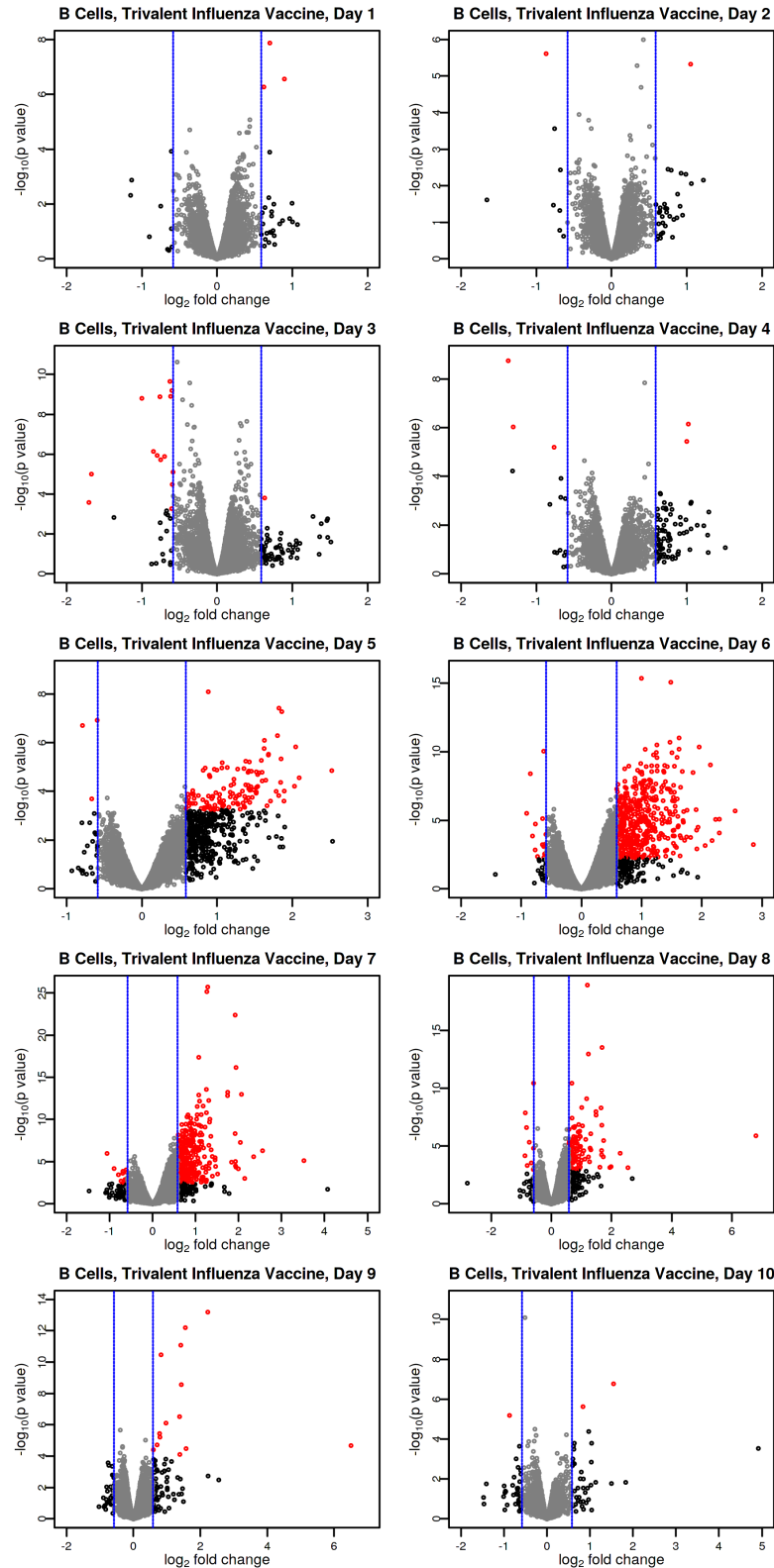




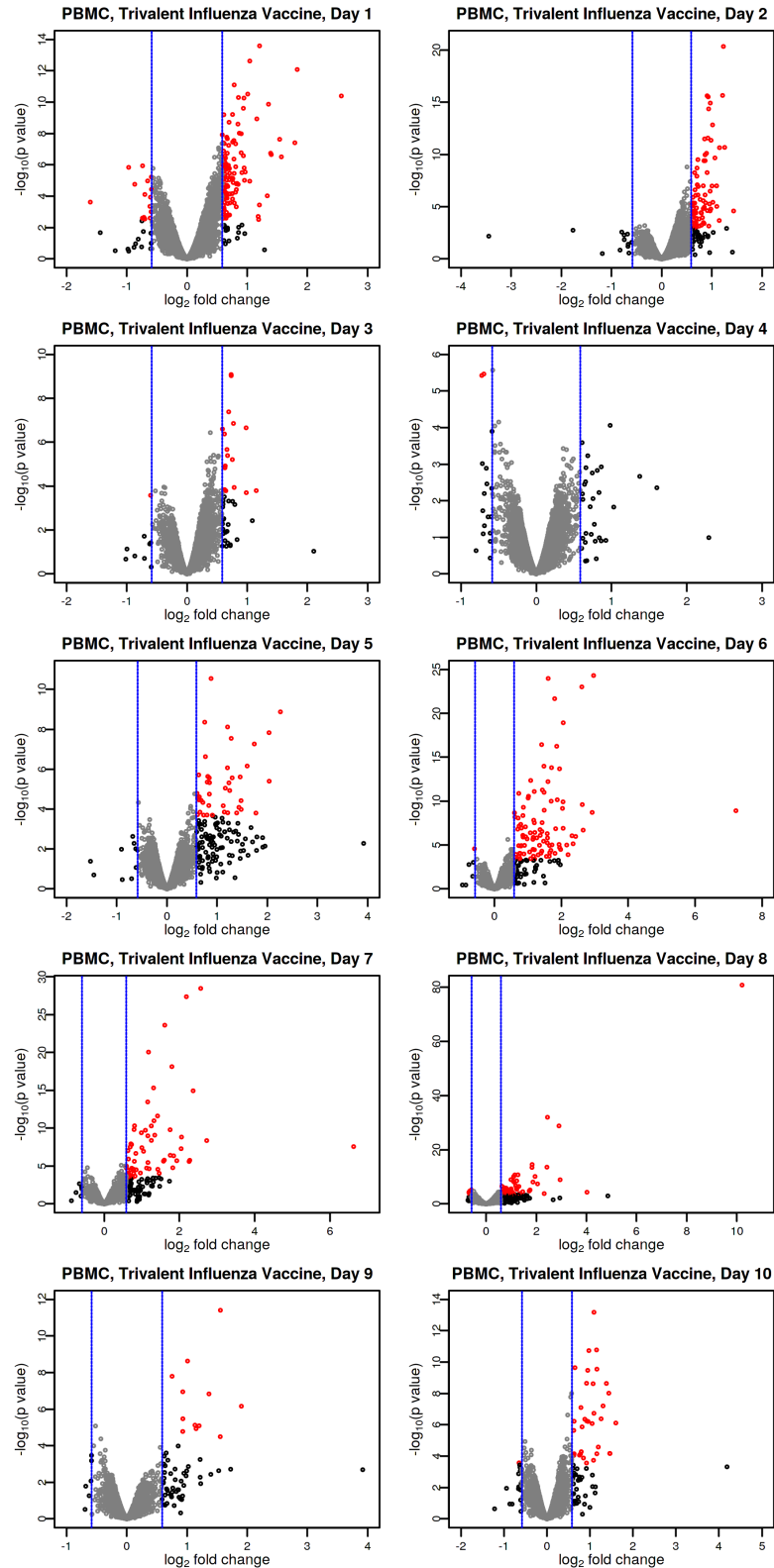
**Figure 18:** Hierarchical clustering plots (B Cells). Euclidean distances hierarchically clustered using the complete linkage clustering algorithm. Outliers are marked by a blue circle next to the sample ID.



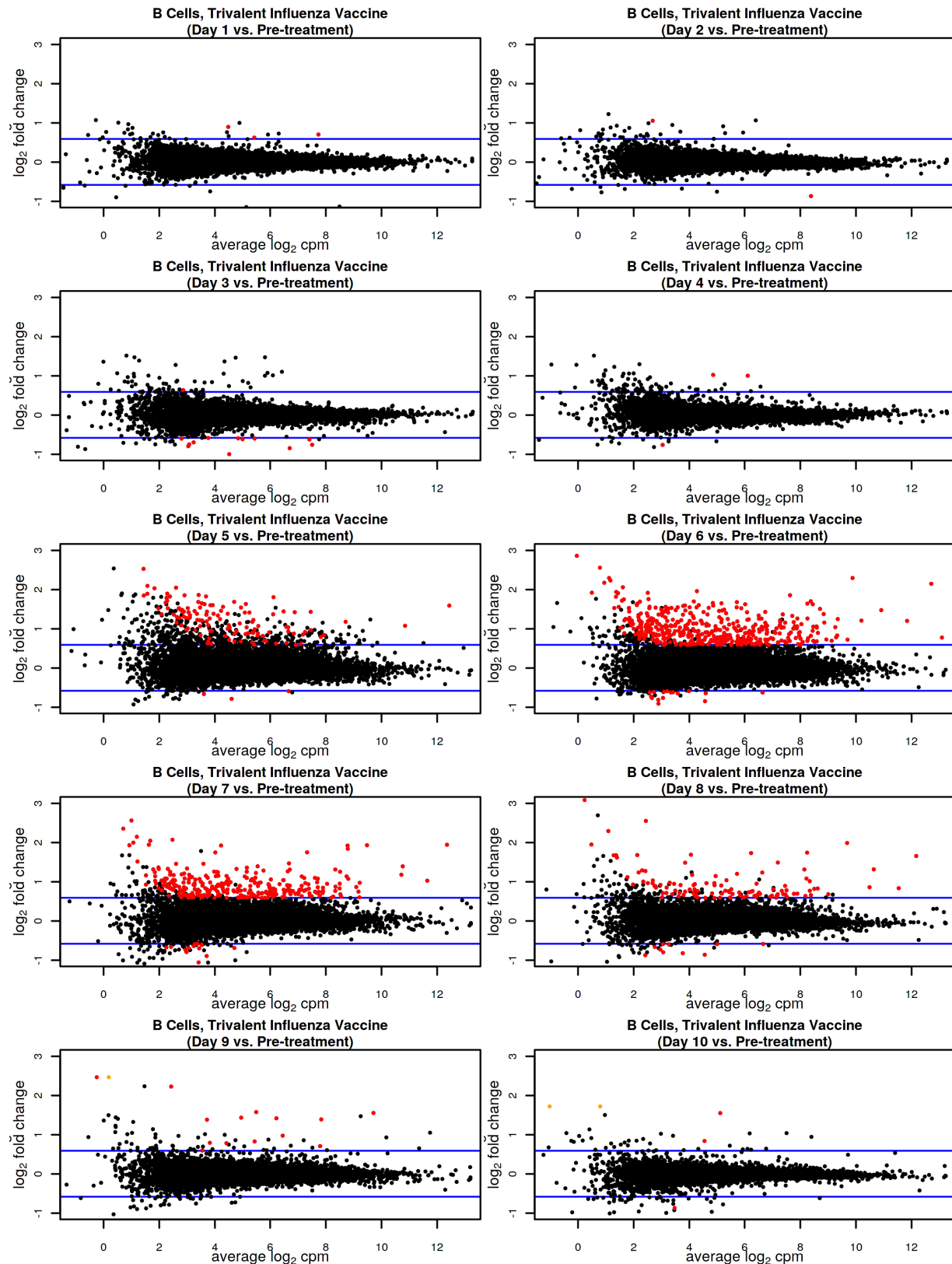
**Figure 19:** Hierarchical clustering plots (PBMC). Euclidean distances hierarchically clustered using the complete linkage clustering algorithm. Outliers are marked by a blue circle next to the sample ID.



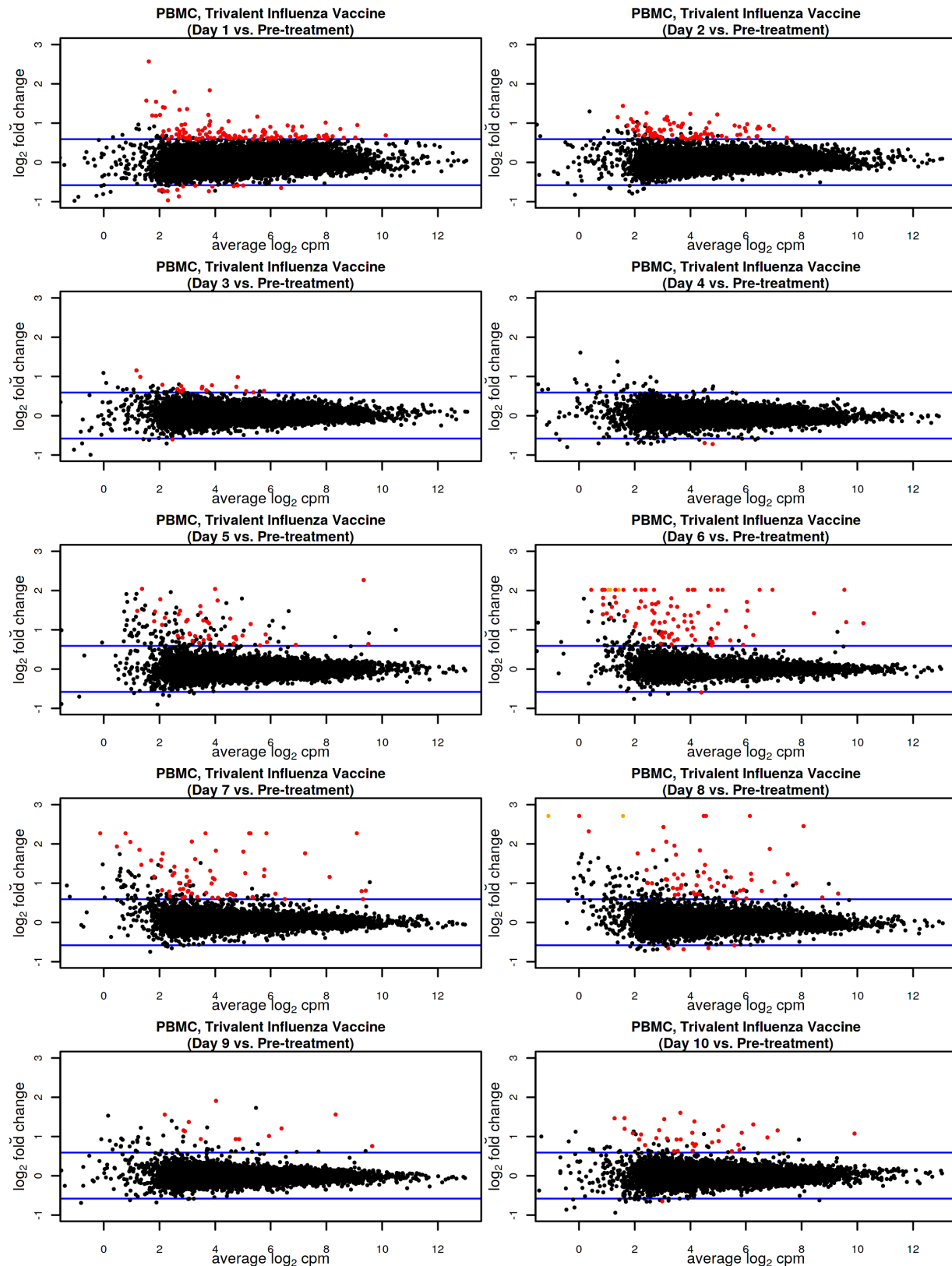
**Figure 20:** Volcano plots (Trivalent Influenza Vaccine, B Cells). In red: DE genes; in grey: genes that did not pass the fold change cut offs; in black: genes that passed the fold change cut off but were not DE.



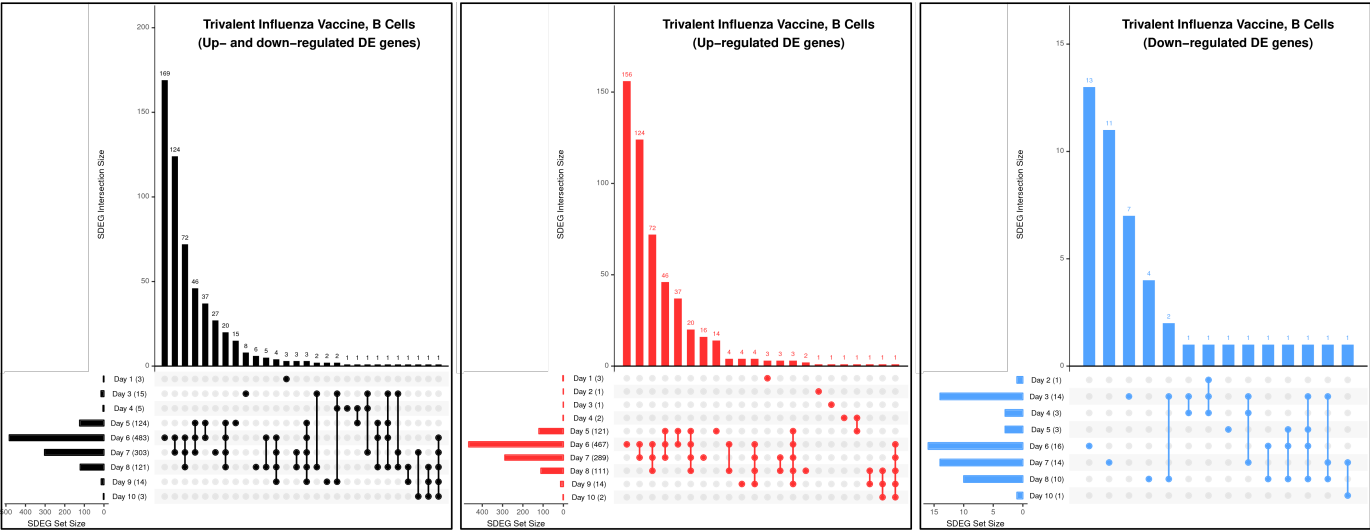
**Figure 21:** Volcano plots (Trivalent Influenza Vaccine, PBMC). In red: DE genes; in grey: genes that did not pass the fold change cut offs; in black: genes that passed the fold change cut off but were not DE.



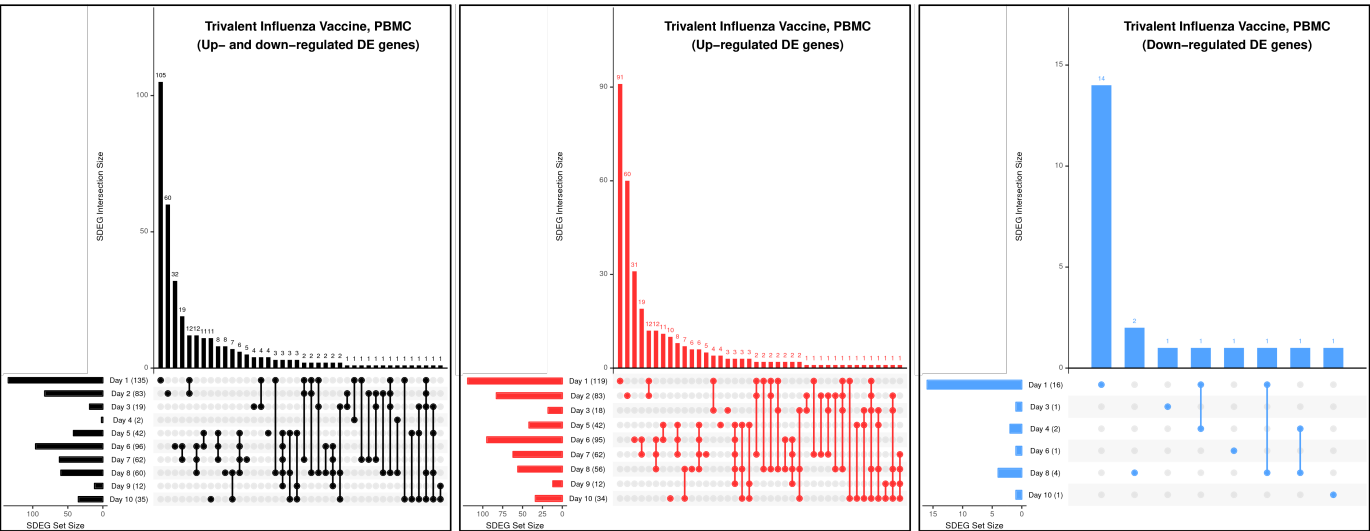
**Figure 22:** MA plot (B Cells). Average  $\log_2$  counts per million is displayed on the x-axis, the y-axis shows average  $\log_2$  fold change from pre-treatment. Blue lines indicate the pre-specified minimum fold change cut off. DE genes are colored in red. Top optimize the visualization, the largest and smallest 0.1% of  $\log_2$ FC observations are not included ( $0.1\% < x < 99.9\%$ ).



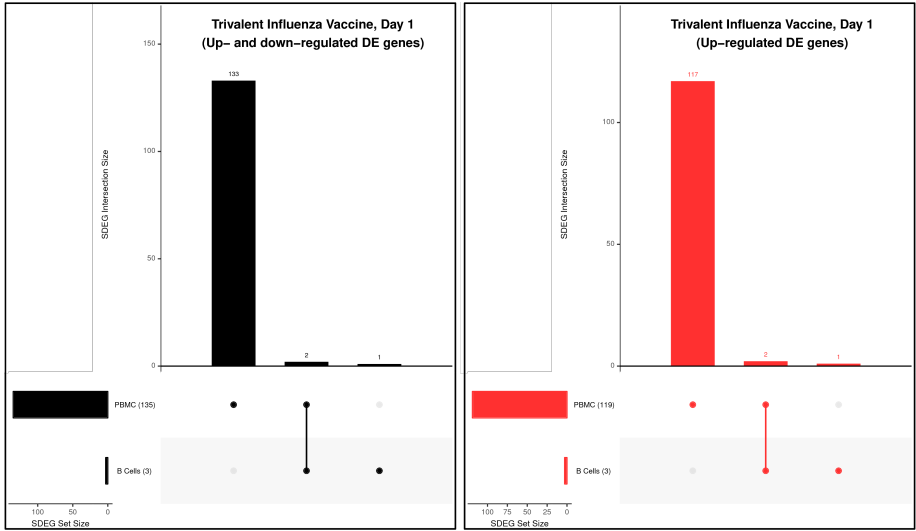
**Figure 23:** MA plot (PBMC). Average  $\log_2$  counts per million is displayed on the x-axis, the y-axis shows average  $\log_2$  fold change from pre-treatment. Blue lines indicate the pre-specified minimum fold change cut off. DE genes are colored in red. Top optimize the visualization, the largest and smallest 0.1% of logFC observations are not included ( $0.1\% < x < 99.9\%$ ).



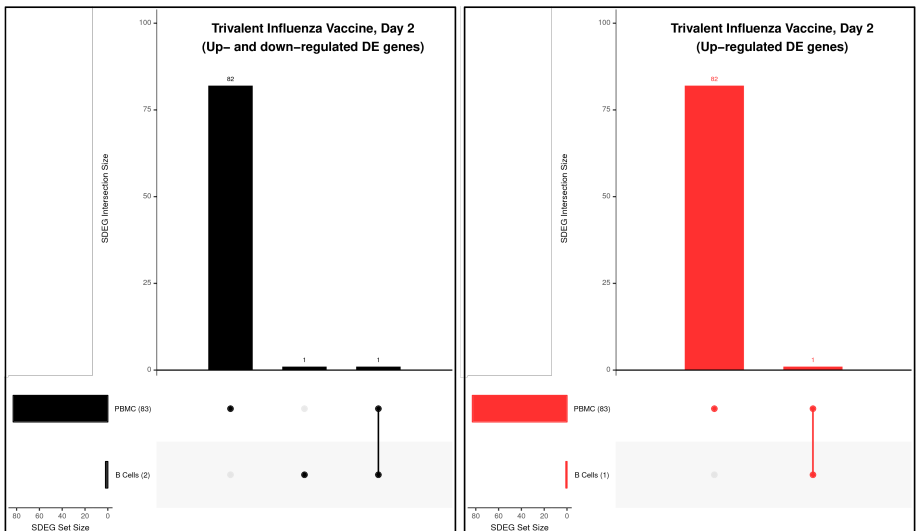
**Figure 24:** UpSet plots summarizing overlap in DE genes between post-treatment time points (B Cells, Trivalent Influenza Vaccine). In red: up-regulated compared to pre-treatment, in blue: down-regulated compared to pre-treatment.



**Figure 25:** UpSet plots summarizing overlap in DE genes between post-treatment time points (PBMC, Trivalent Influenza Vaccine). In red: up-regulated compared to pre-treatment, in blue: down-regulated compared to pre-treatment.

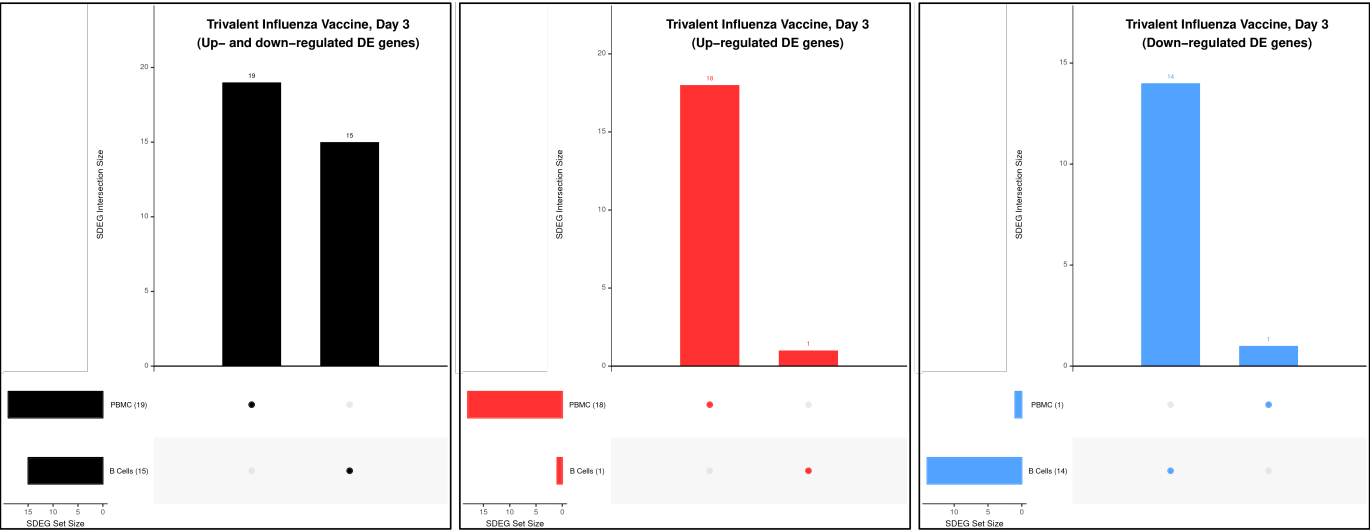


**Figure 26:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 1). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.

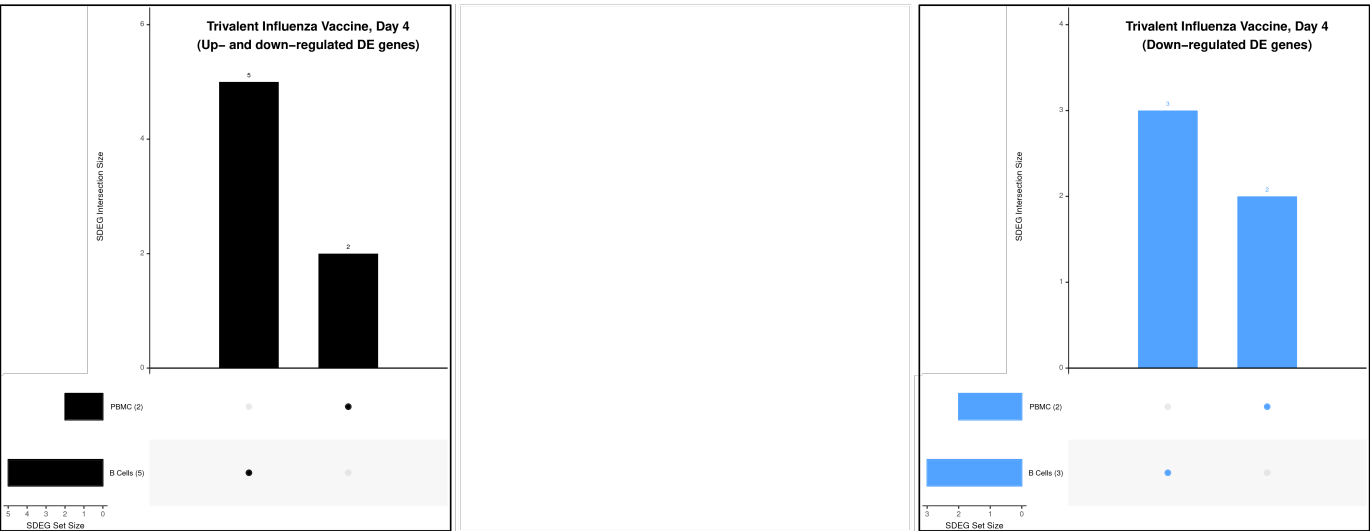


**Figure 27:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 2). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.

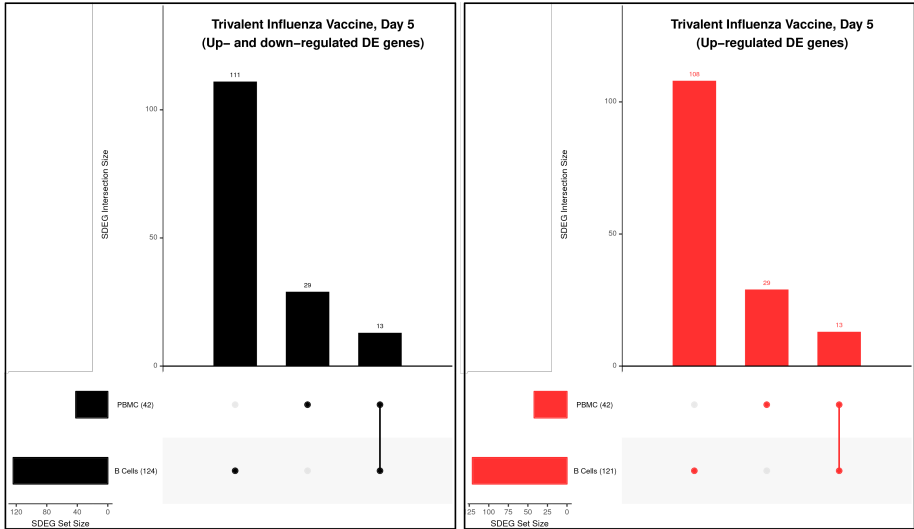




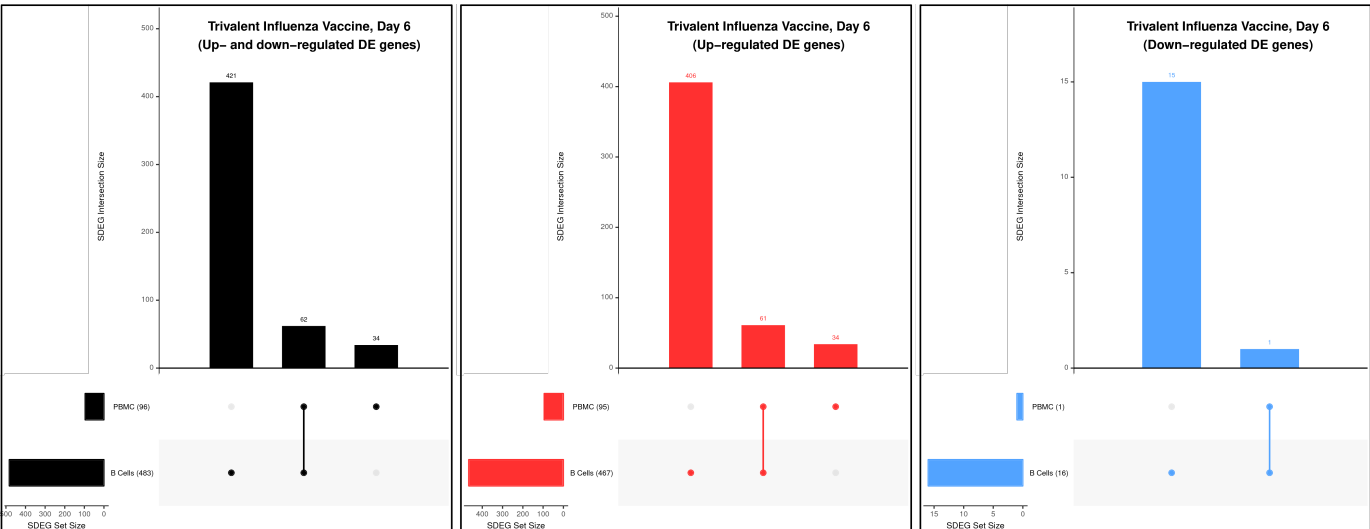
**Figure 28:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 3). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



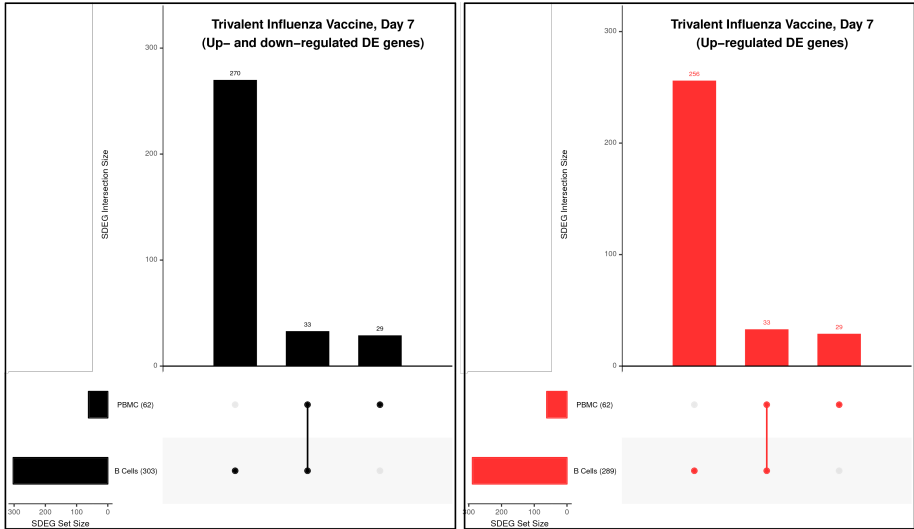
**Figure 29:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 4). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



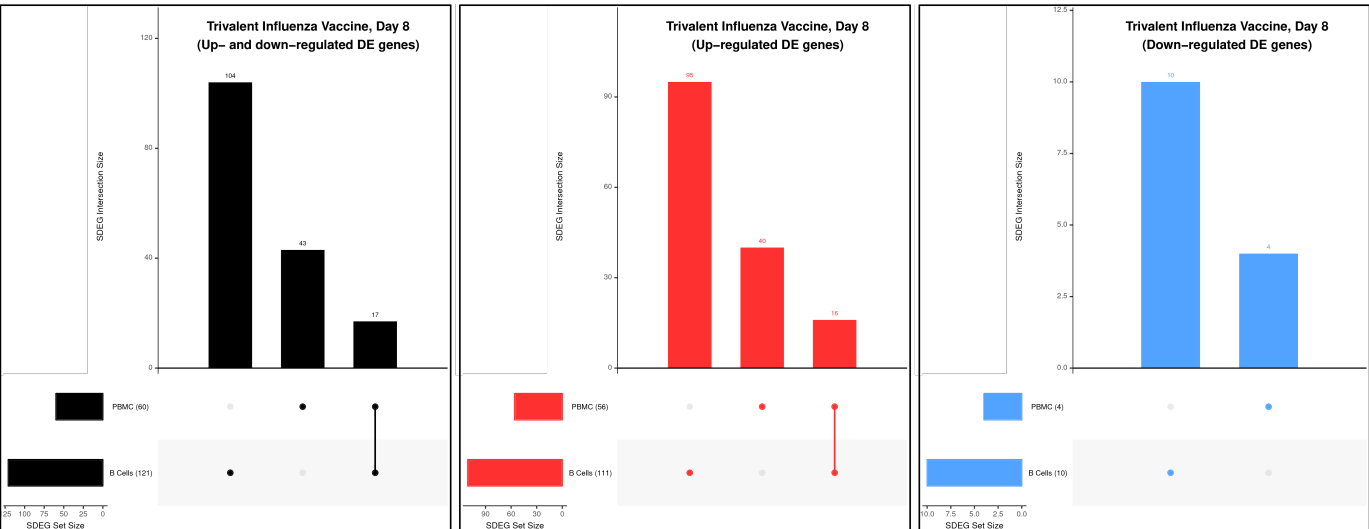
**Figure 30:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 5). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



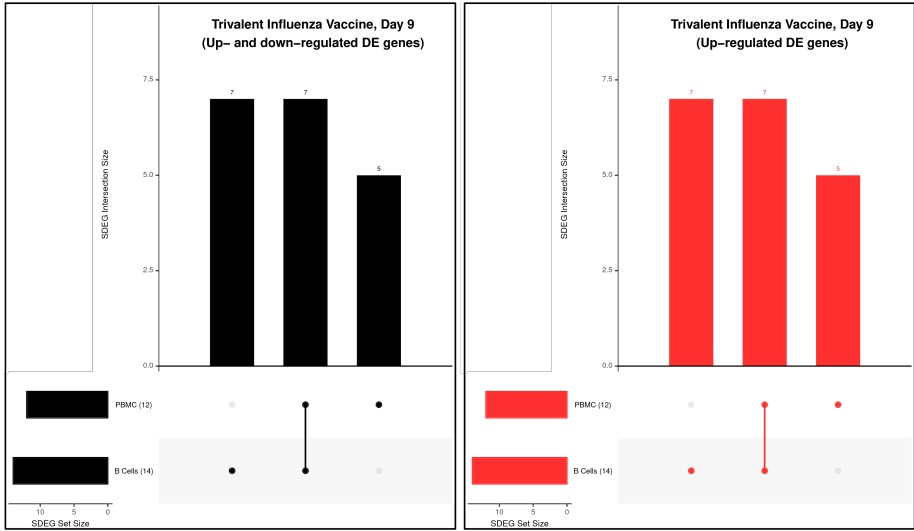
**Figure 31:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 6). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



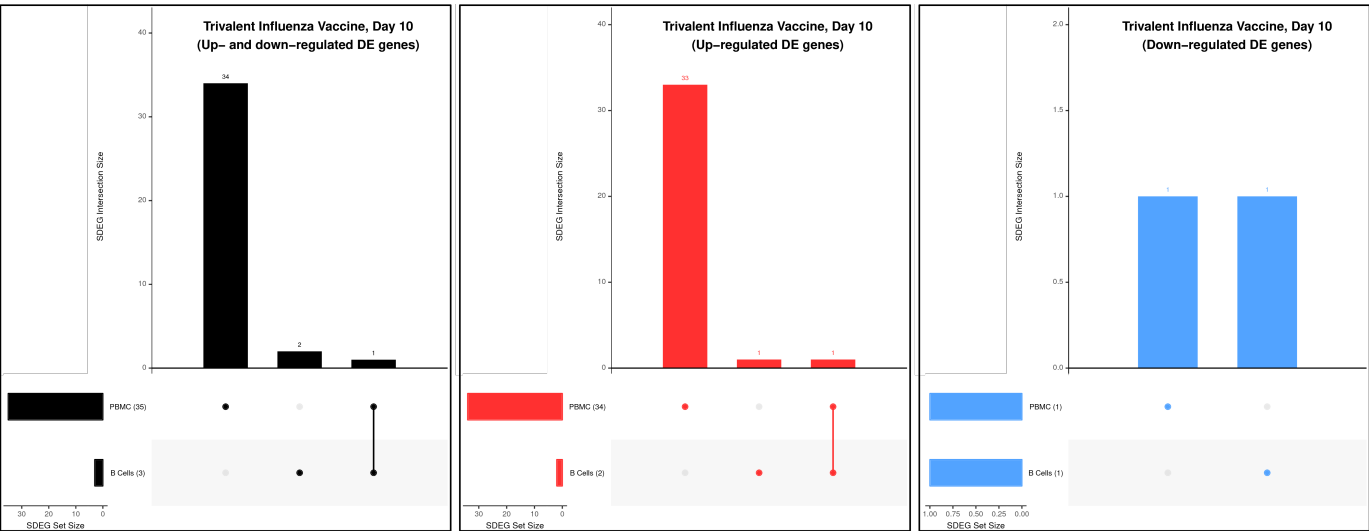
**Figure 32:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 7). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



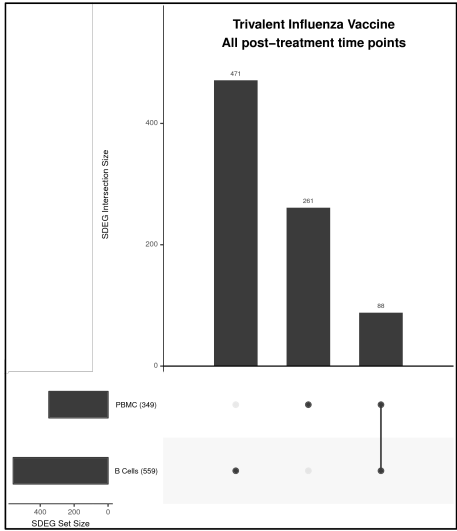
**Figure 33:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 8). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



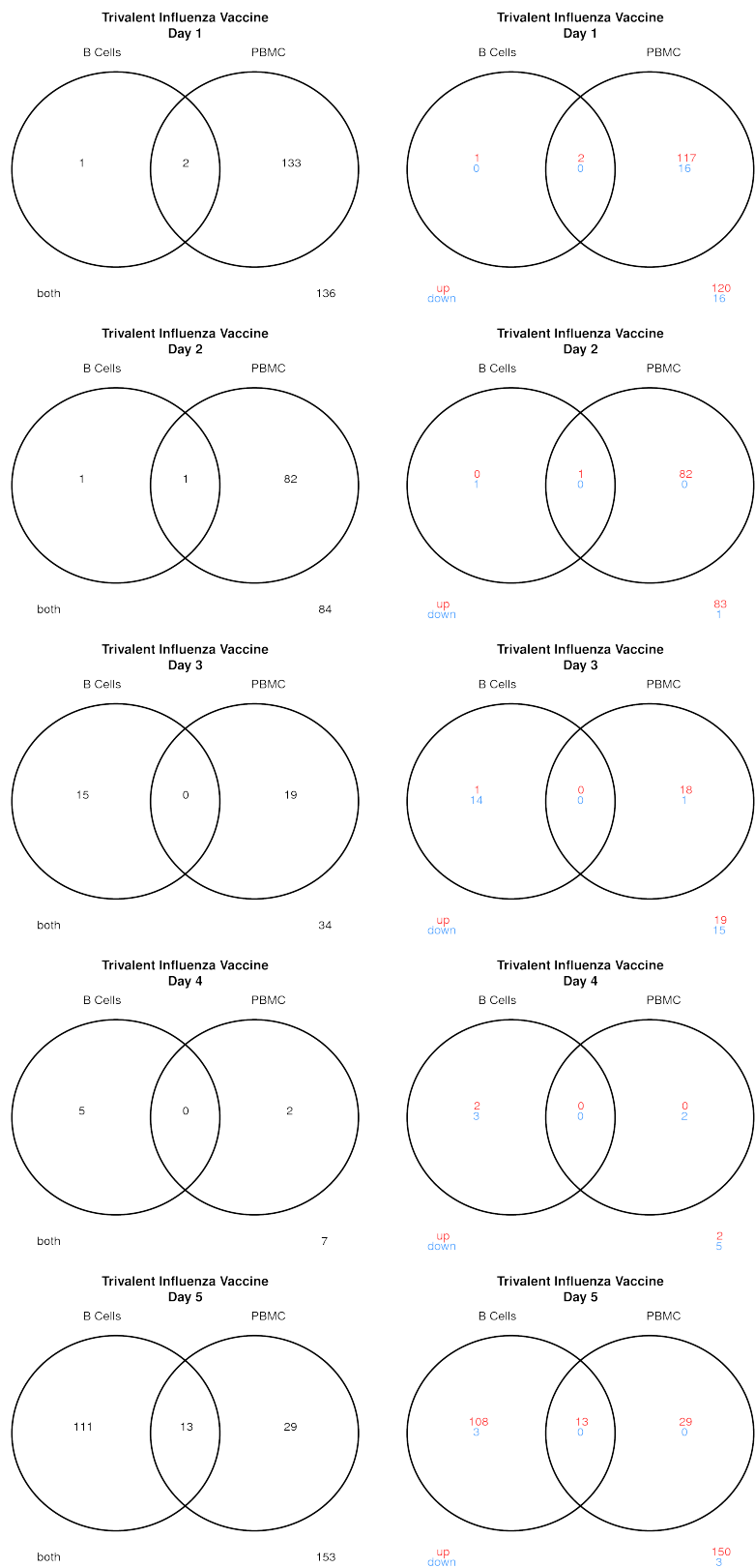
**Figure 34:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 9). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



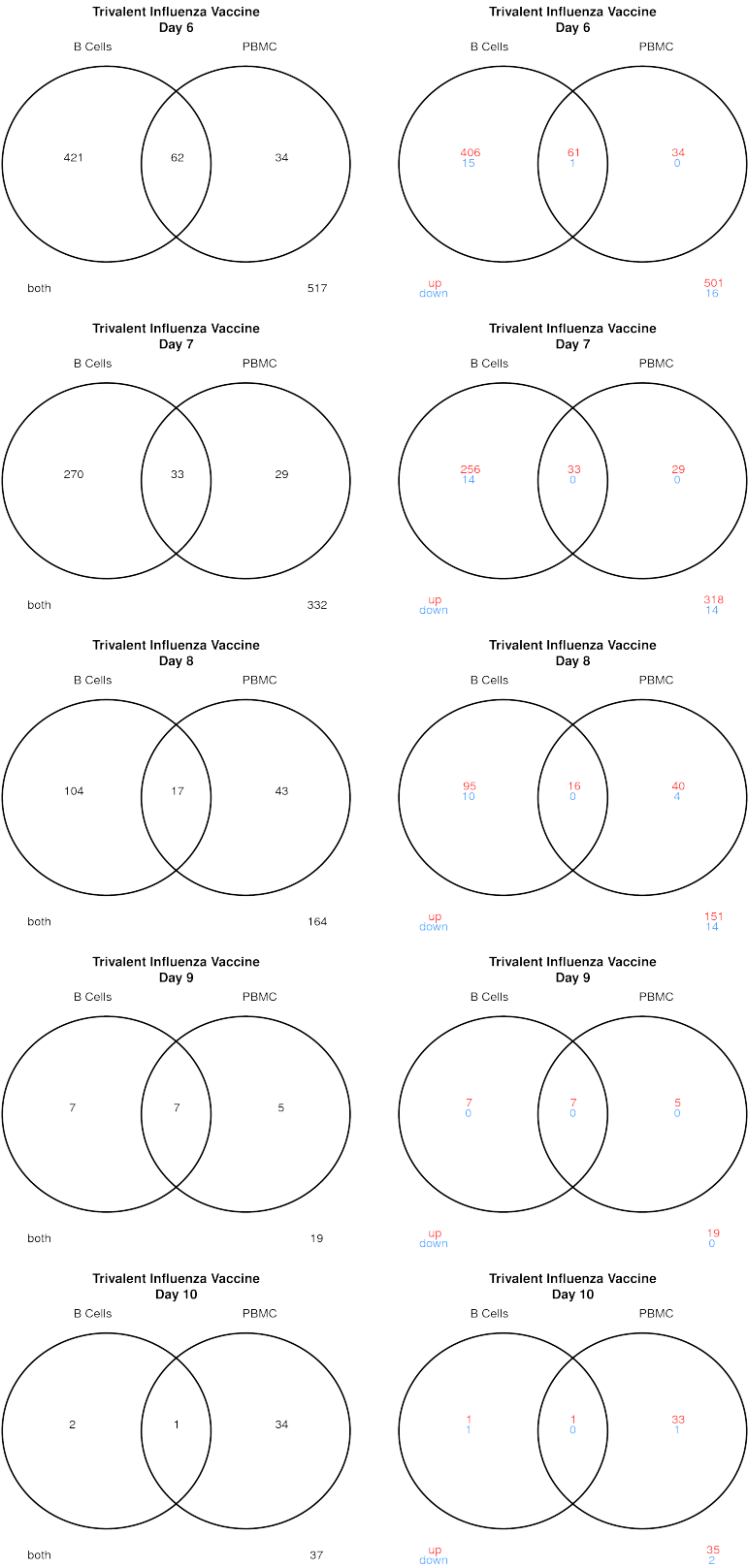
**Figure 35:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, Day 10). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



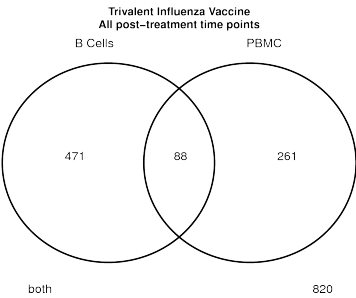
**Figure 36:** UpSet plots summarizing overlap in DE genes between specimen types (Trivalent Influenza Vaccine, All post-treatment time points). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.



**Figure 37:** Venn diagrams summarizing overlap in DE genes between specimen types 1 of 3 (Trivalent Influenza Vaccine). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.

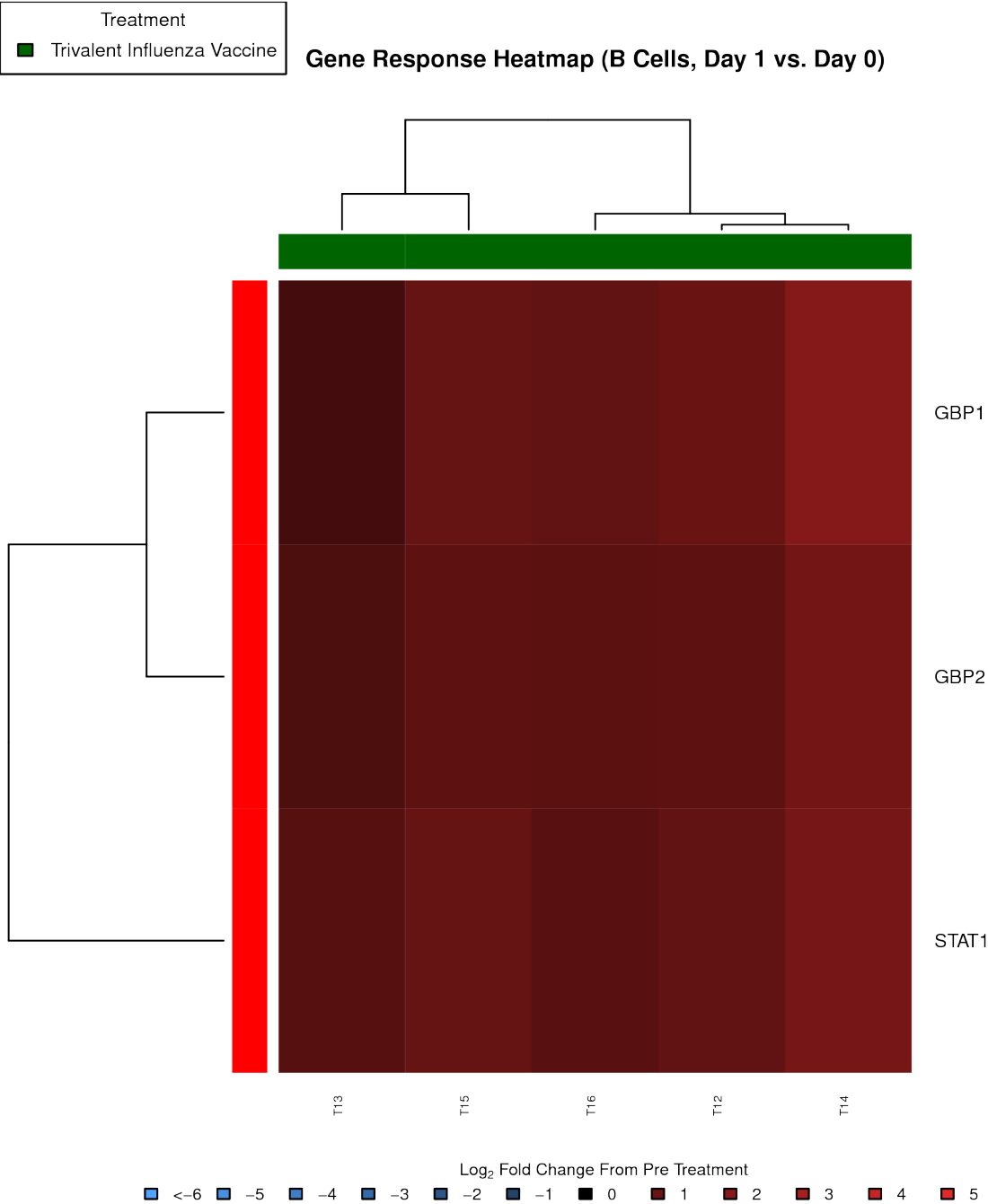


**Figure 38:** Venn diagrams summarizing overlap in DE genes between specimen types 2 of 3 (Trivalent Influenza Vaccine). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.

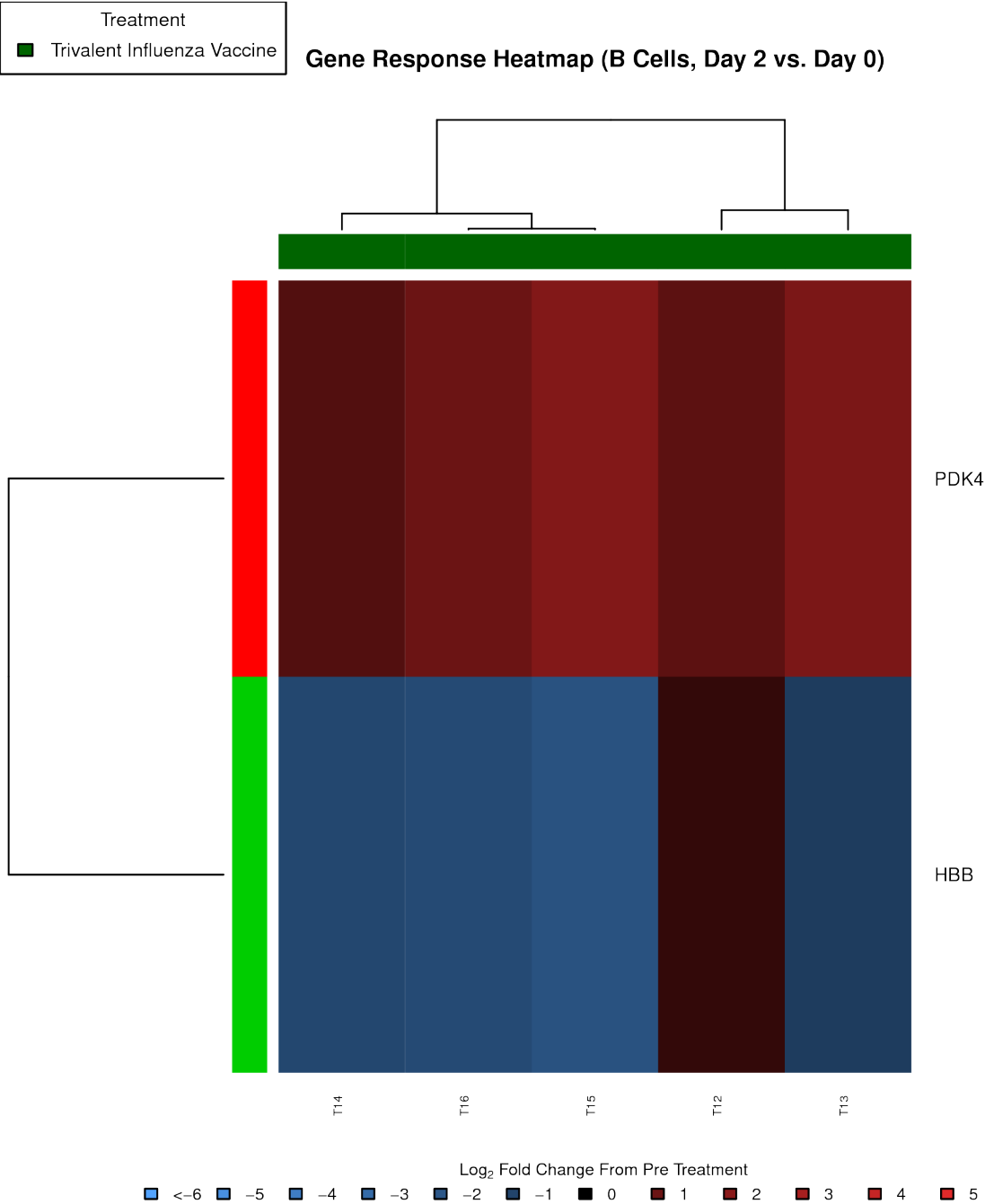


**Figure 39:** Venn diagrams summarizing overlap in DE genes between specimen types 3 of 3 (Trivalent Influenza Vaccine). In red: up-regulated from pre-treatment, in blue: down-regulated from pre-treatment.

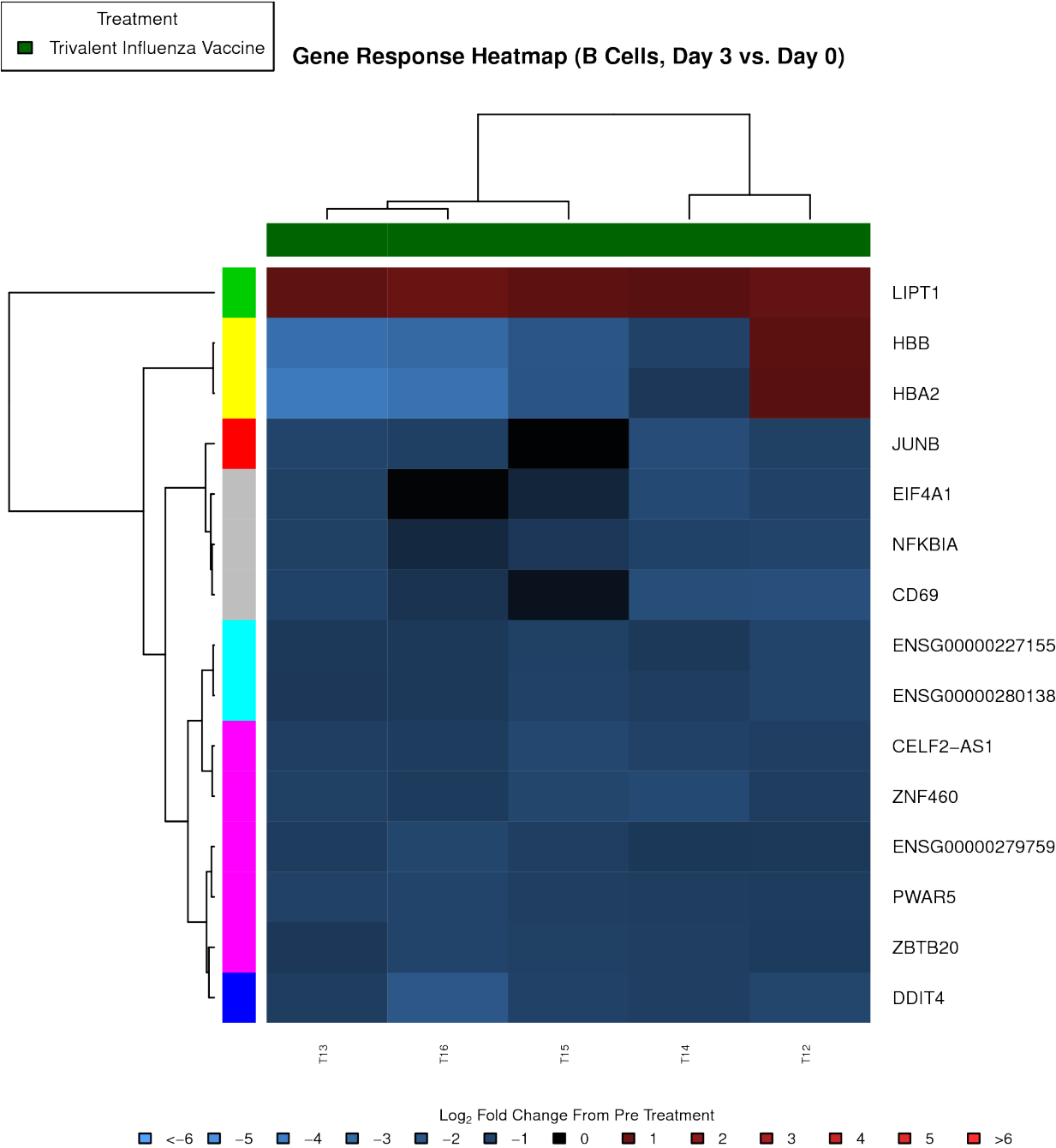




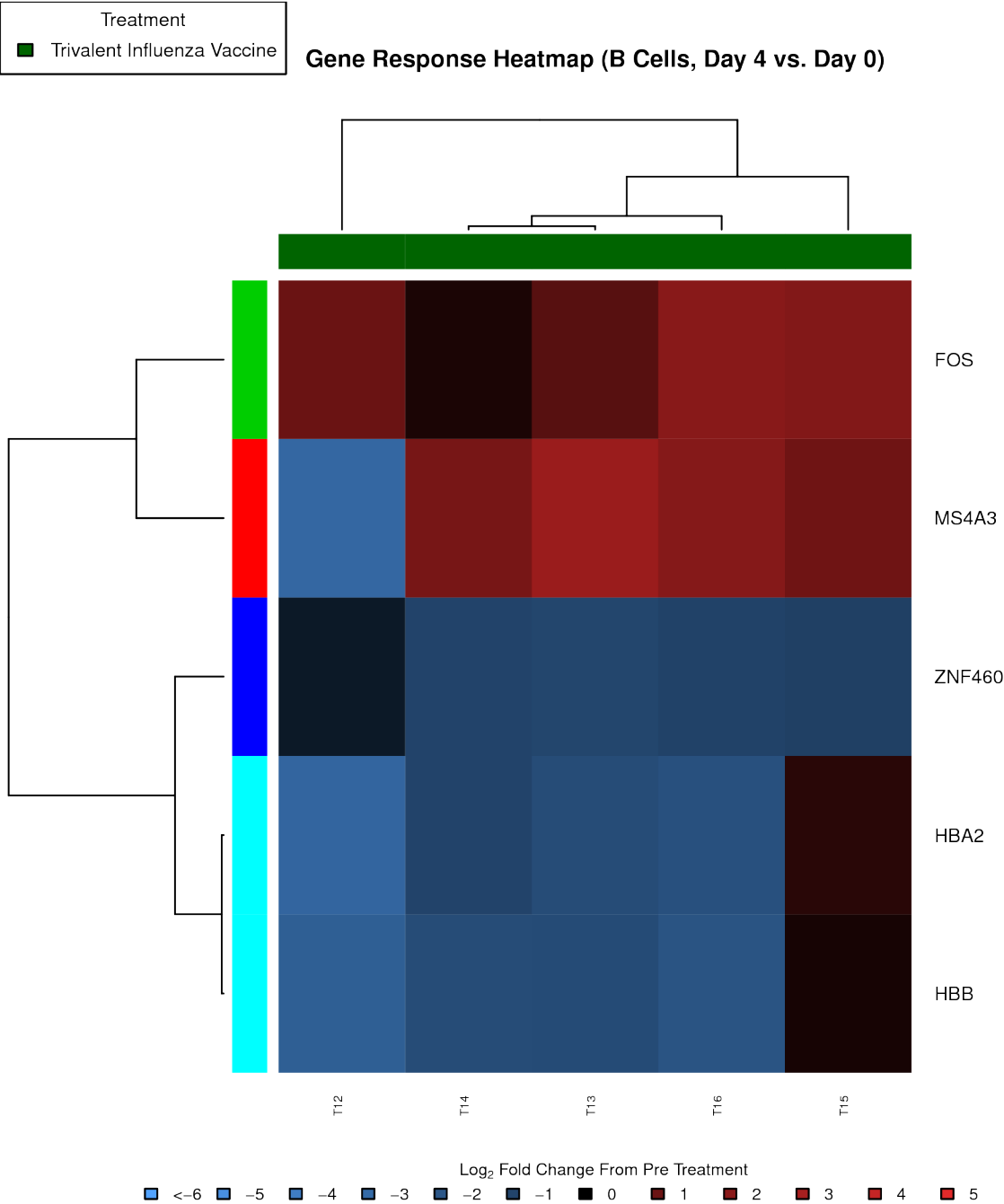
**Figure 40:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 1). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



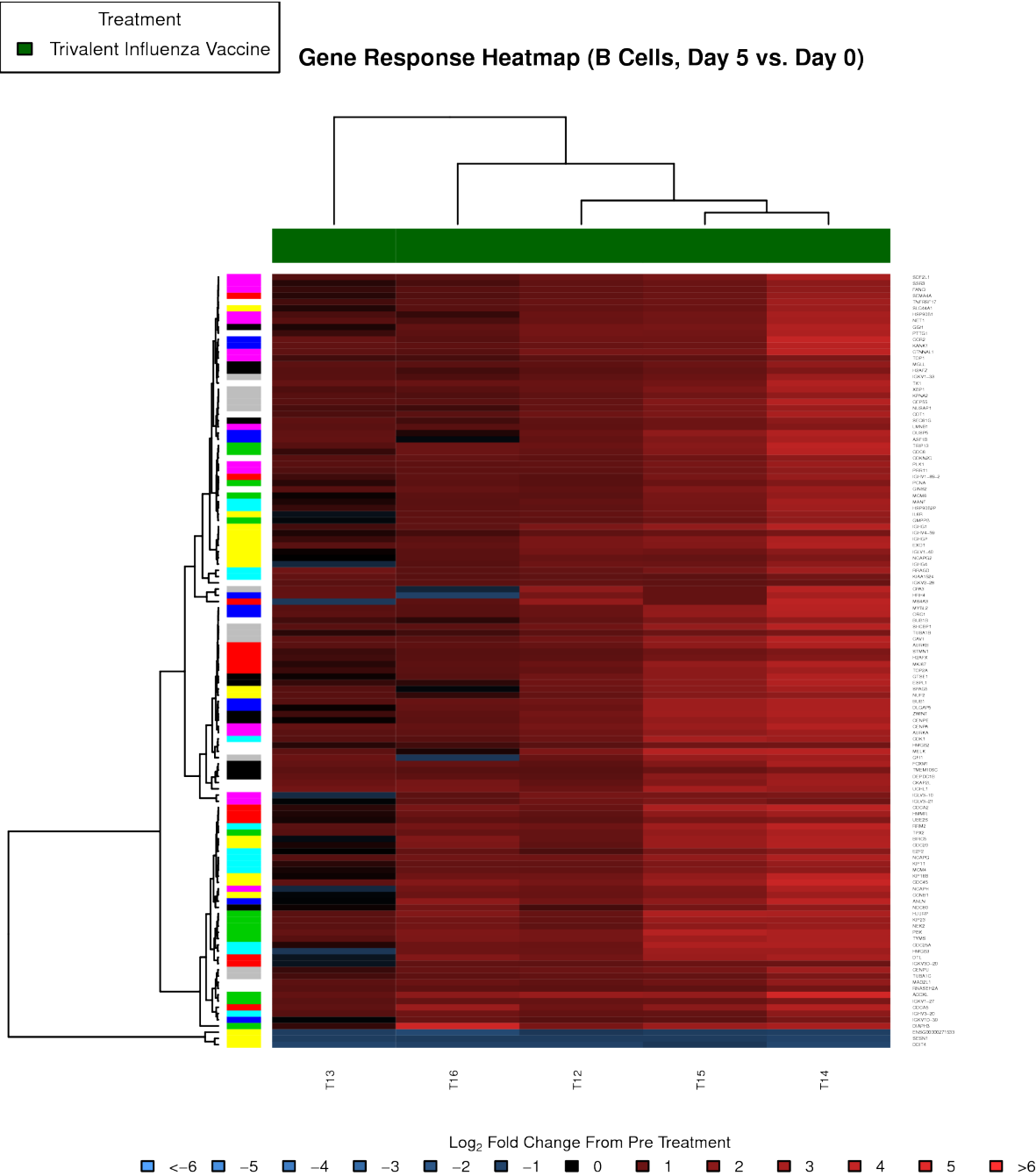
**Figure 41:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 2). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



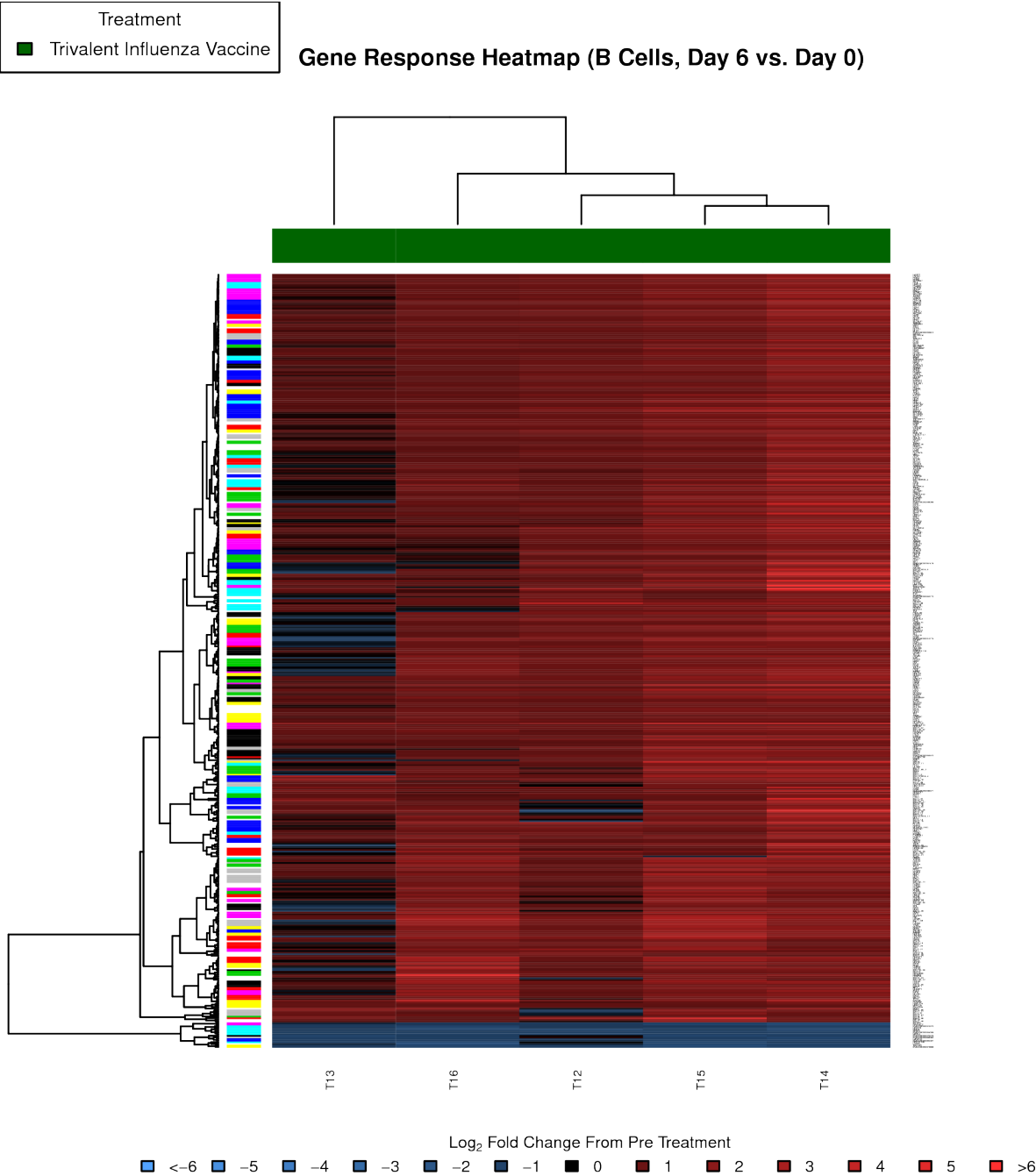
**Figure 42:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 3). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



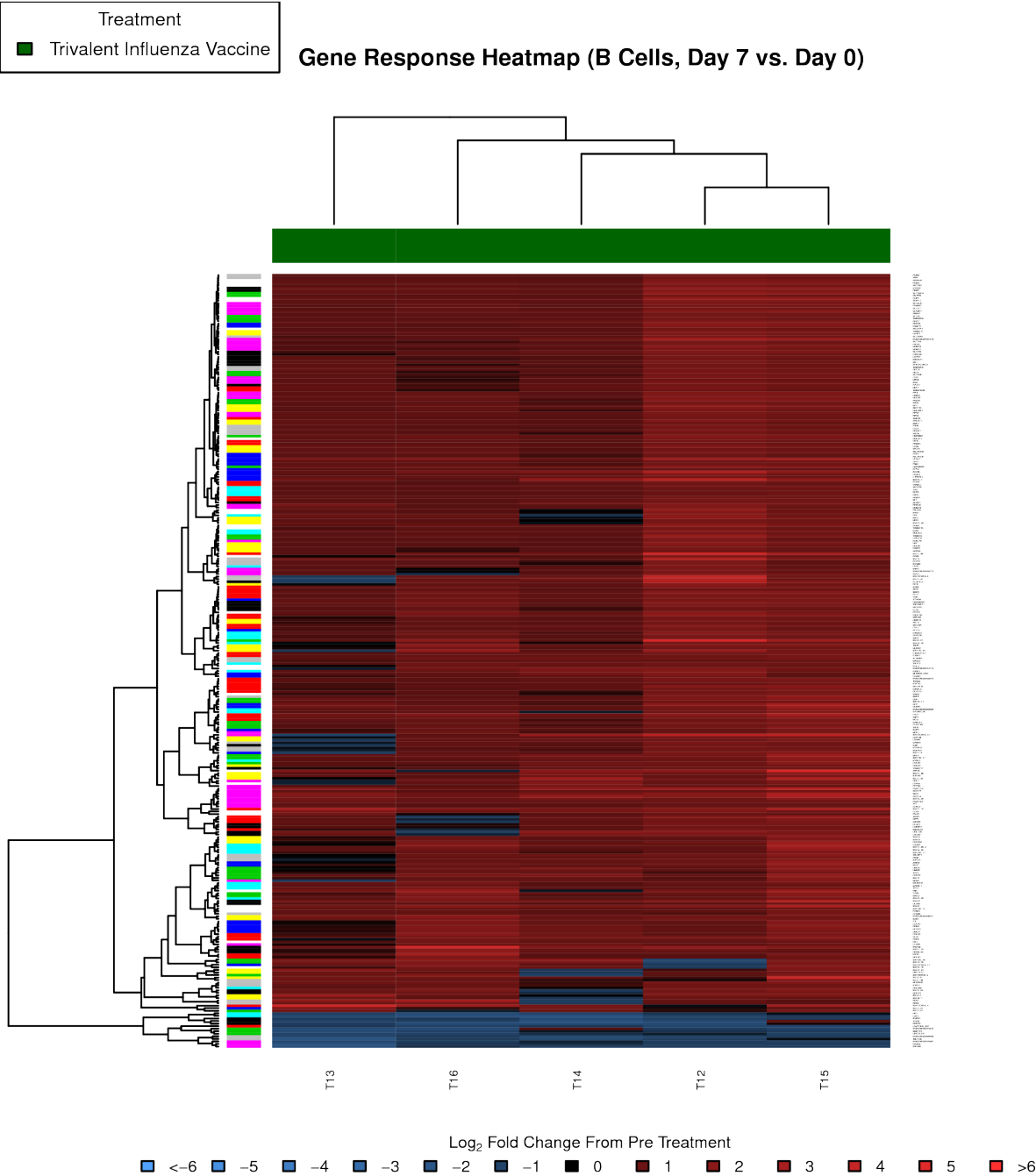
**Figure 43:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 4). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



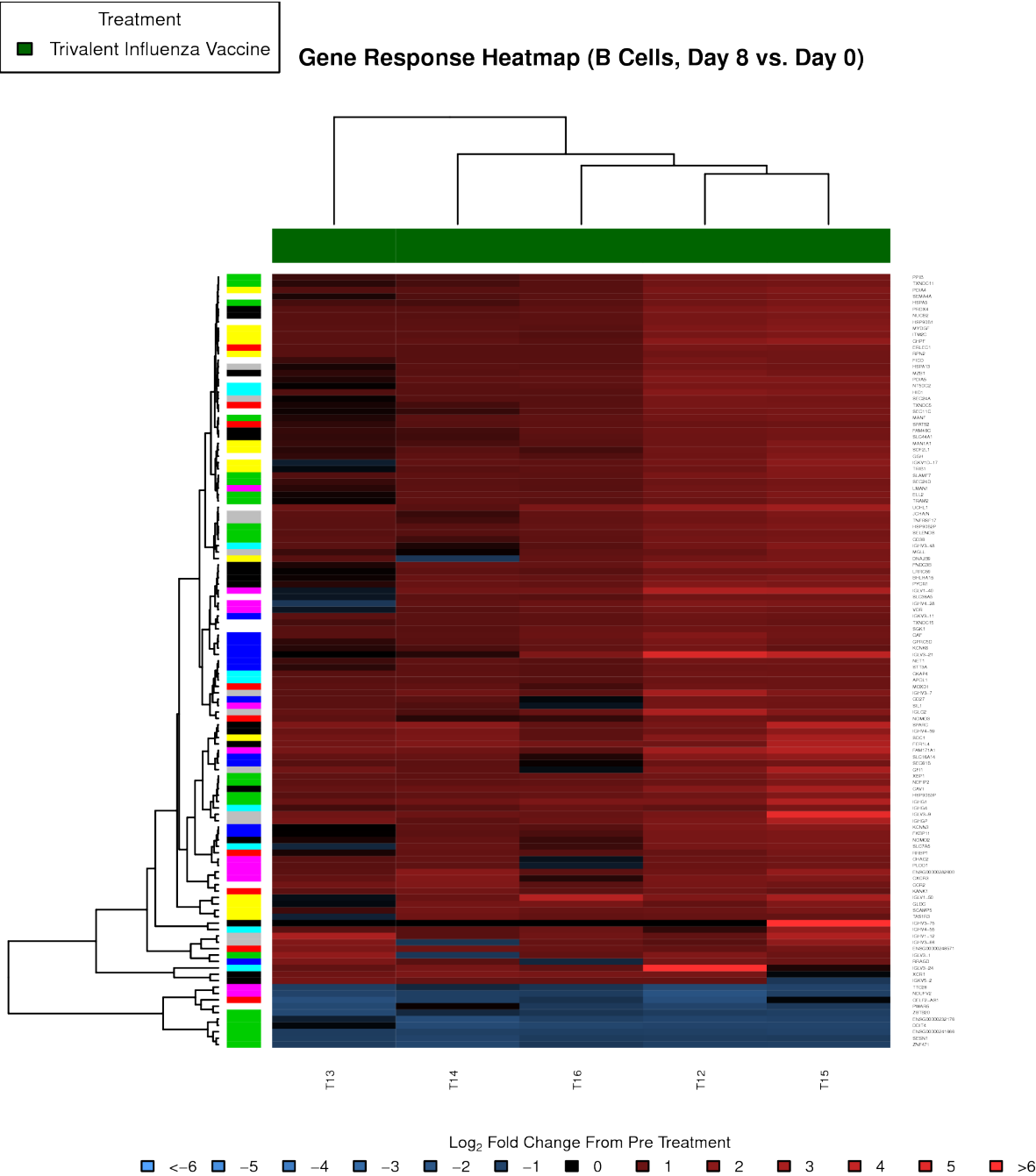
**Figure 44:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 5). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



**Figure 45:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 6). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

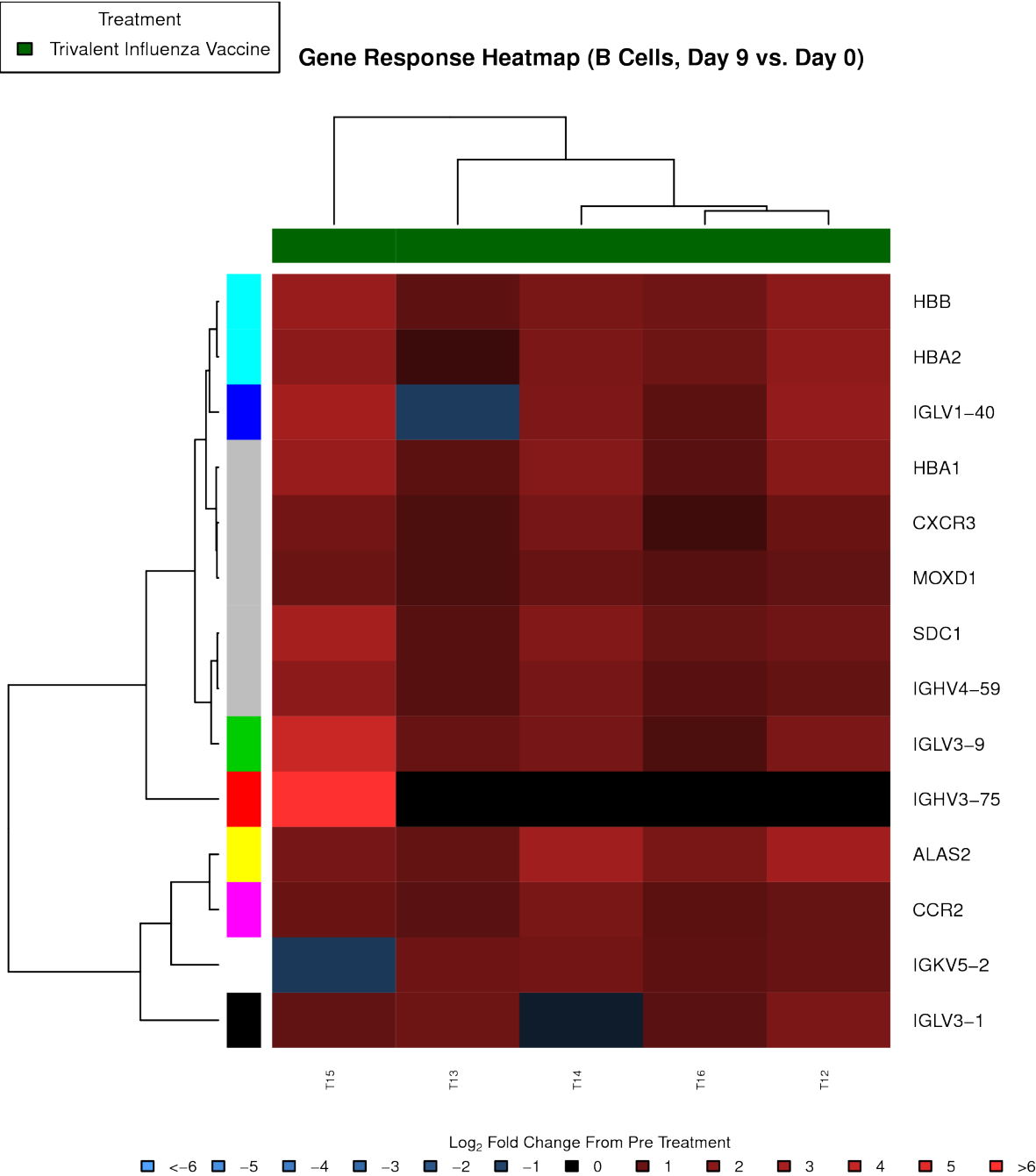


**Figure 46:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 7). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

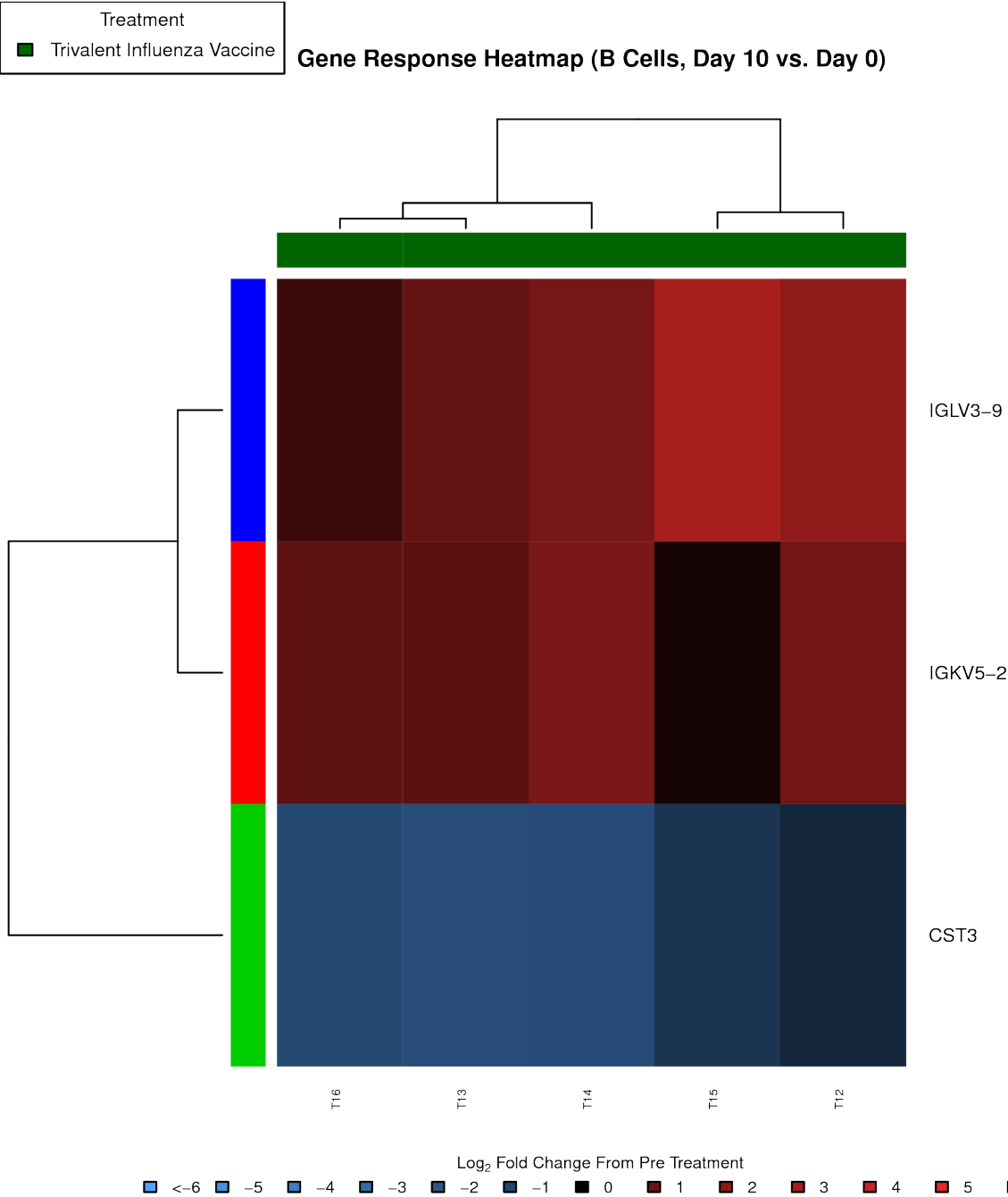


**Figure 47:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 8). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

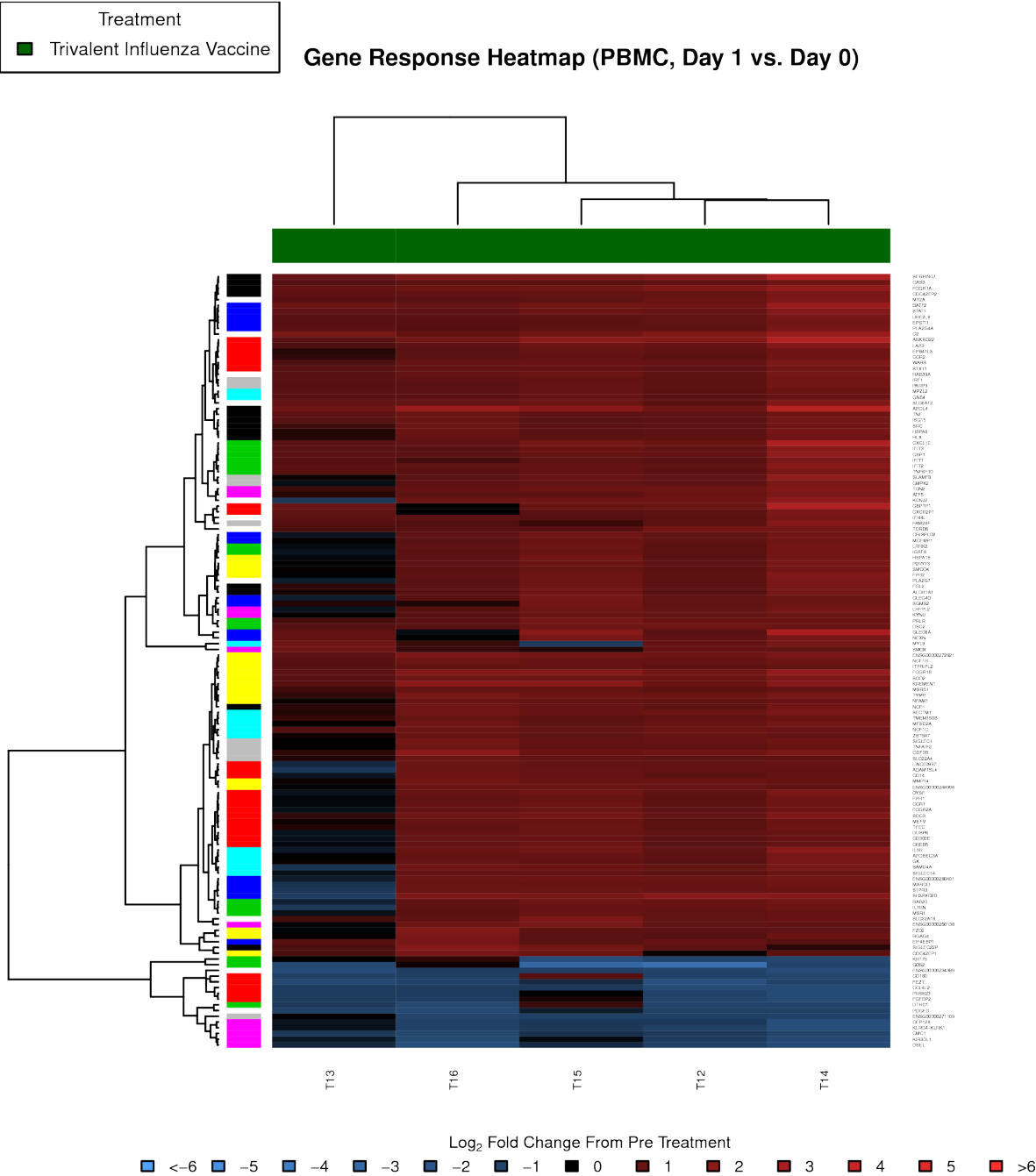




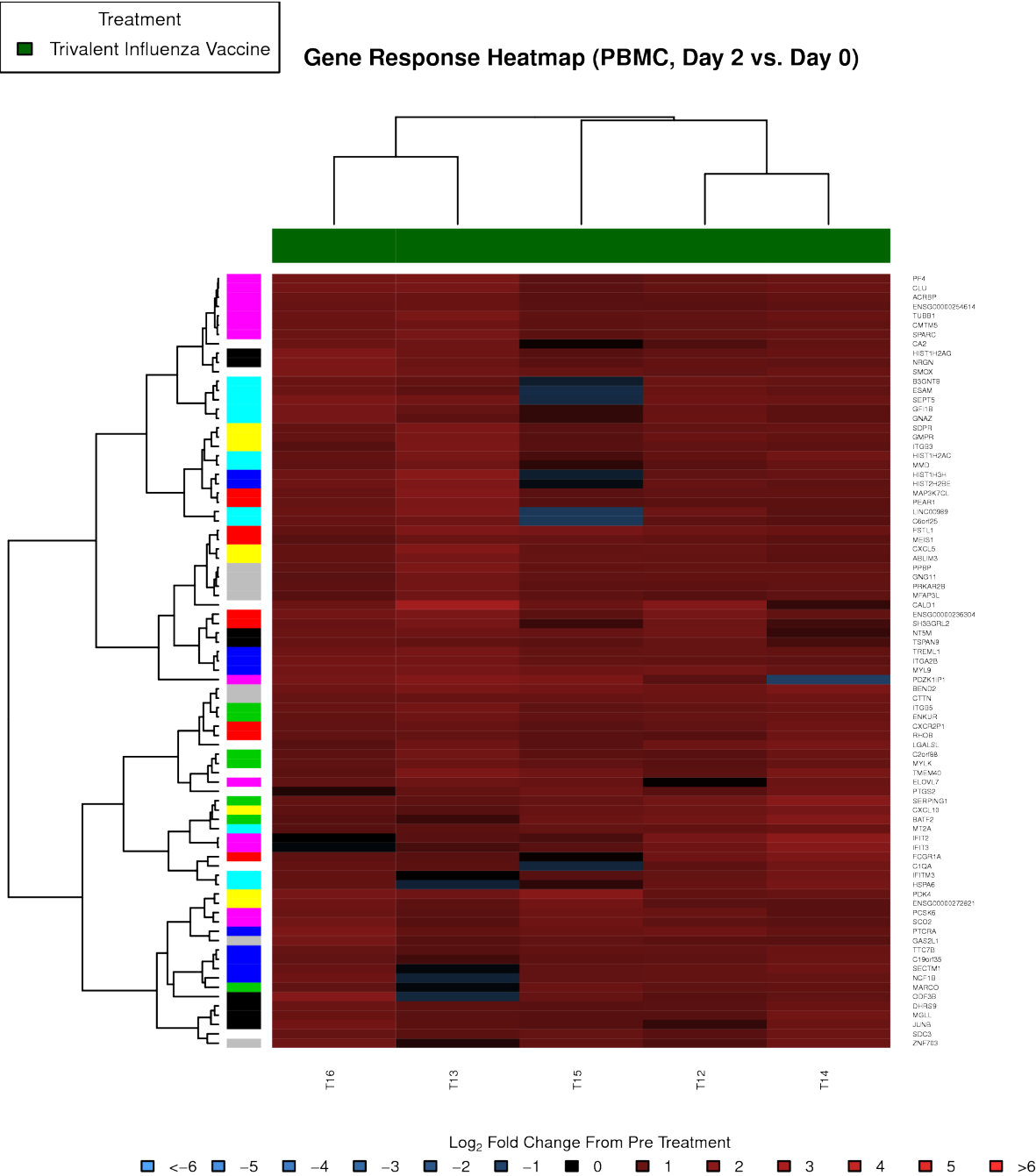
**Figure 48:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 9). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



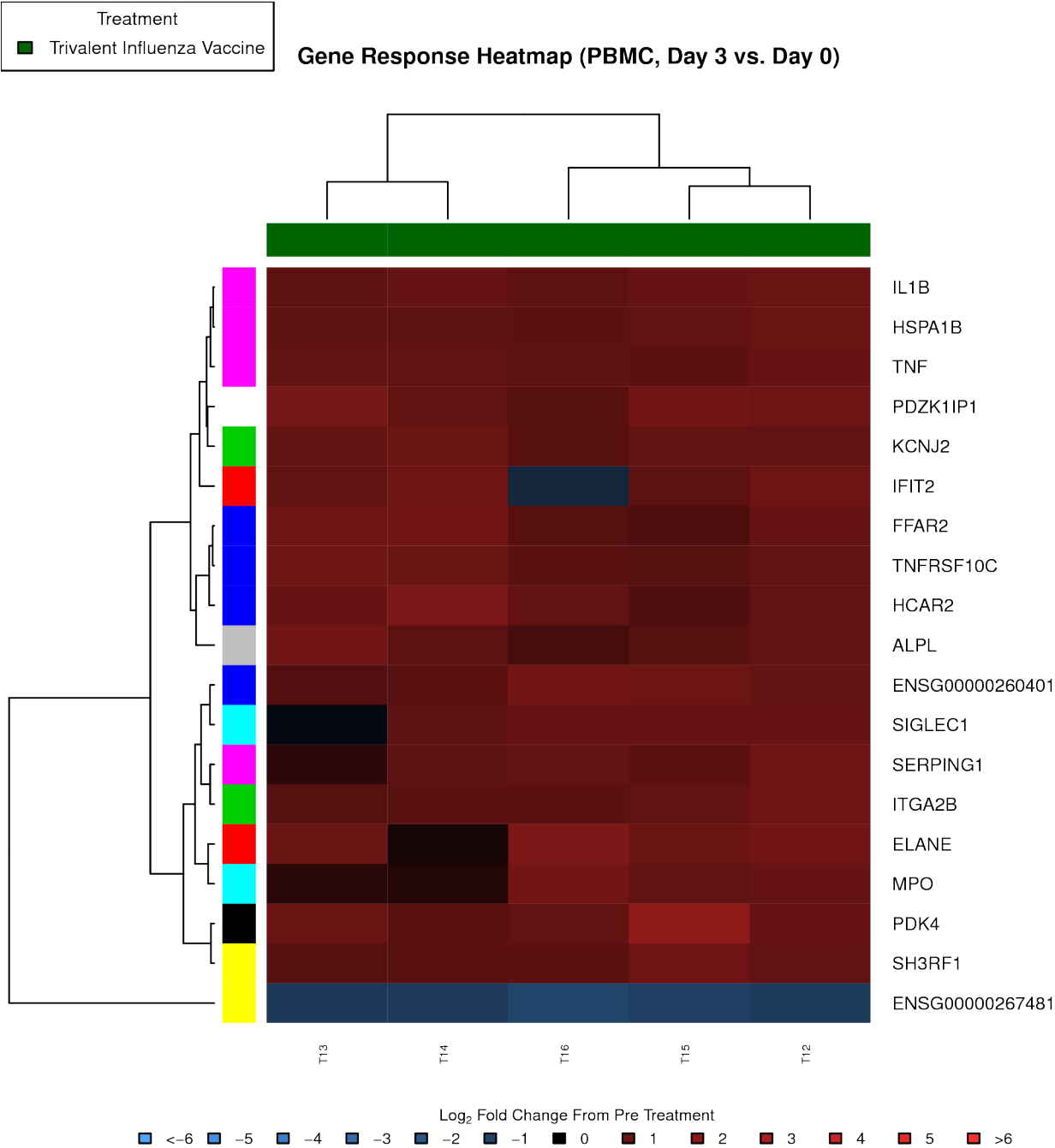
**Figure 49:** Heatmap of  $\log_2$  fold change from pre-treatment (B Cells, Day 10). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



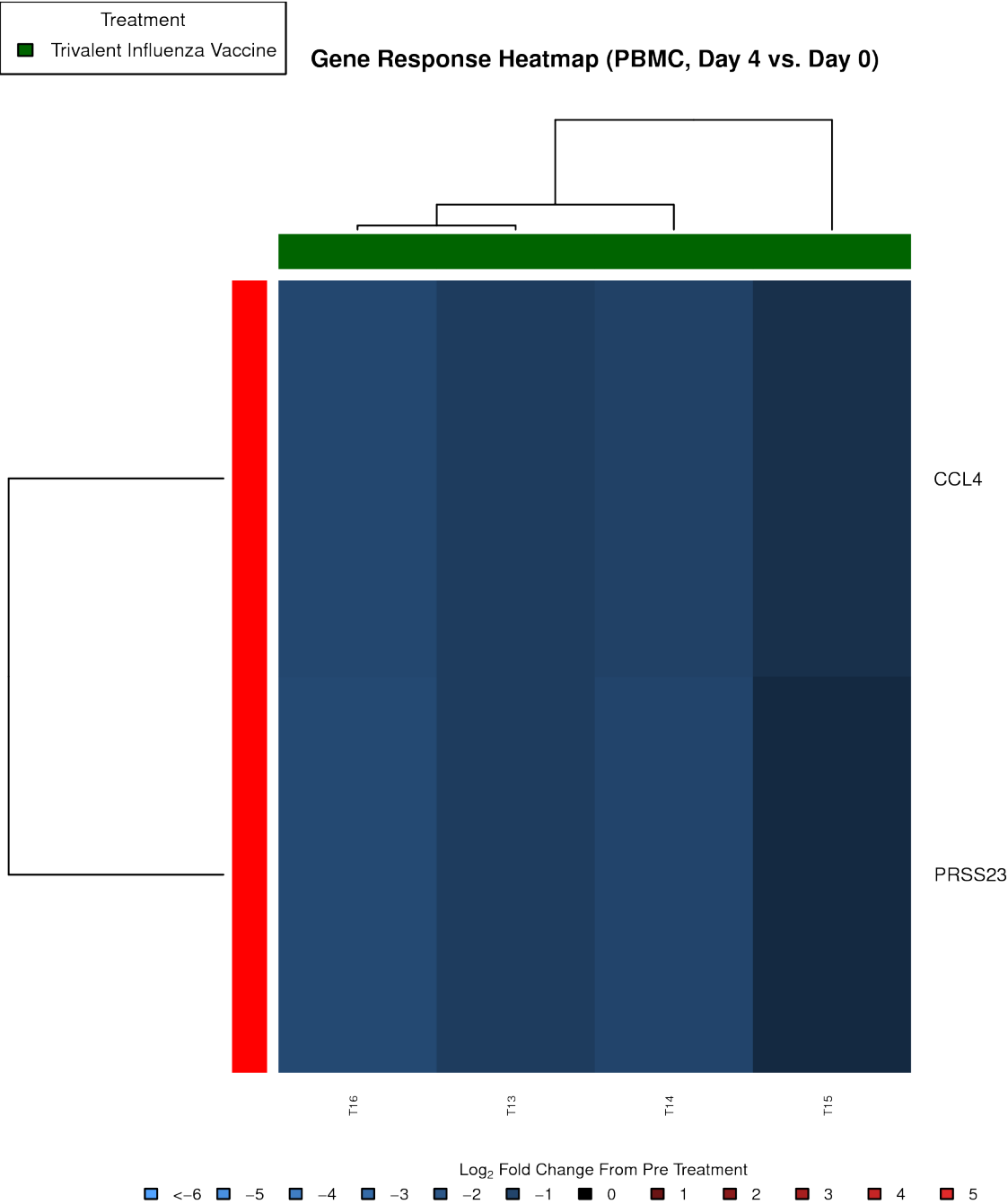
**Figure 50:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 1). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



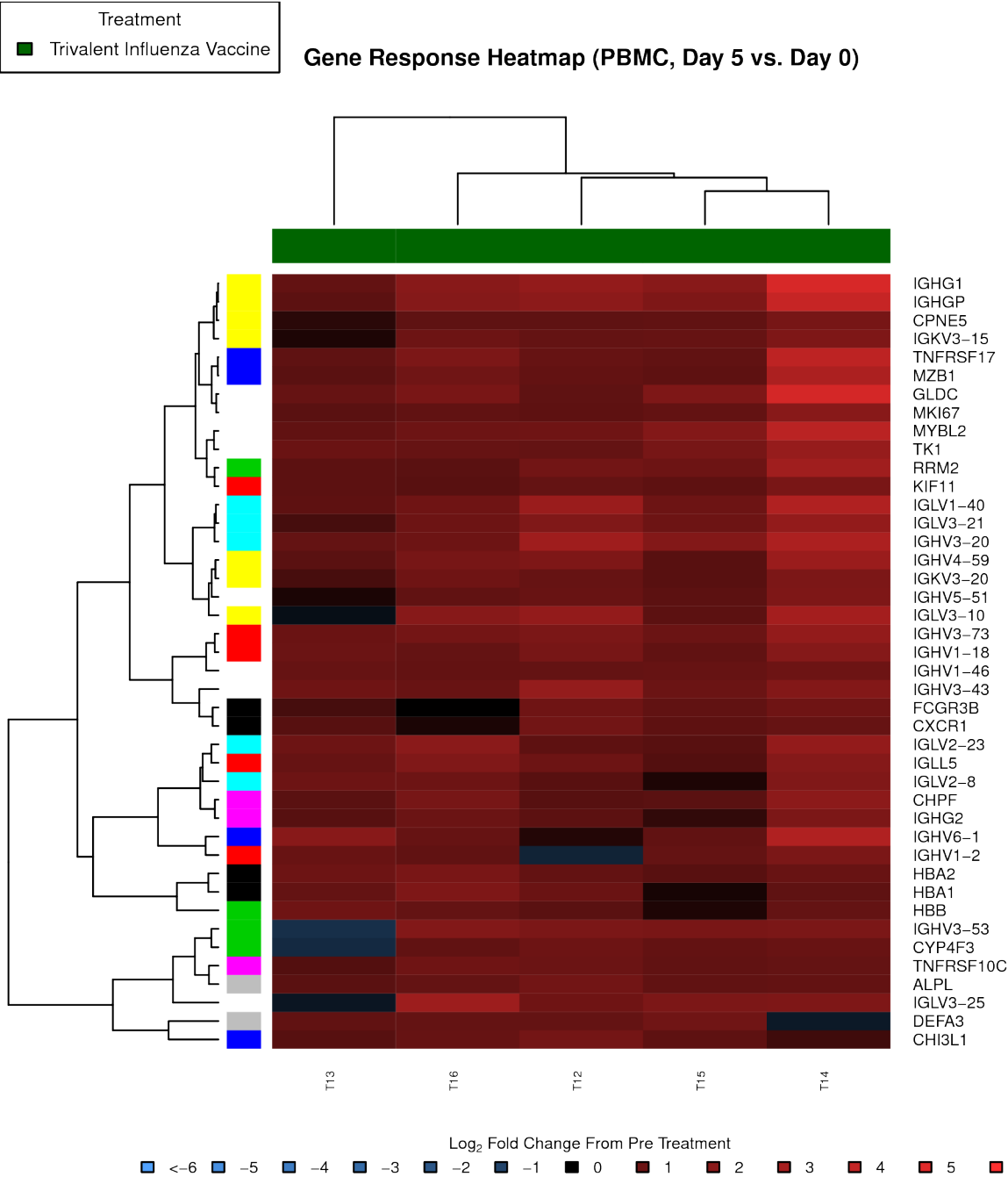
**Figure 51:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 2). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



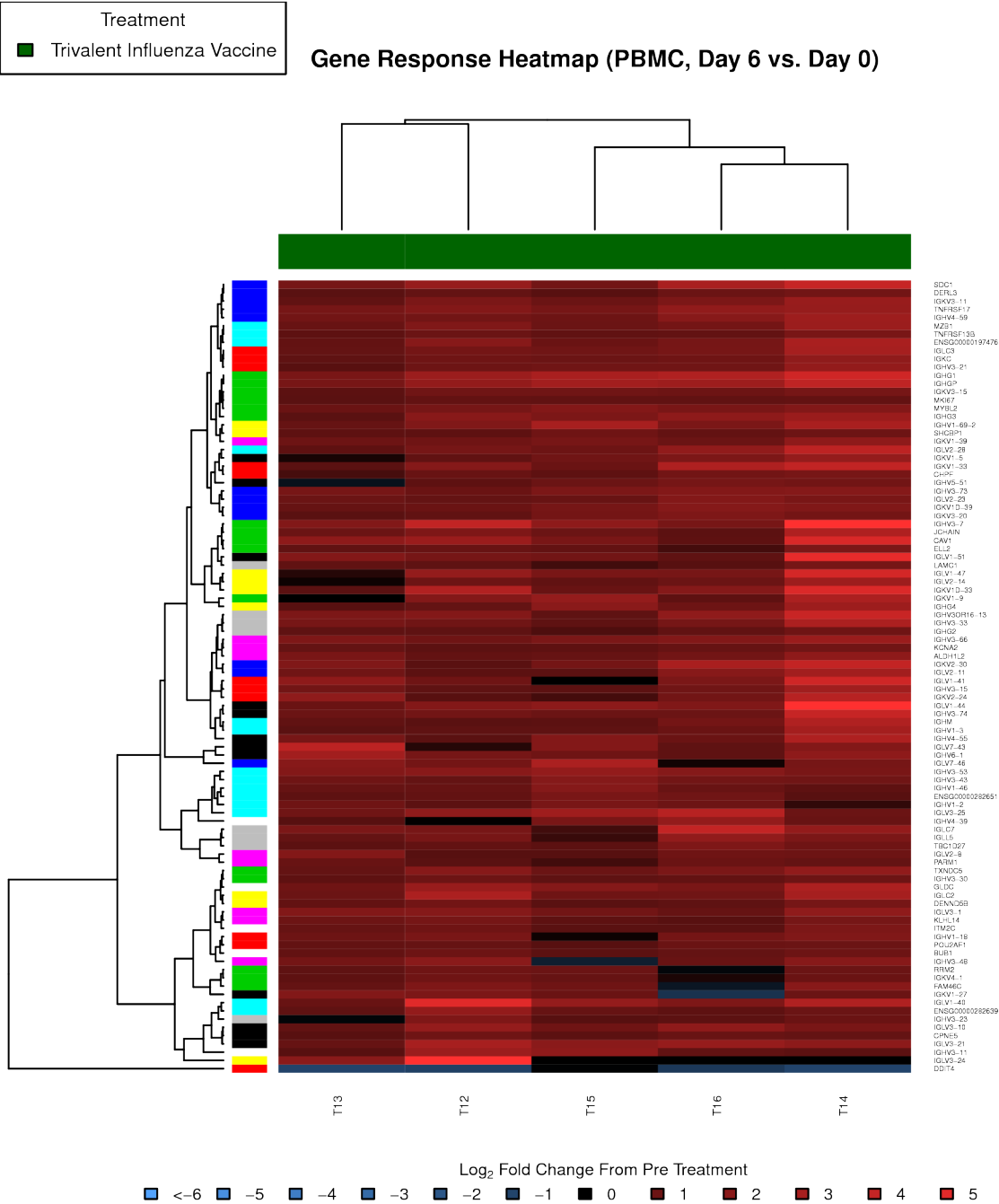
**Figure 52:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 3). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



**Figure 53:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 4). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

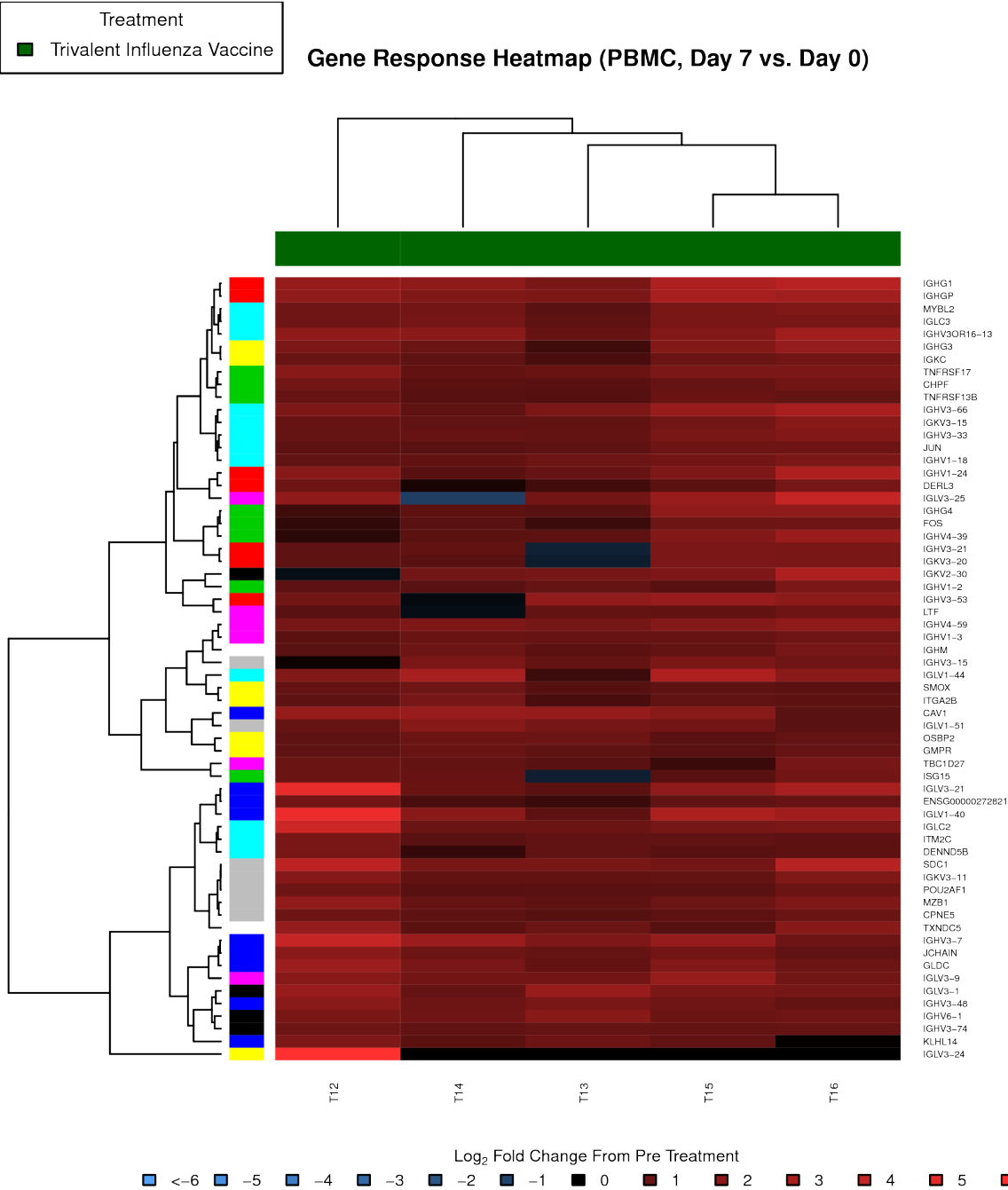


**Figure 54:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 5). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

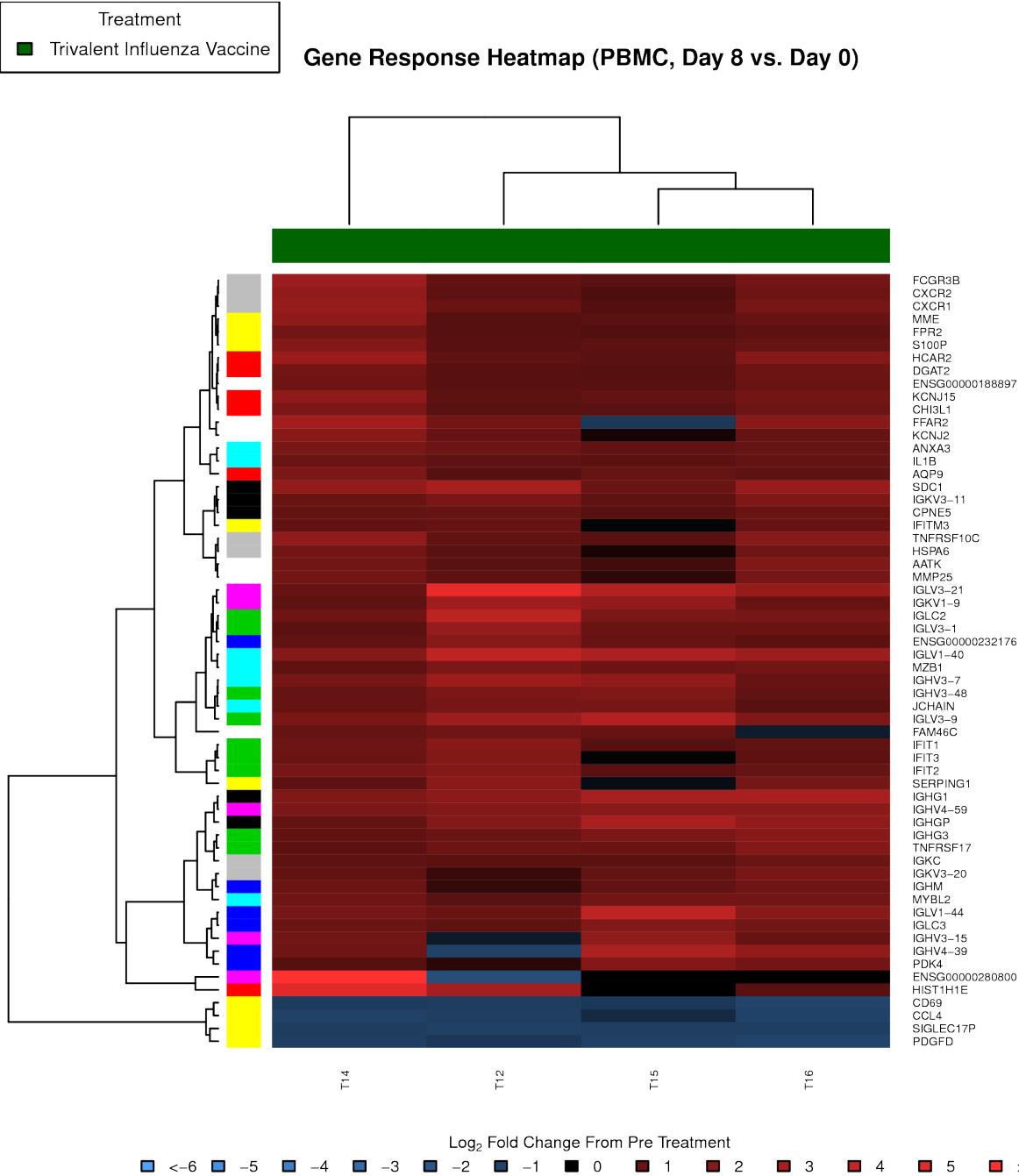


**Figure 55:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 6). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).

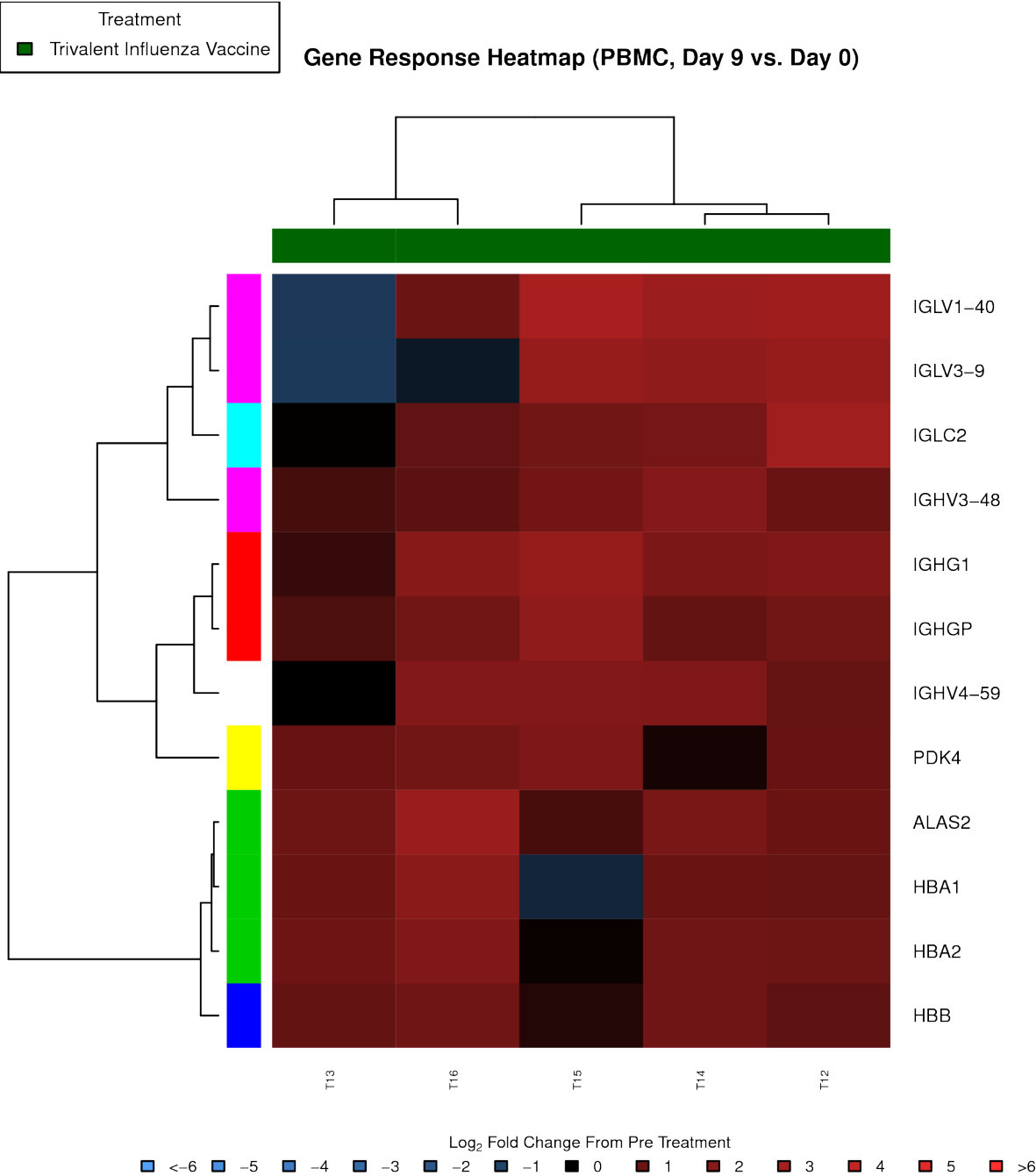




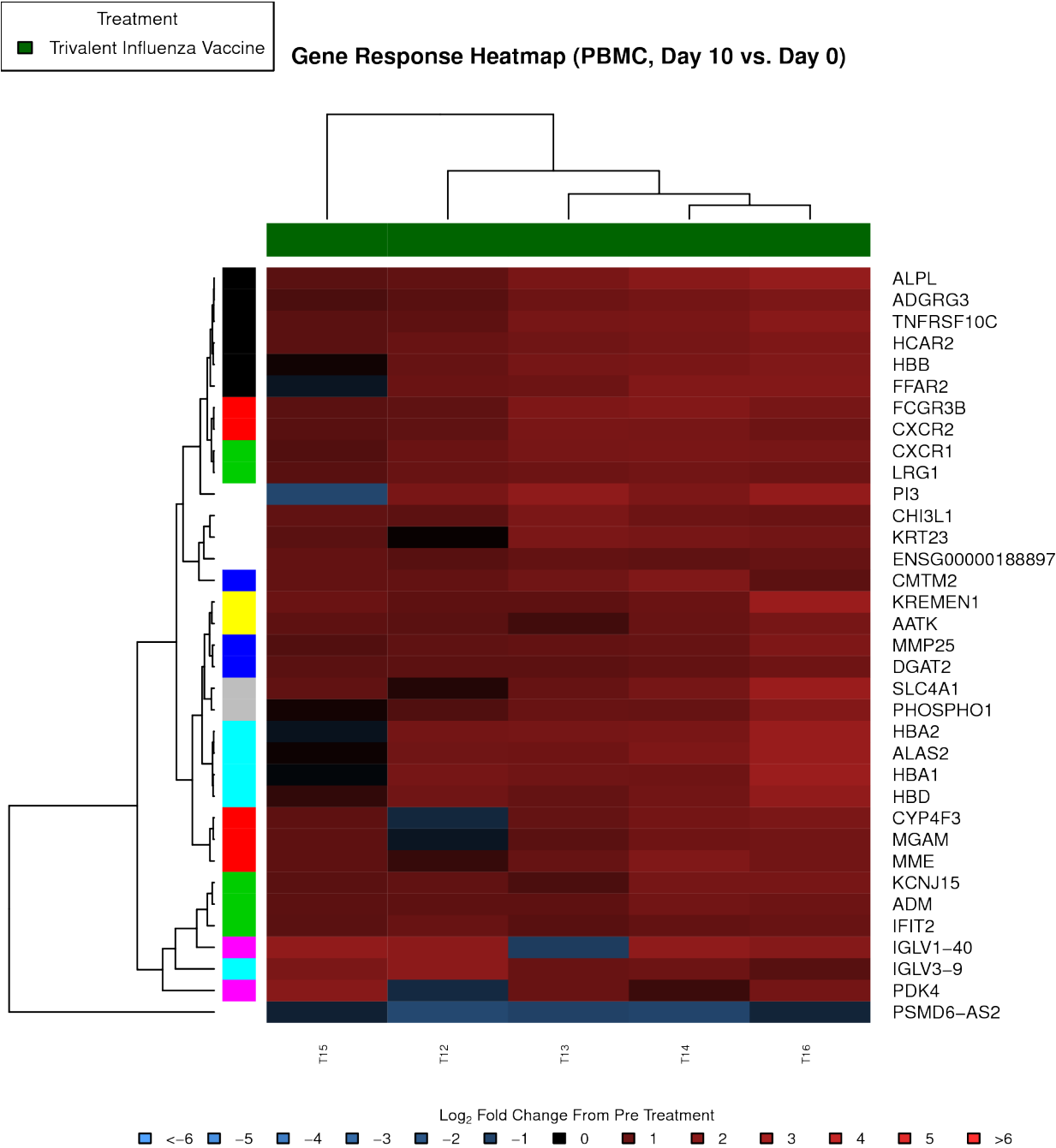
**Figure 56:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 7). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



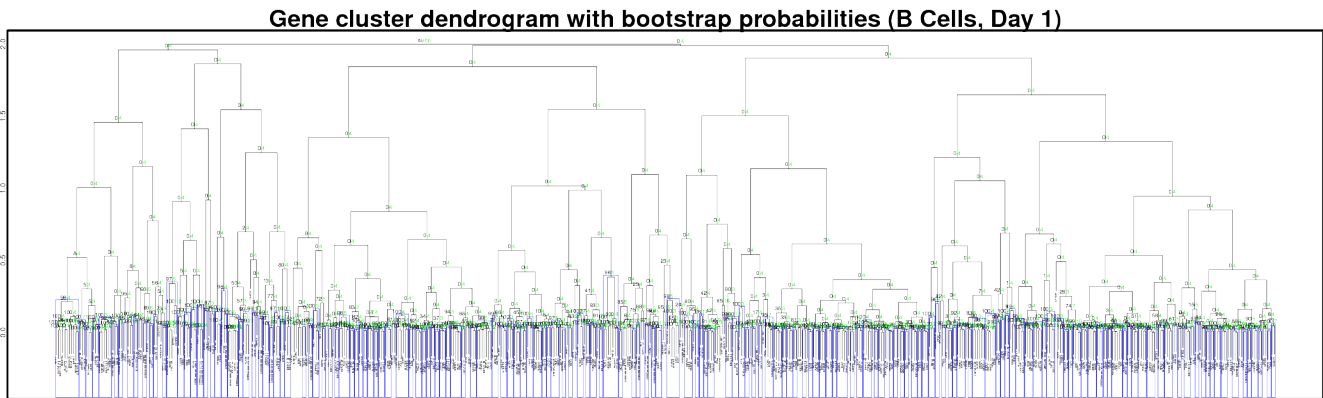
**Figure 57:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 8). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



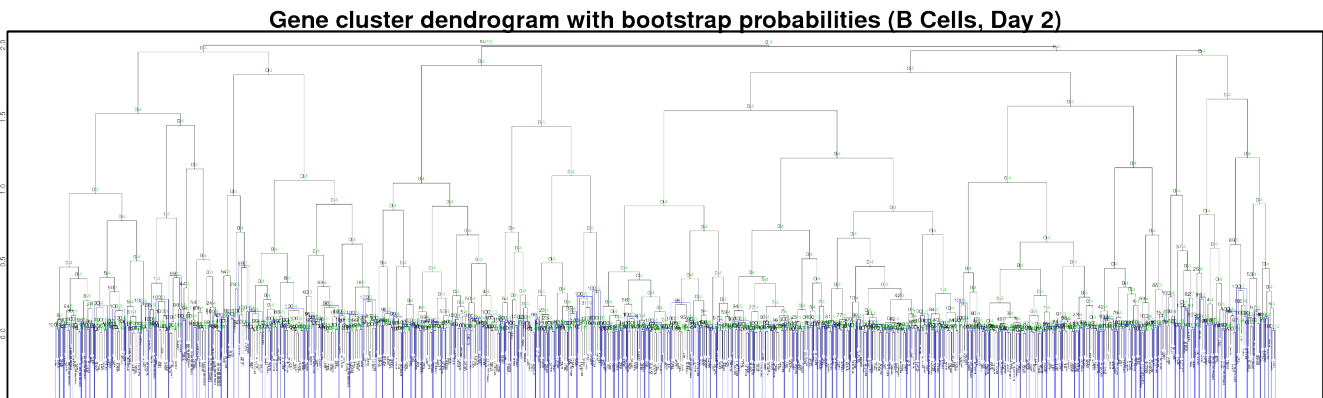
**Figure 58:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 9). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



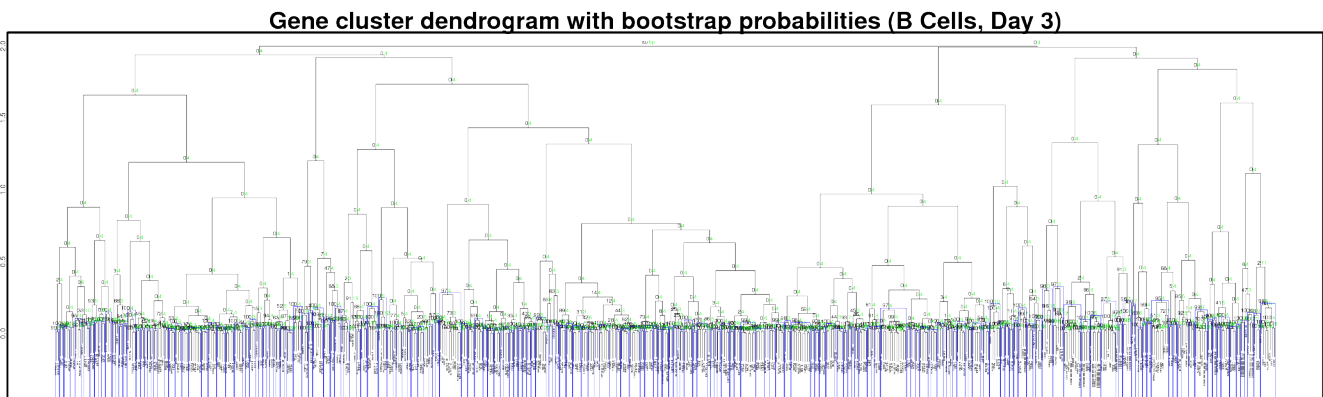
**Figure 59:** Heatmap of  $\log_2$  fold change from pre-treatment (PBMC, Day 10). Rows represent DE genes across treatment types, columns represent samples. In red: up regulated compared to pre-treatment; in green: down-regulated compared to pre-treatment. Dendrograms were obtained using complete linkage clustering of uncentered pairwise Pearson correlation distances for  $\log_2$  fold changes. Samples are color-coded by treatment group (see row below sample dendrogram).



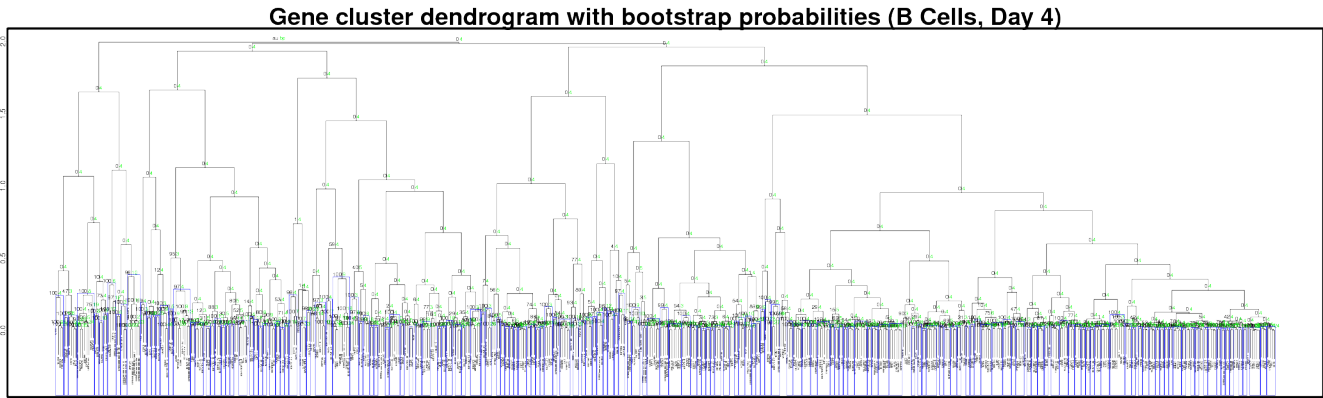
**Figure 60:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 1). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



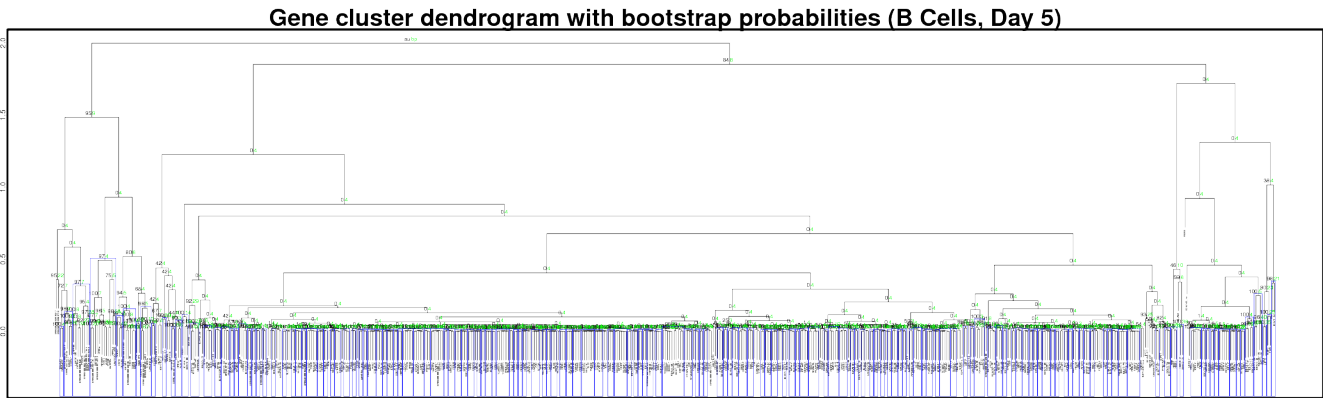
**Figure 61:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 2). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



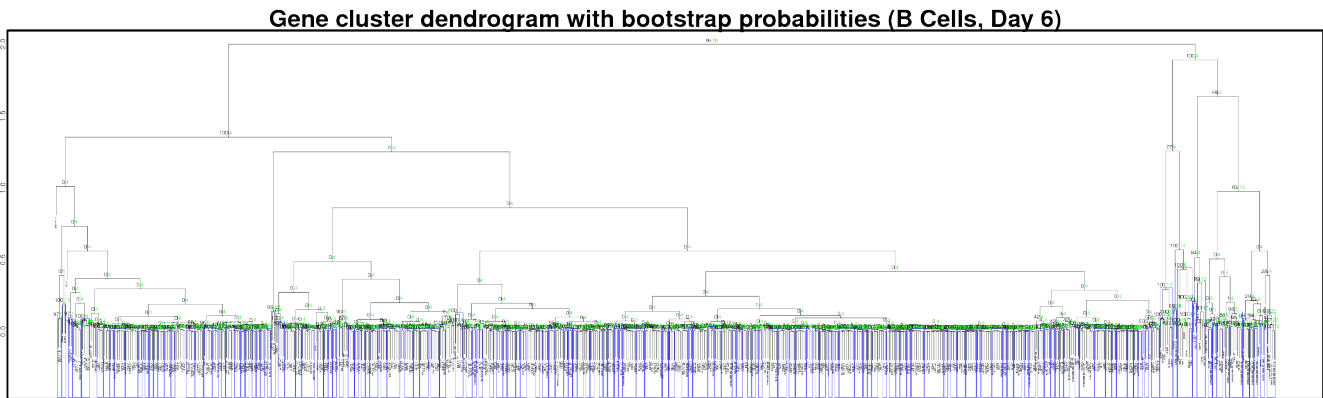
**Figure 62:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 3). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



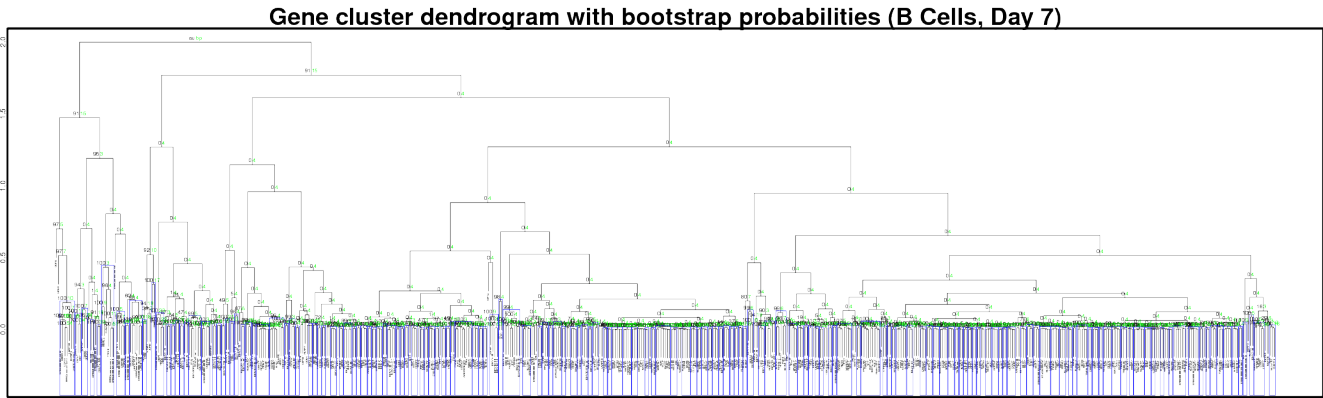
**Figure 63:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 4). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



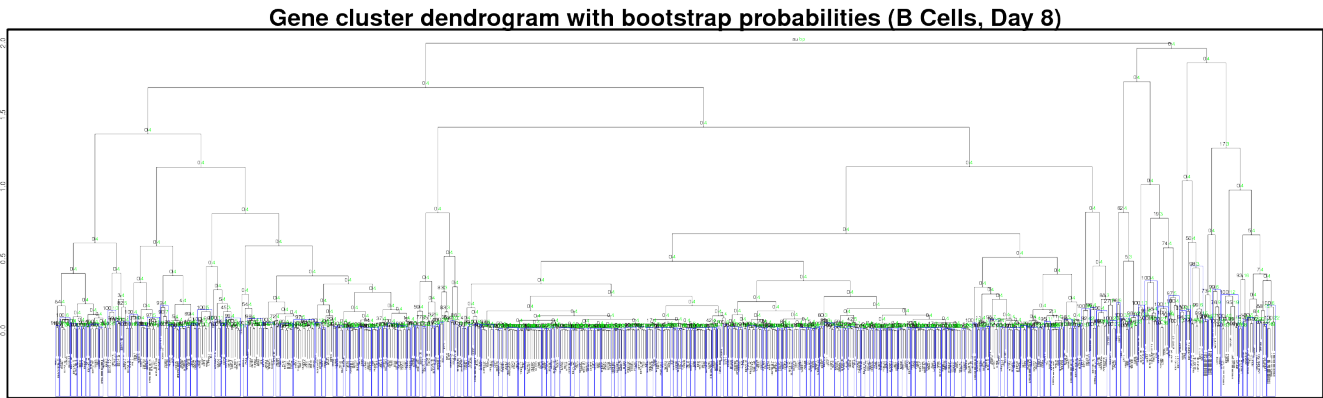
**Figure 64:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 5). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



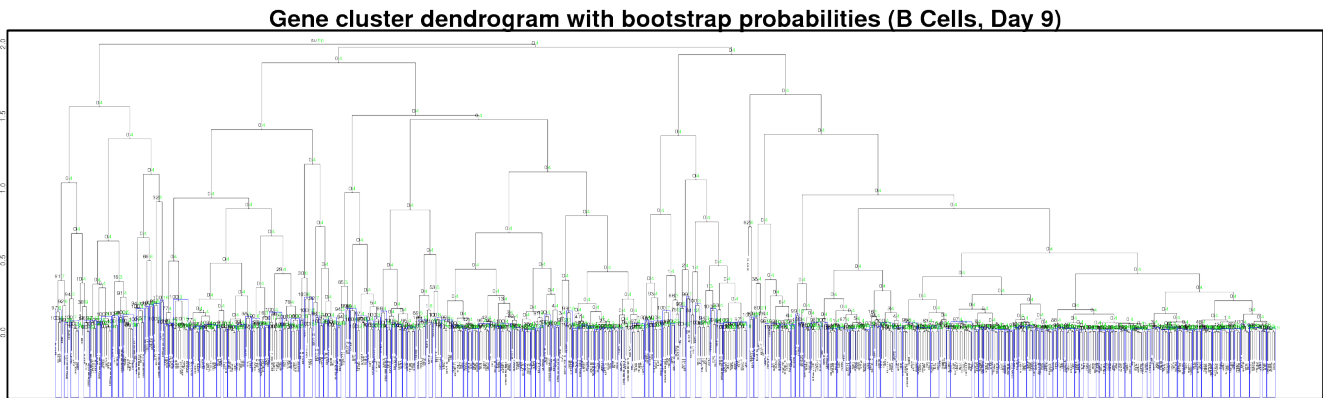
**Figure 65:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 6). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



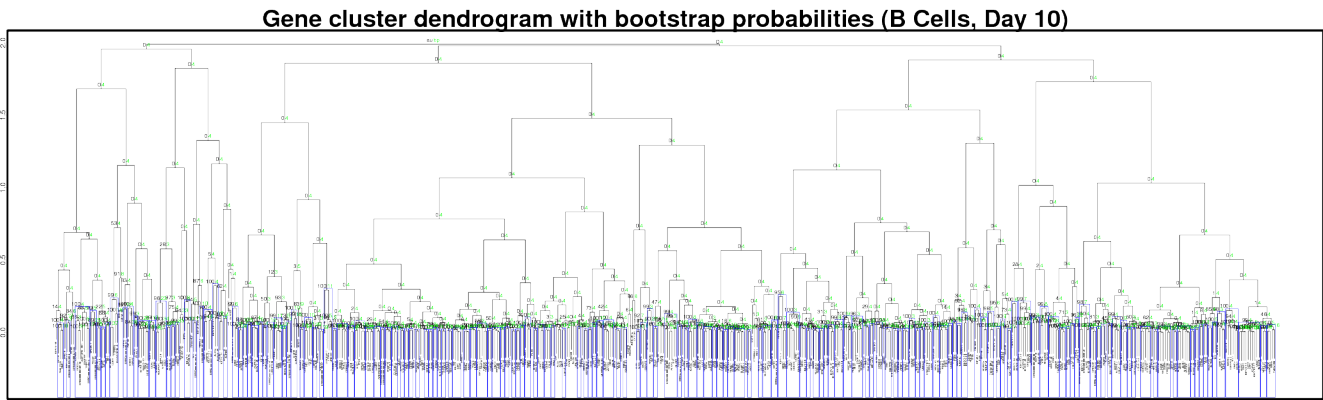
**Figure 66:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 7). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



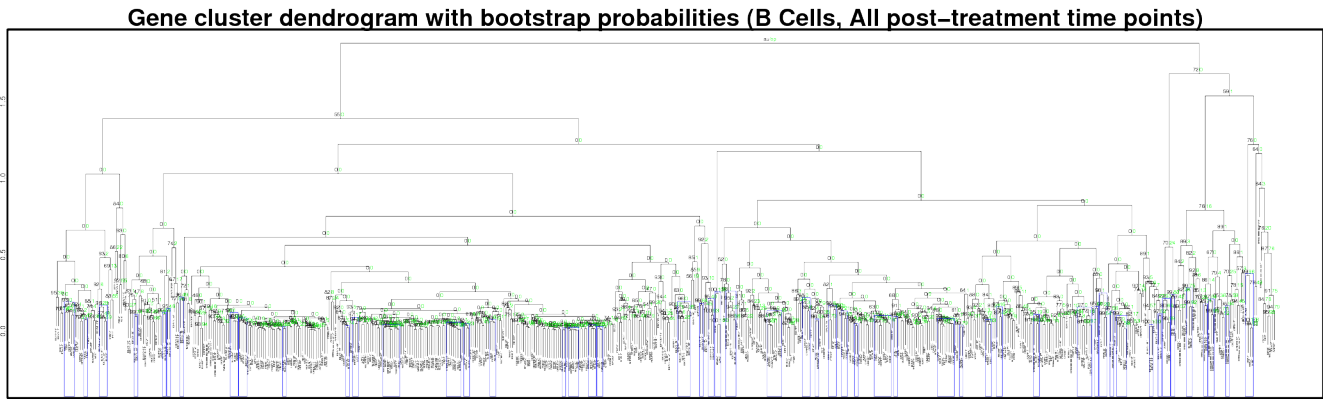
**Figure 67:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 8). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



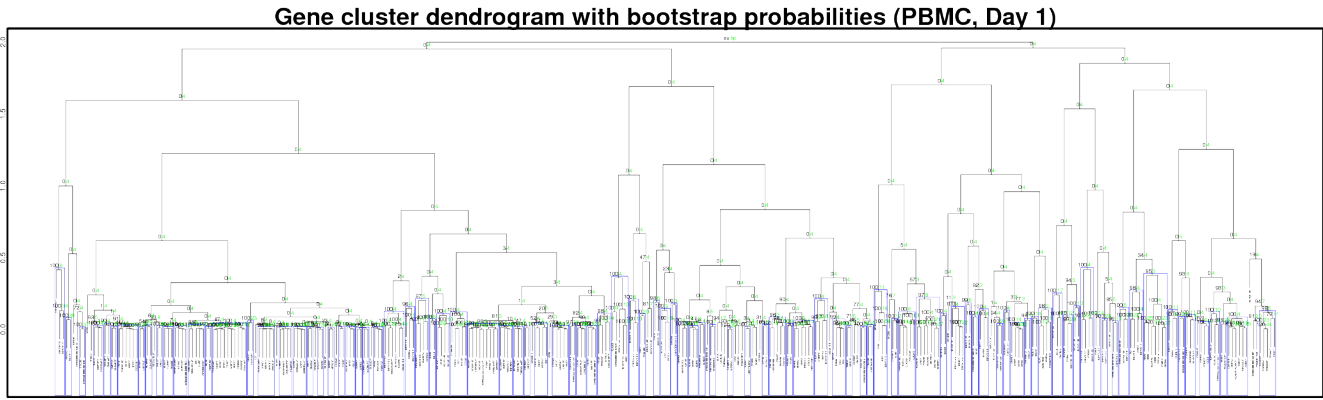
**Figure 68:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 9). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



**Figure 69:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, Day 10). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.

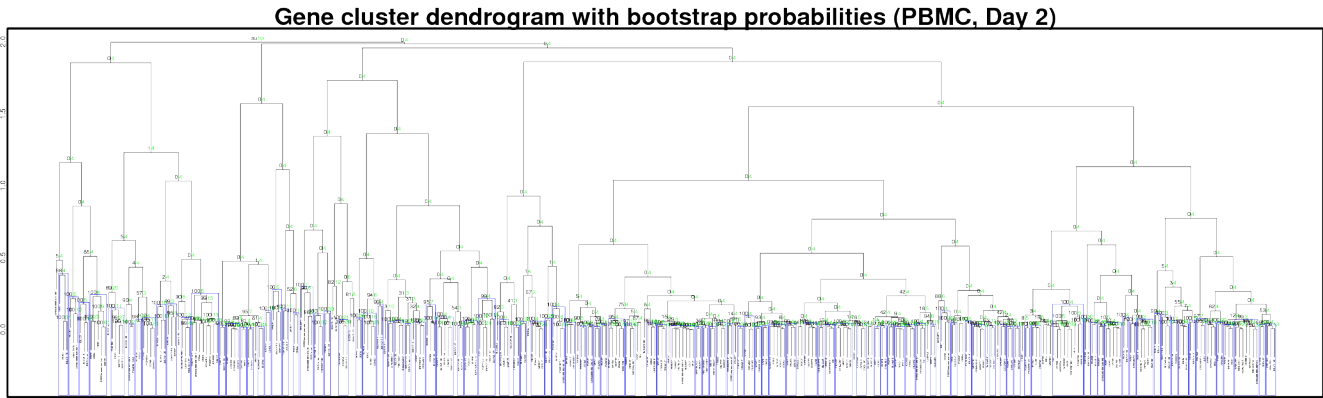


**Figure 70:** Co-expressed gene cluster dendrogram with bootstrap probabilities (B Cells, All post-treatment time points). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.

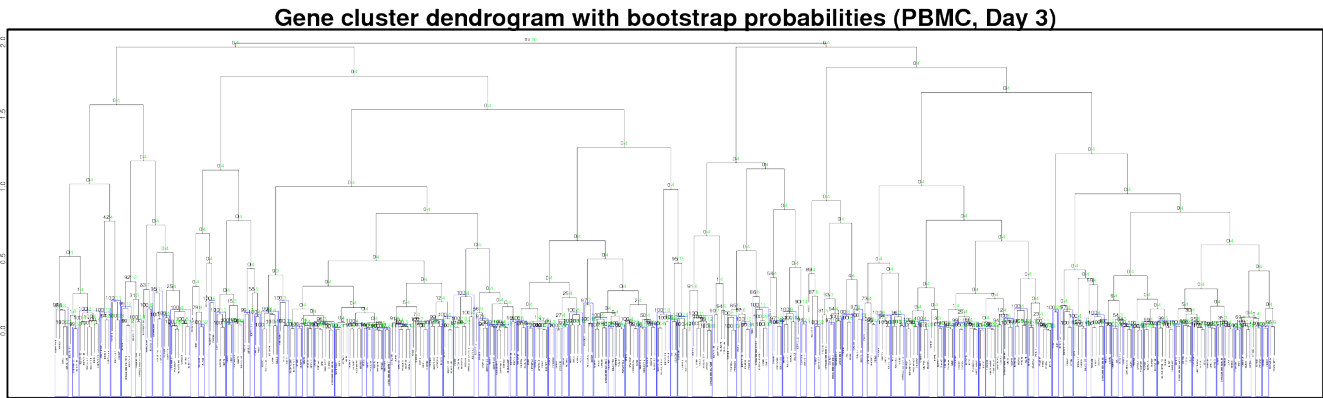


**Figure 71:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 1). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.

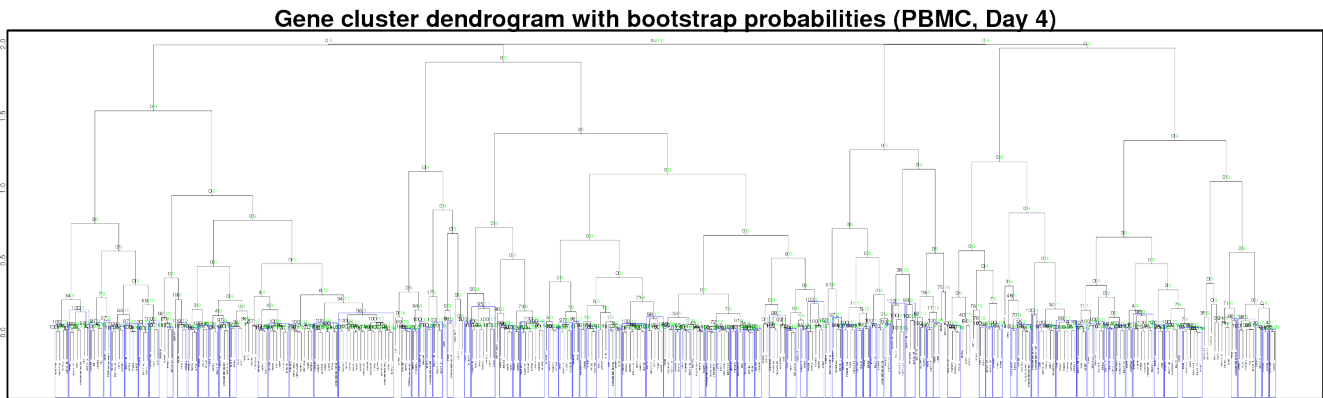




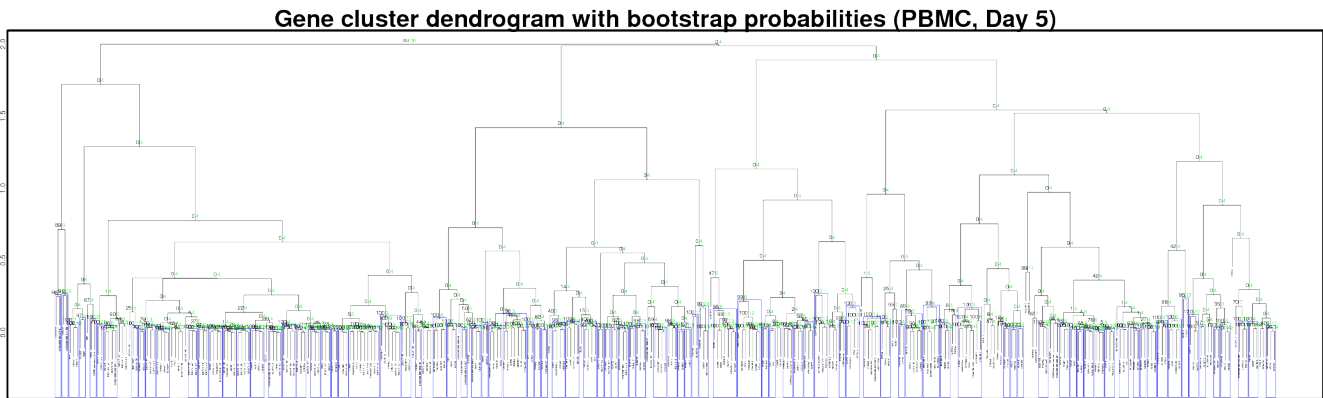
**Figure 72:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 2). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



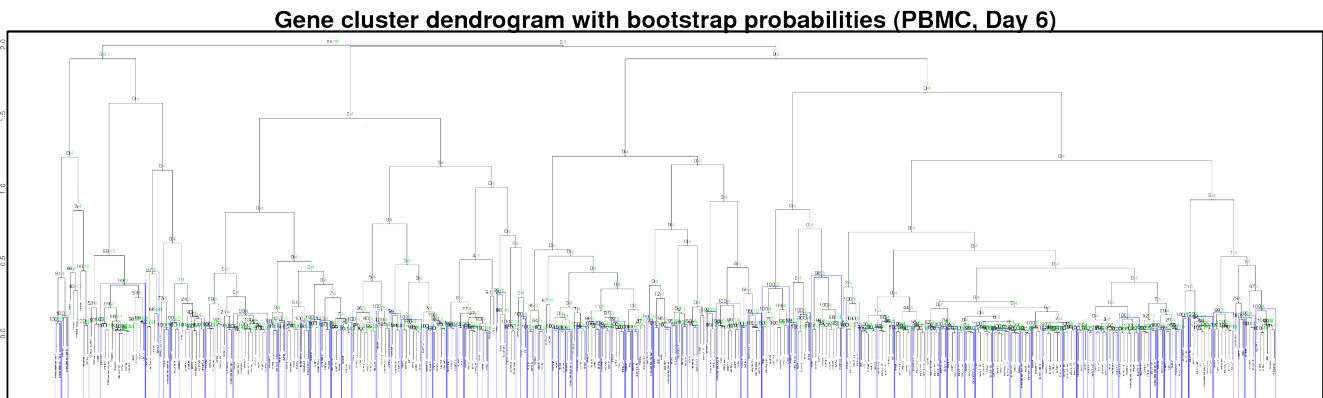
**Figure 73:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 3). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



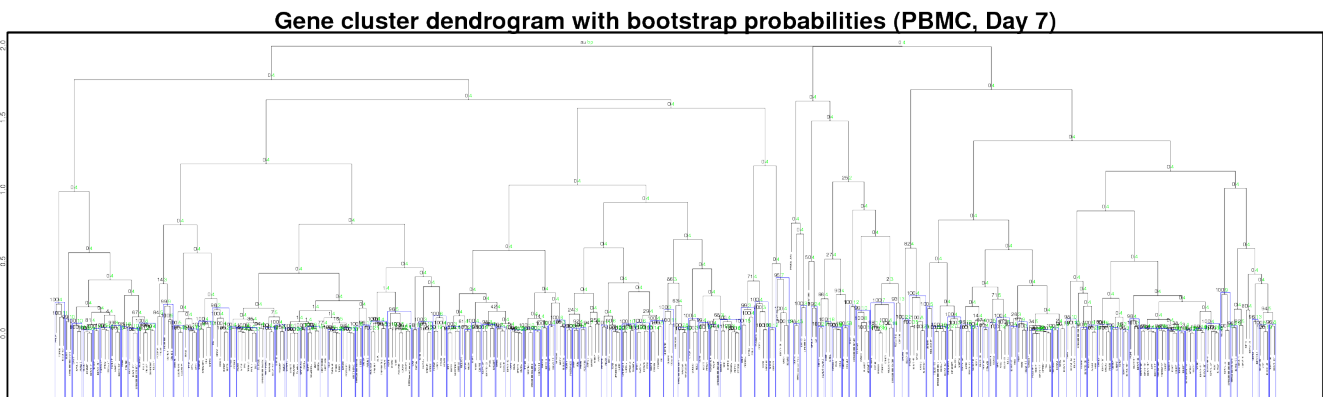
**Figure 74:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 4). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



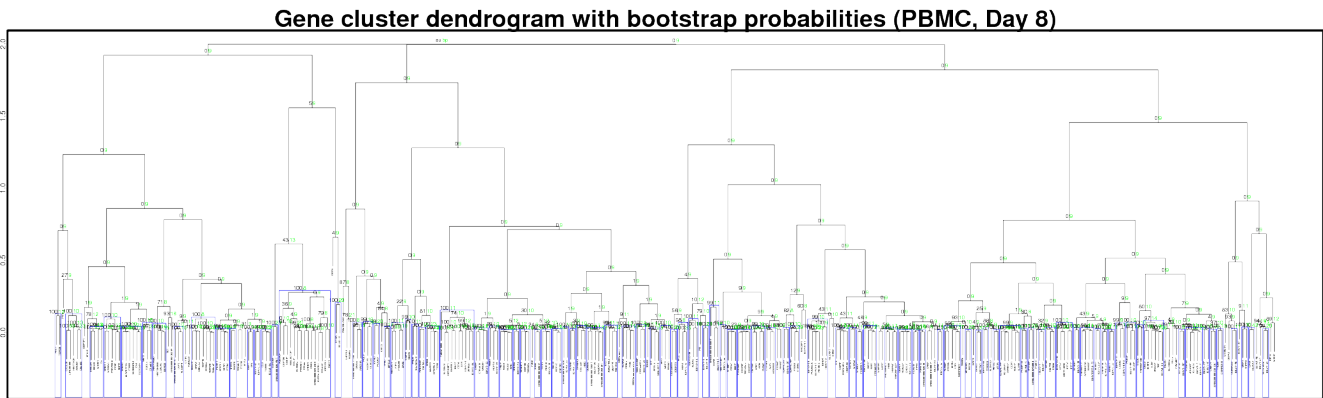
**Figure 75:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 5). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



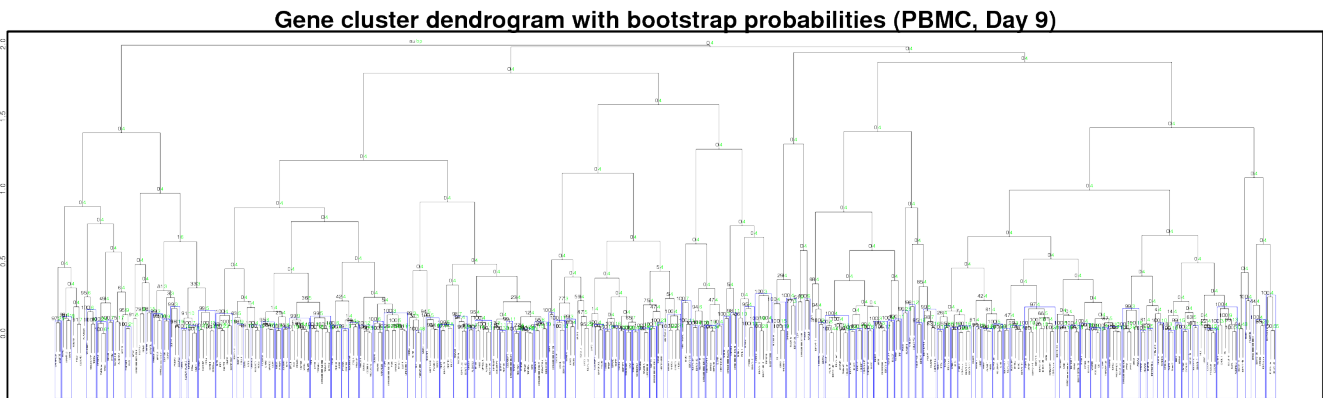
**Figure 76:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 6). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



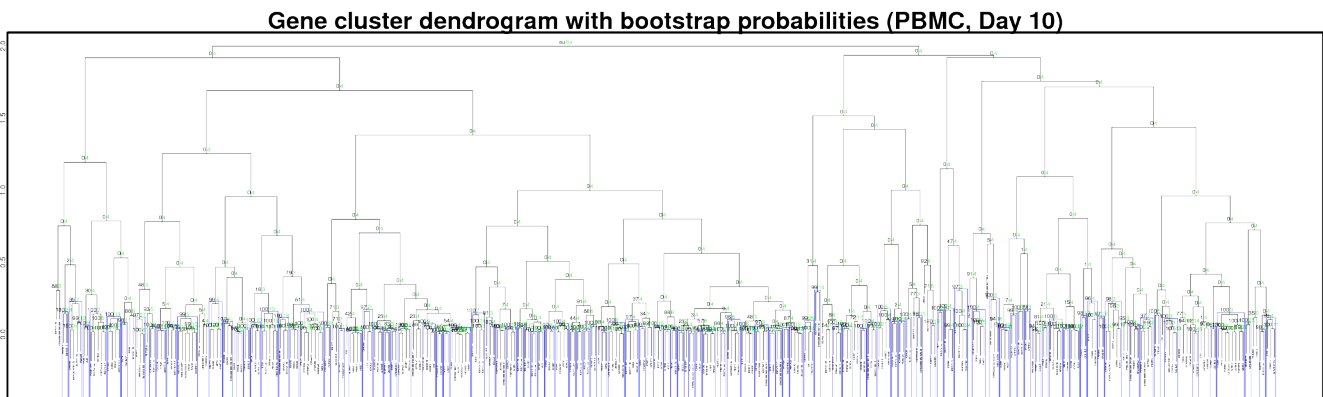
**Figure 77:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 7). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



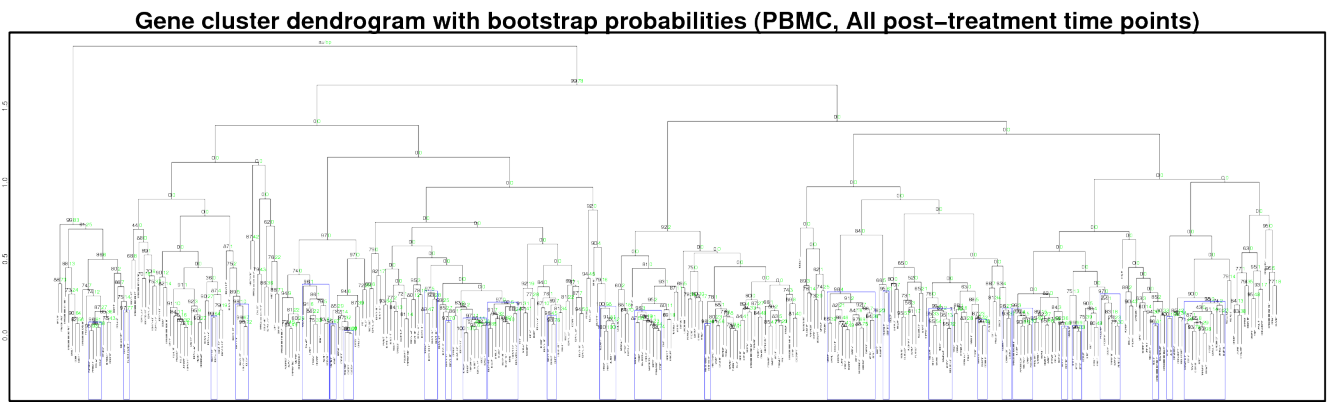
**Figure 78:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 8). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



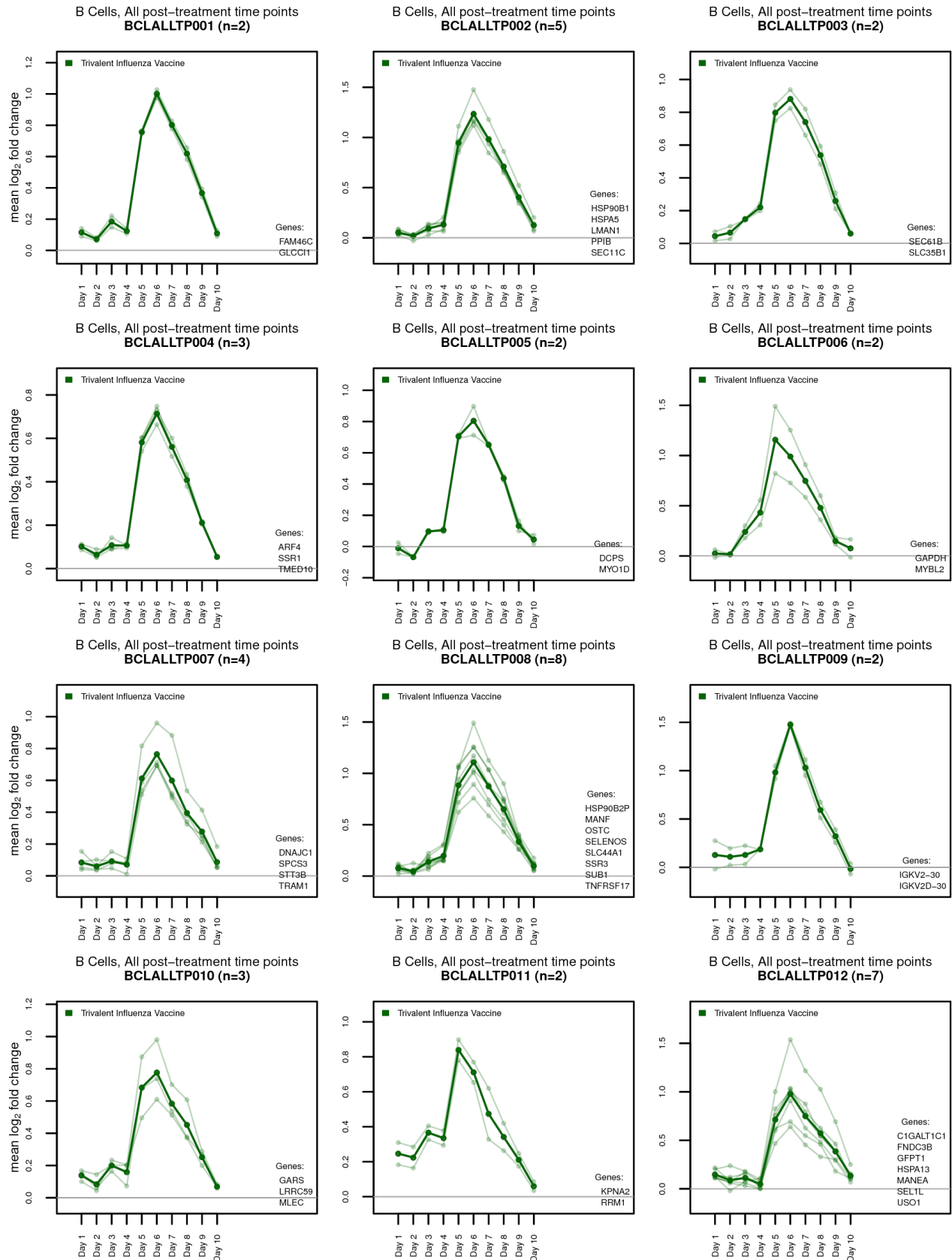
**Figure 79:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 9). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



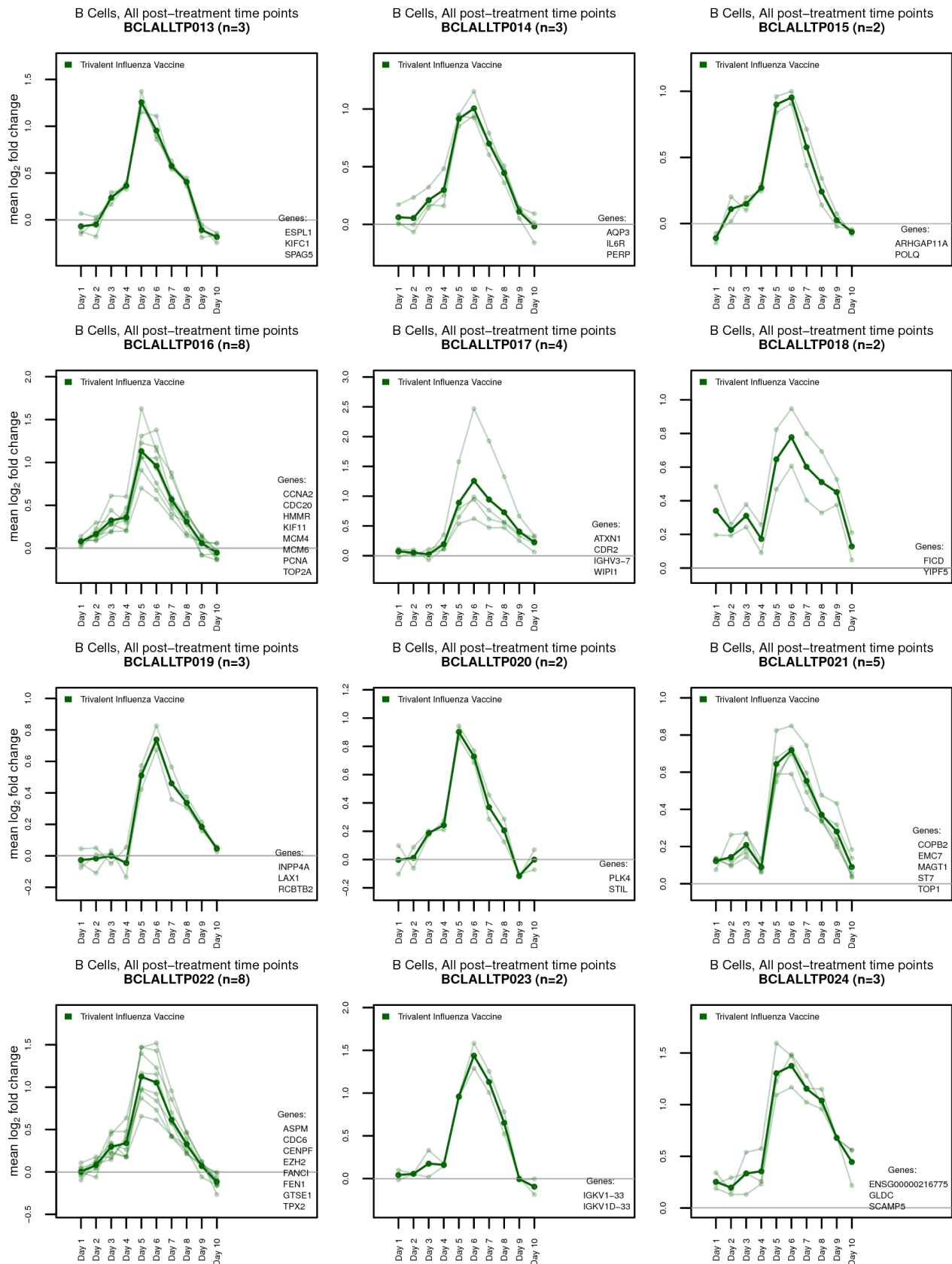
**Figure 80:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, Day 10). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



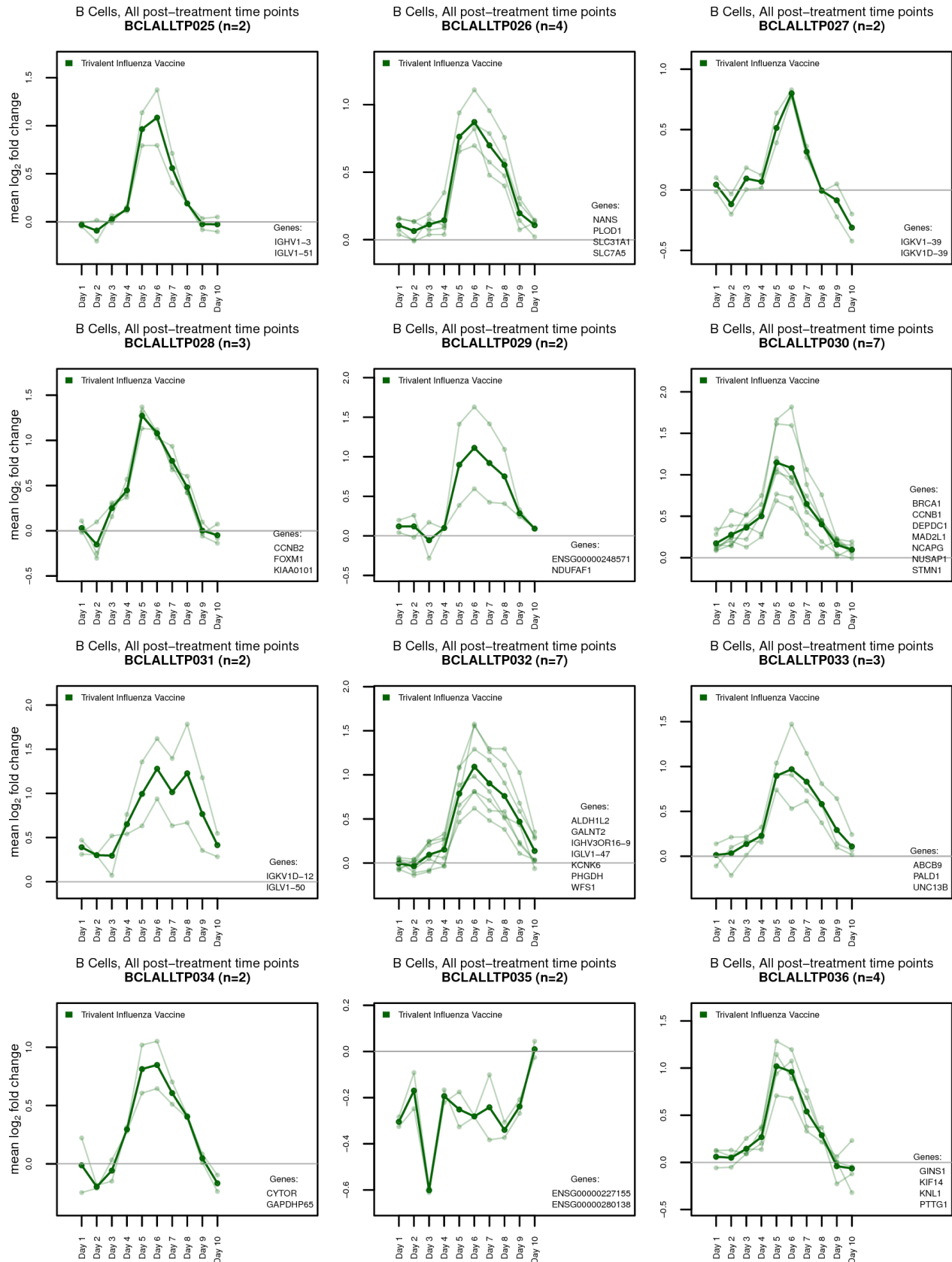
**Figure 81:** Co-expressed gene cluster dendrogram with bootstrap probabilities (PBMC, All post-treatment time points). The y axis shows the distance at which clusters were formed by the complete linkage clustering algorithm based on uncentered Pearson correlation distance between  $\log_2$  fold changes. Multiscale bootstrap probabilities are shown at each branch intersection. Significant clusters are highlighted in blue. Asterisks indicate genes that were significantly expressed at a certain day.



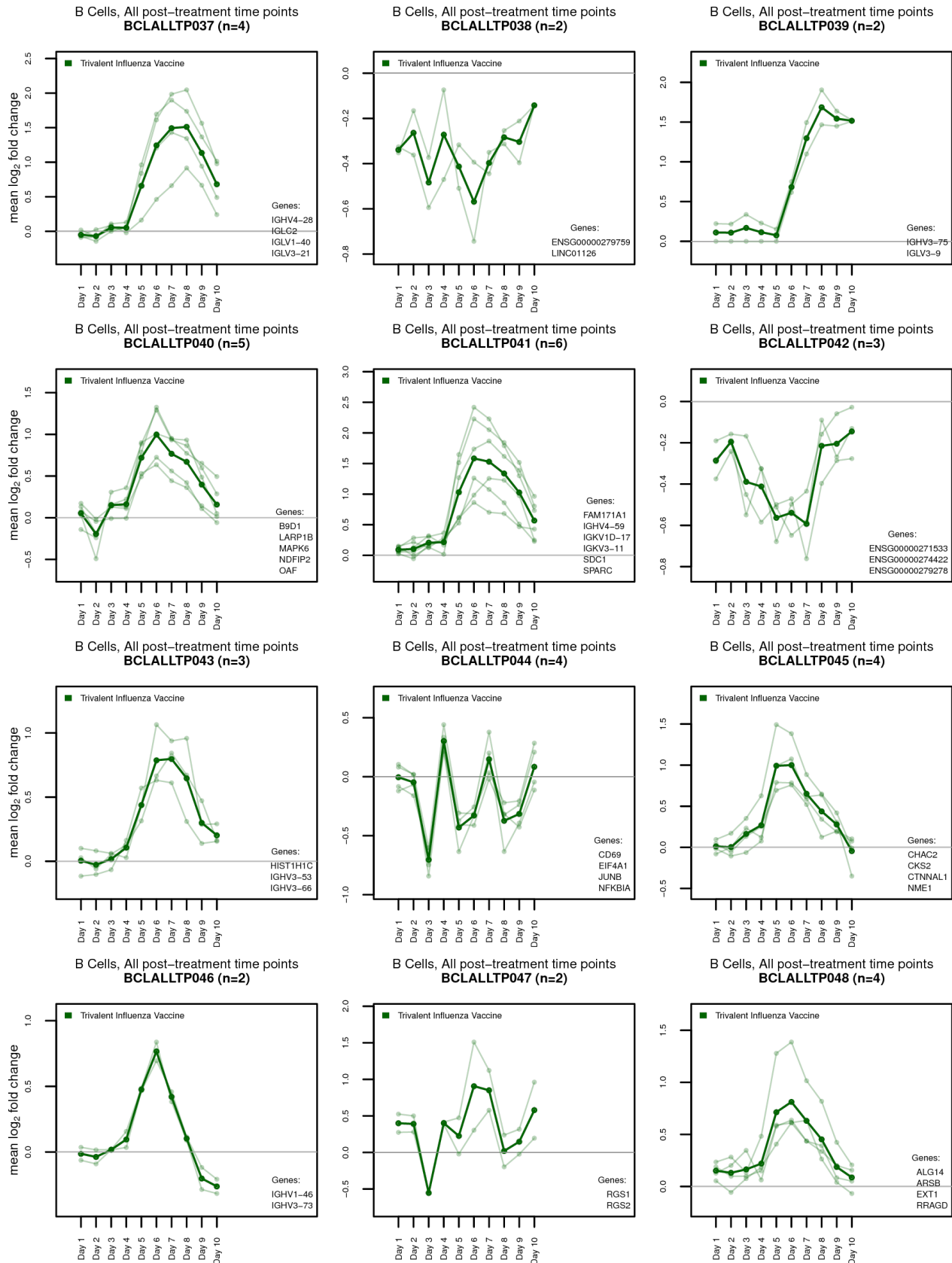
**Figure 82:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 1 of 5 (B Cells). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.



**Figure 83:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 2 of 5 (B Cells). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.

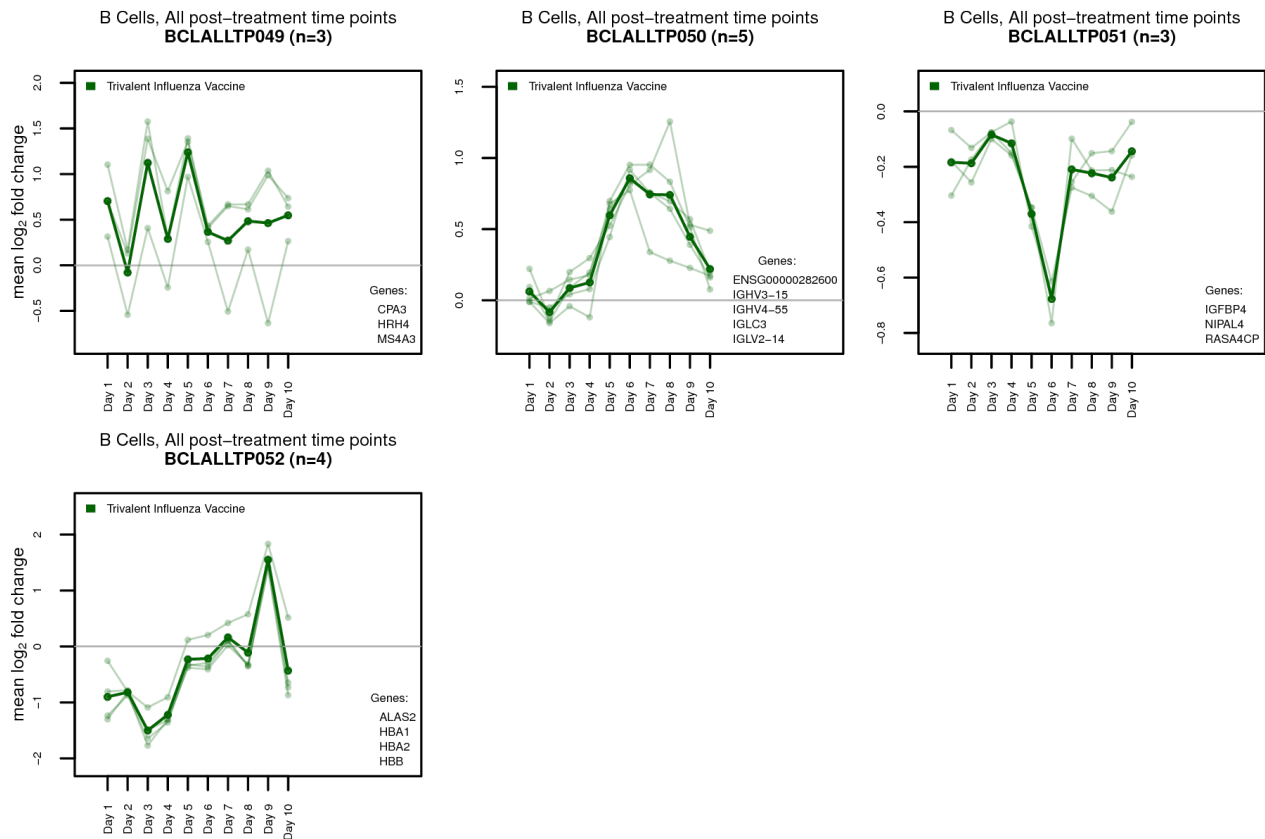


**Figure 84:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 3 of 5 (B Cells). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.

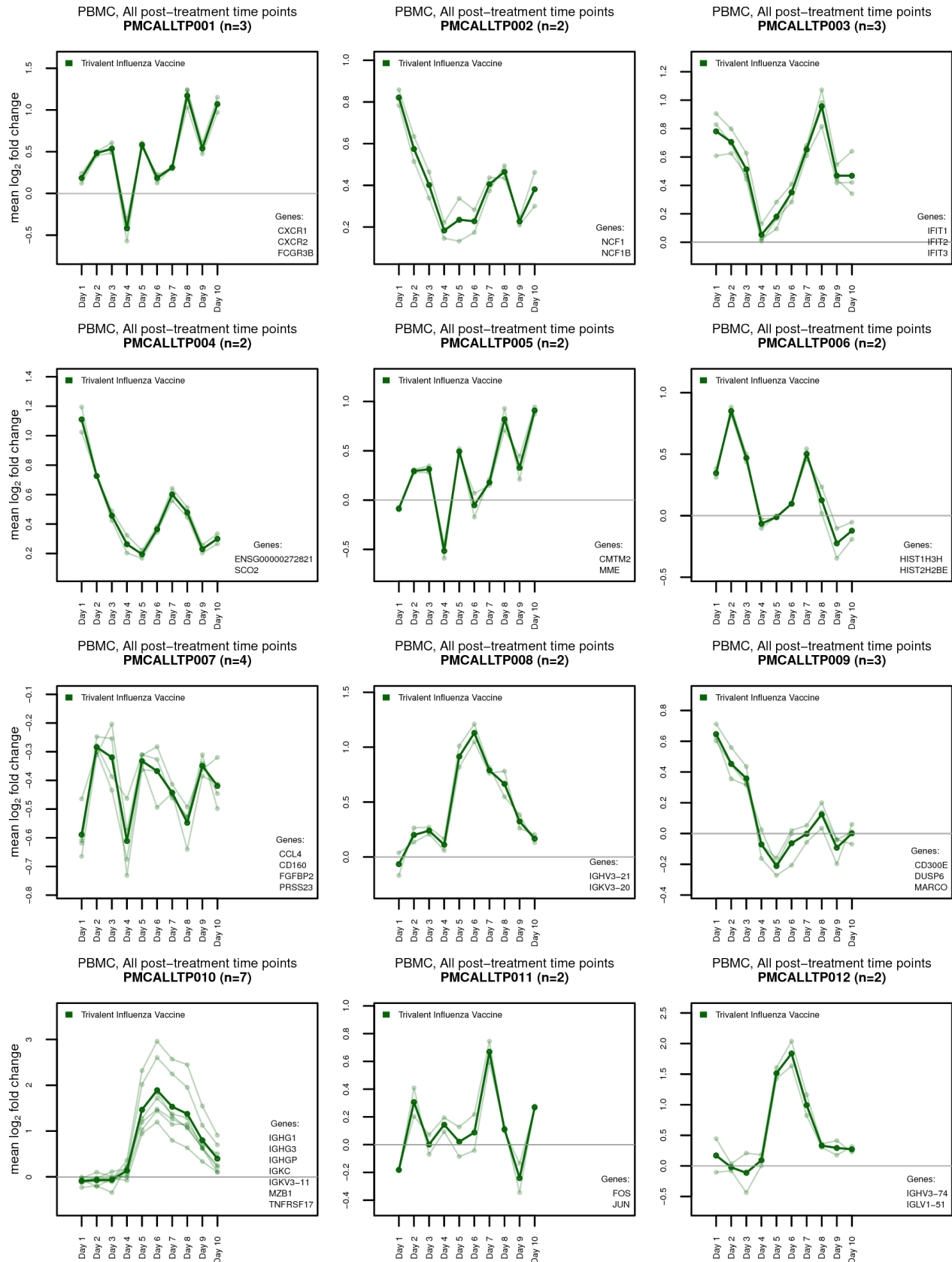


**Figure 85:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 4 of 5 (B Cells). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.

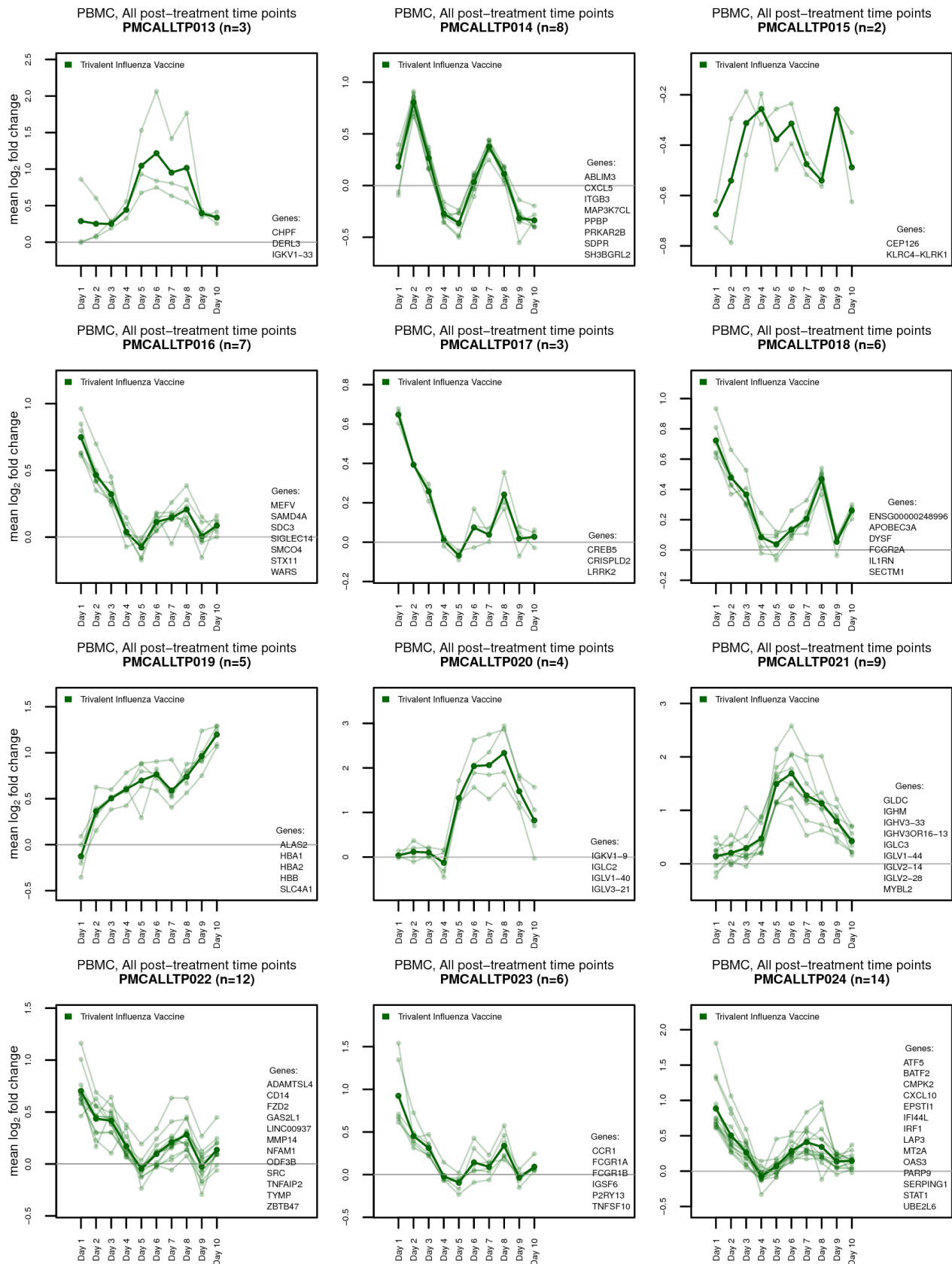




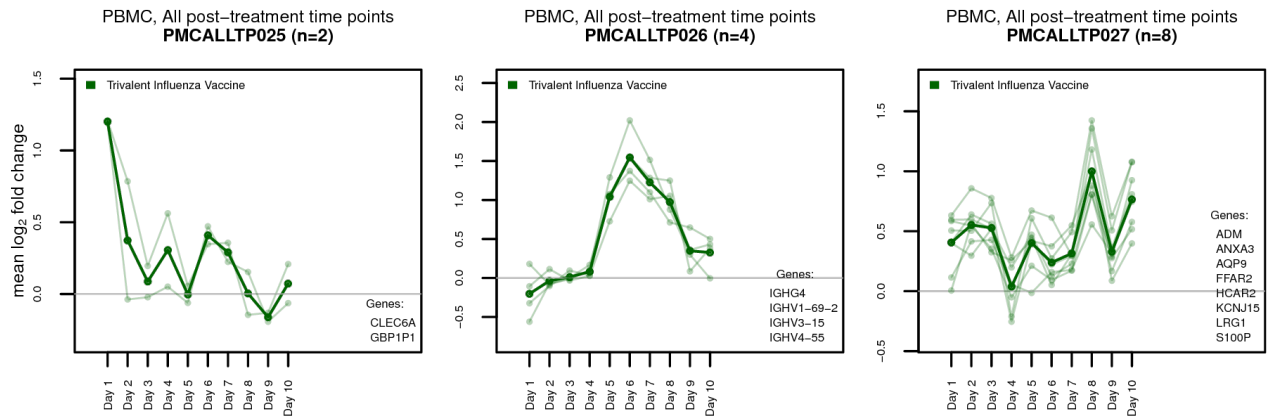
**Figure 86:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 5 of 5 (B Cells). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.



**Figure 87:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 1 of 3 (PBMC). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.



**Figure 88:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 2 of 3 (PBMC). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.



**Figure 89:** Co-expressed gene cluster time trends of  $\log_2$  fold change from pre-treatment levels by treatment 3 of 3 (PBMC). Header indicates cluster ID. Mean  $\log_2$  fold change across cluster genes is drawn in bold. Individual mean gene  $\log_2$  fold changes are plotted in lighter colors.

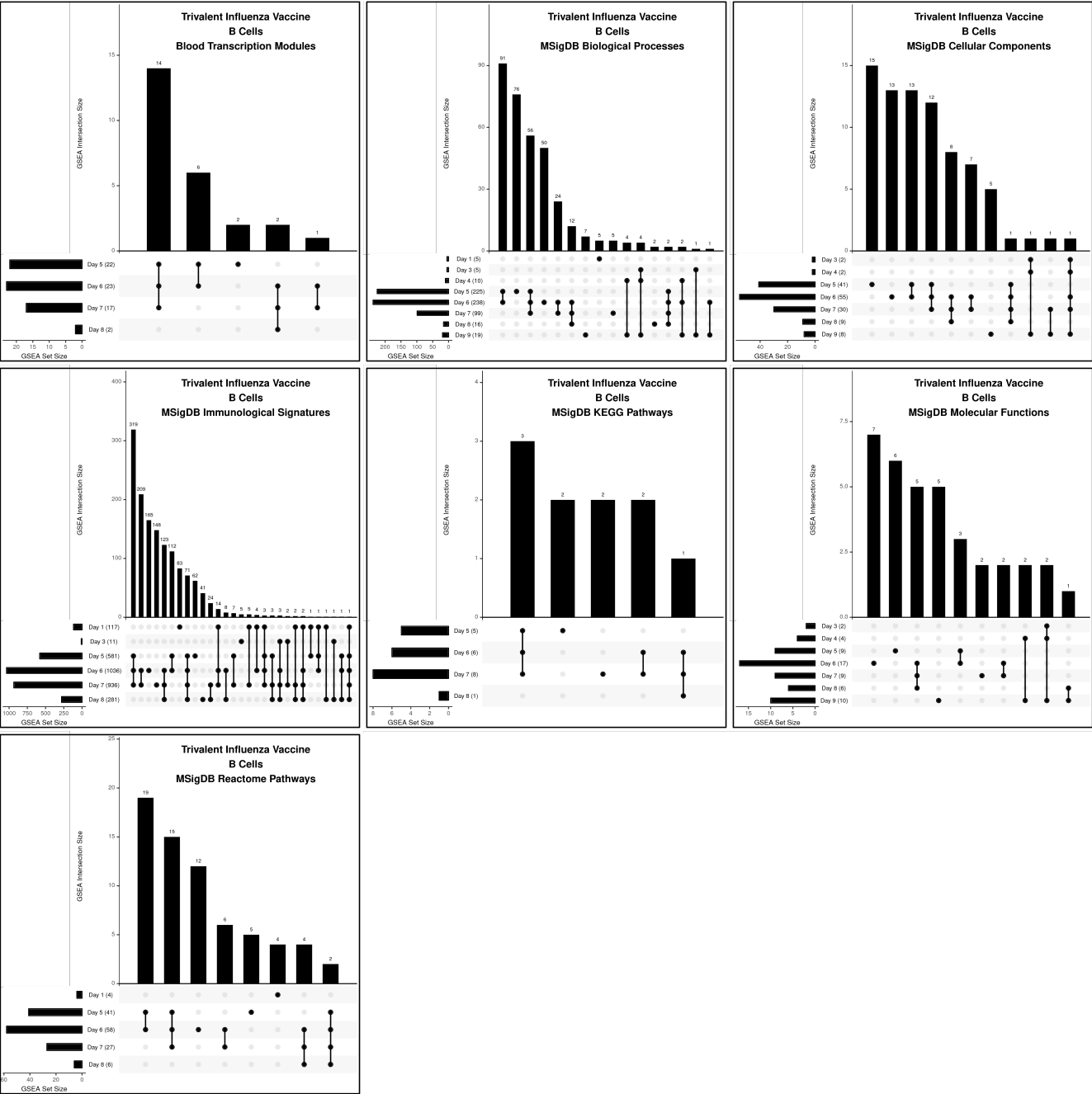


Figure 90: UpSet plots of enriched gene sets between post-treatment time points (B Cells, Trivalent Influenza Vaccine).

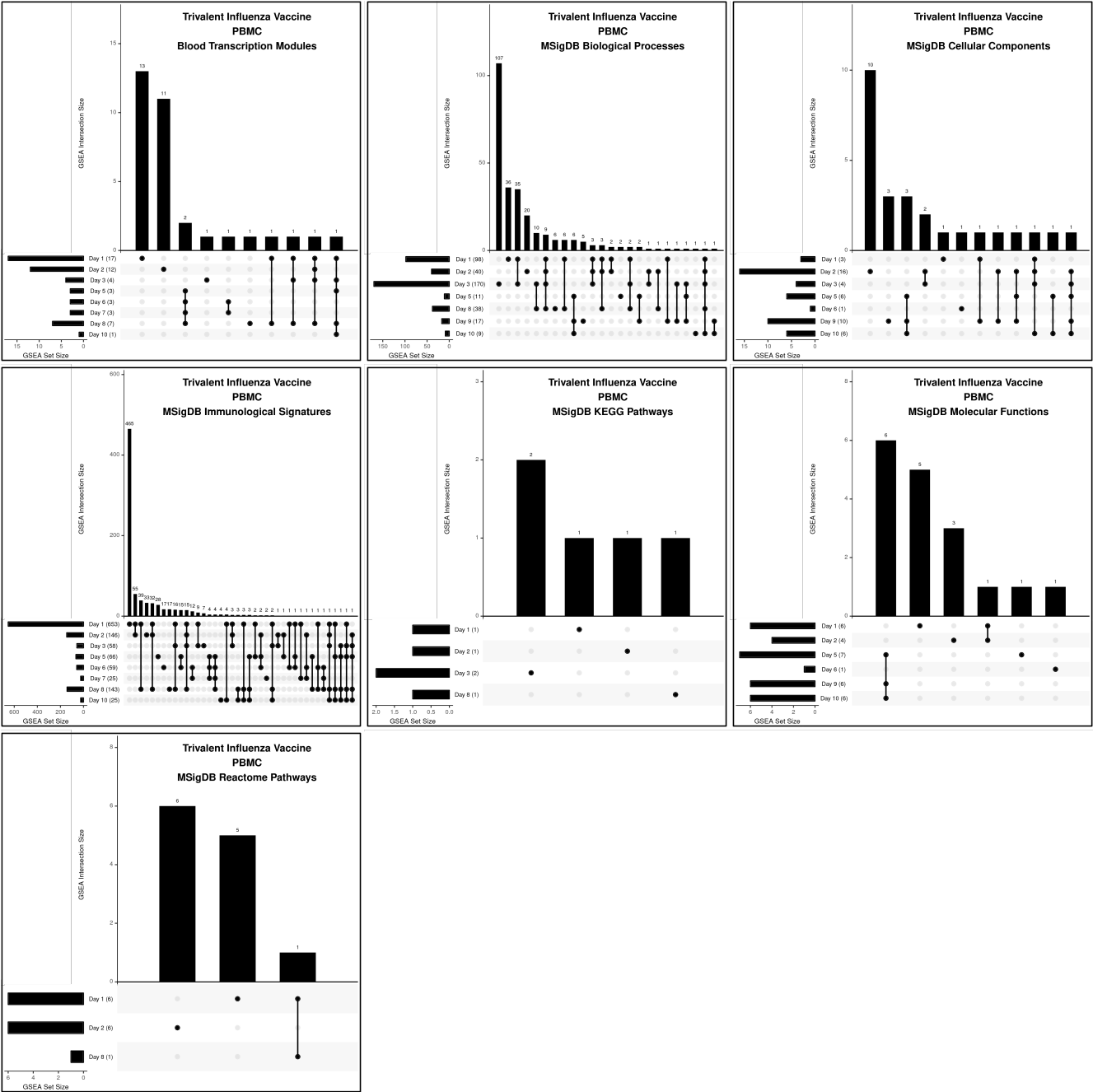


Figure 91: UpSet plots of enriched gene sets between post-treatment time points (PBMC, Trivalent Influenza Vaccine).

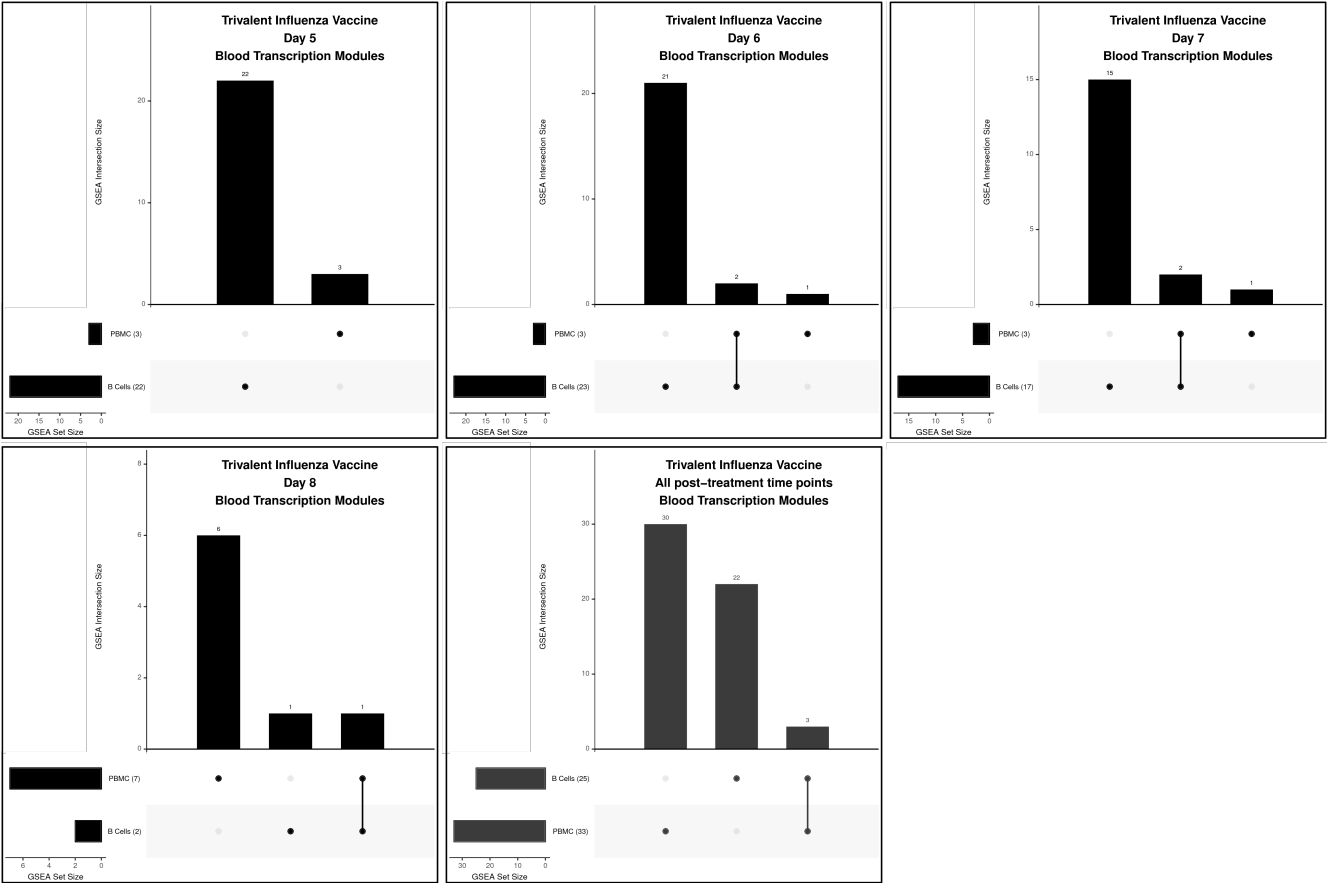


Figure 92: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, Blood Transcription Modules).

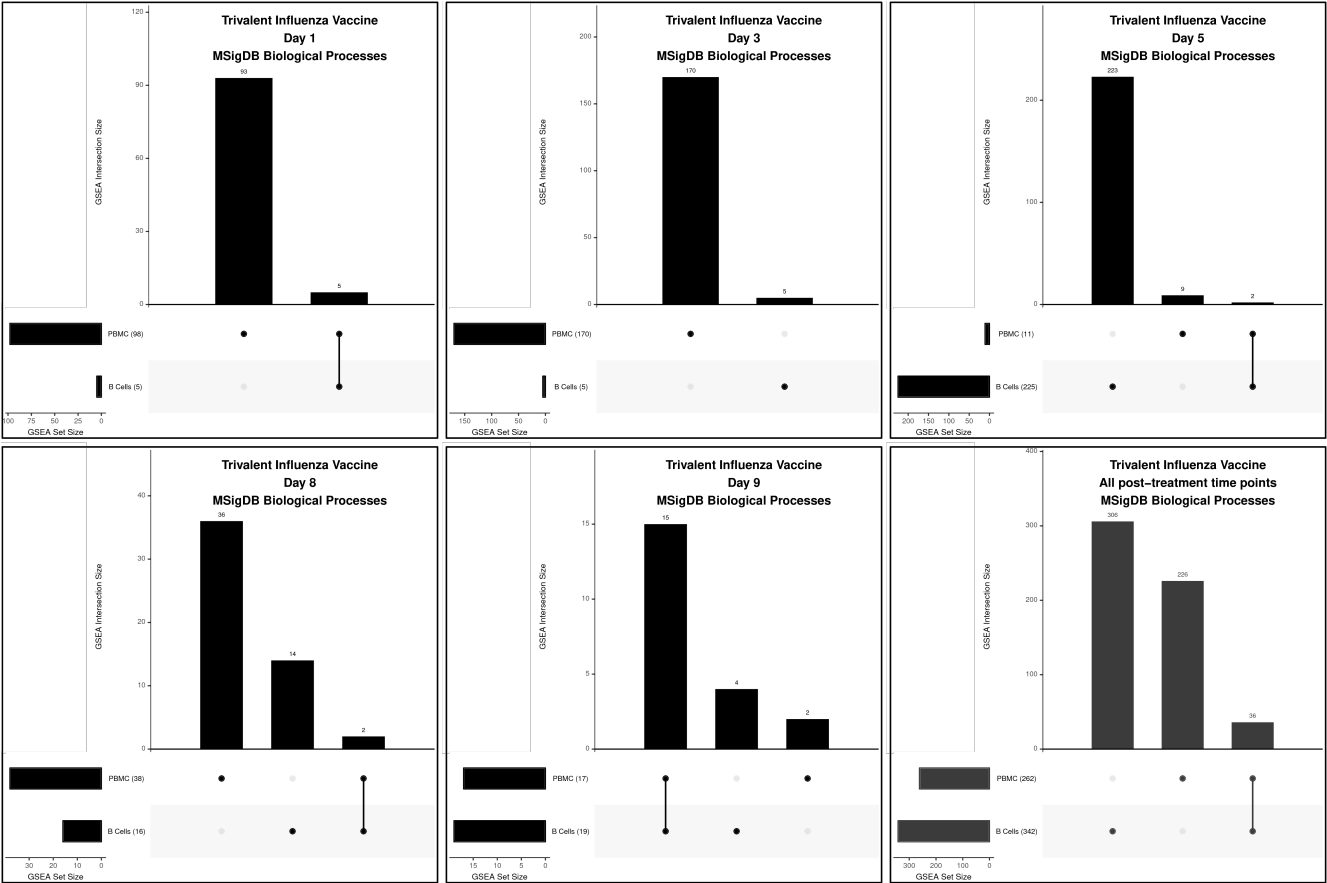


Figure 93: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB Biological Processes).



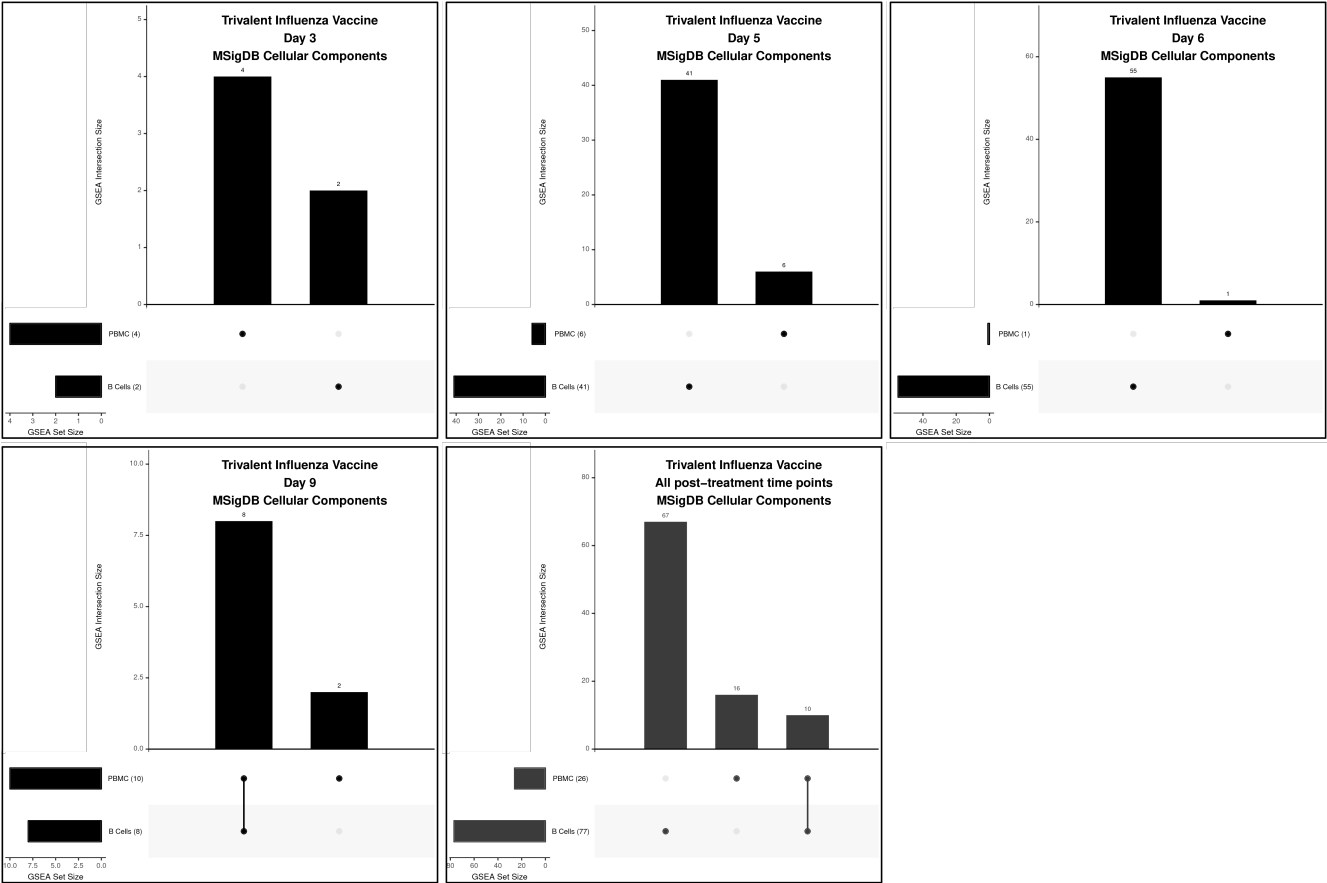


Figure 94: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB Cellular Components).

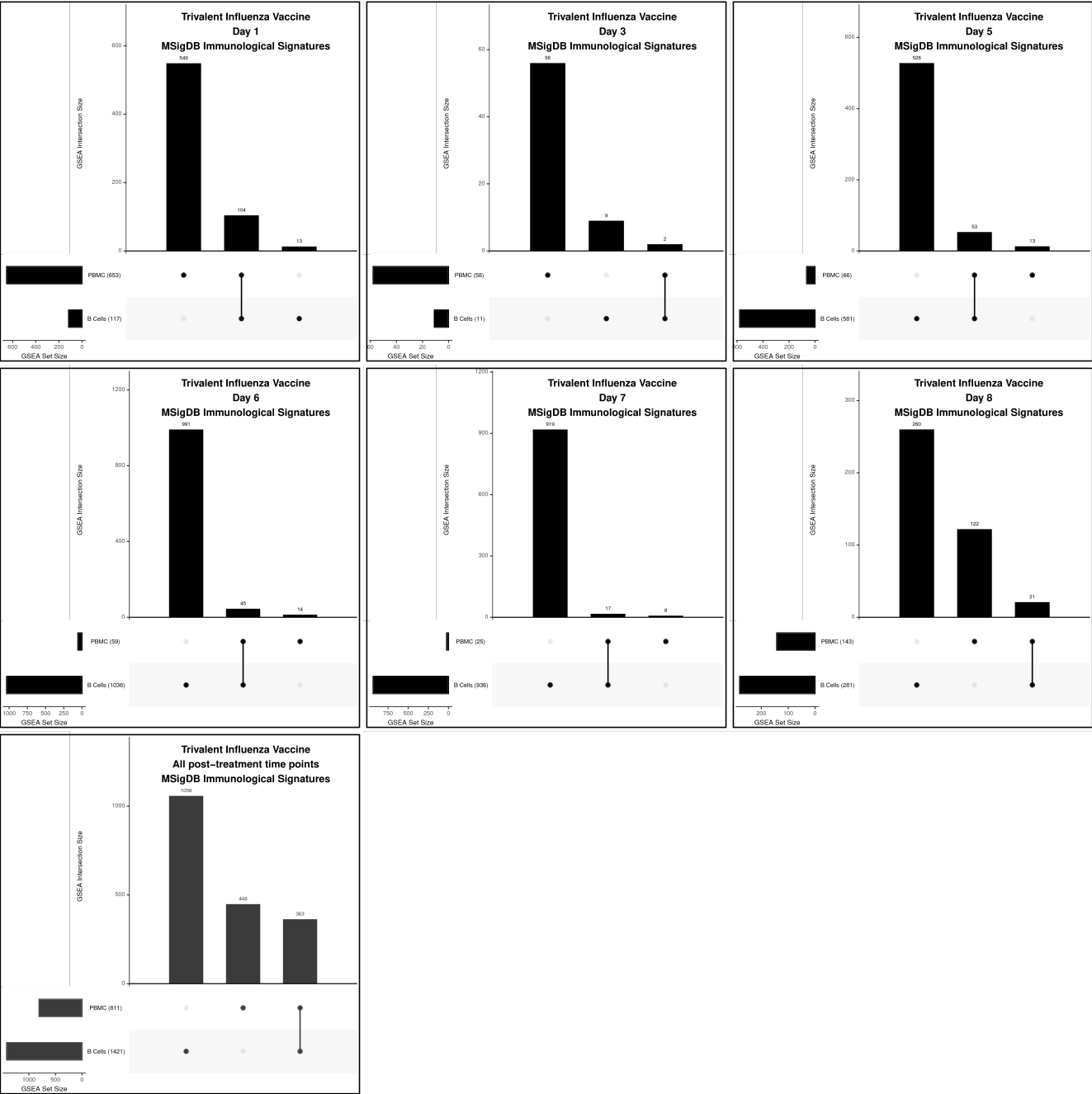


Figure 95: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB Immunological Signatures).

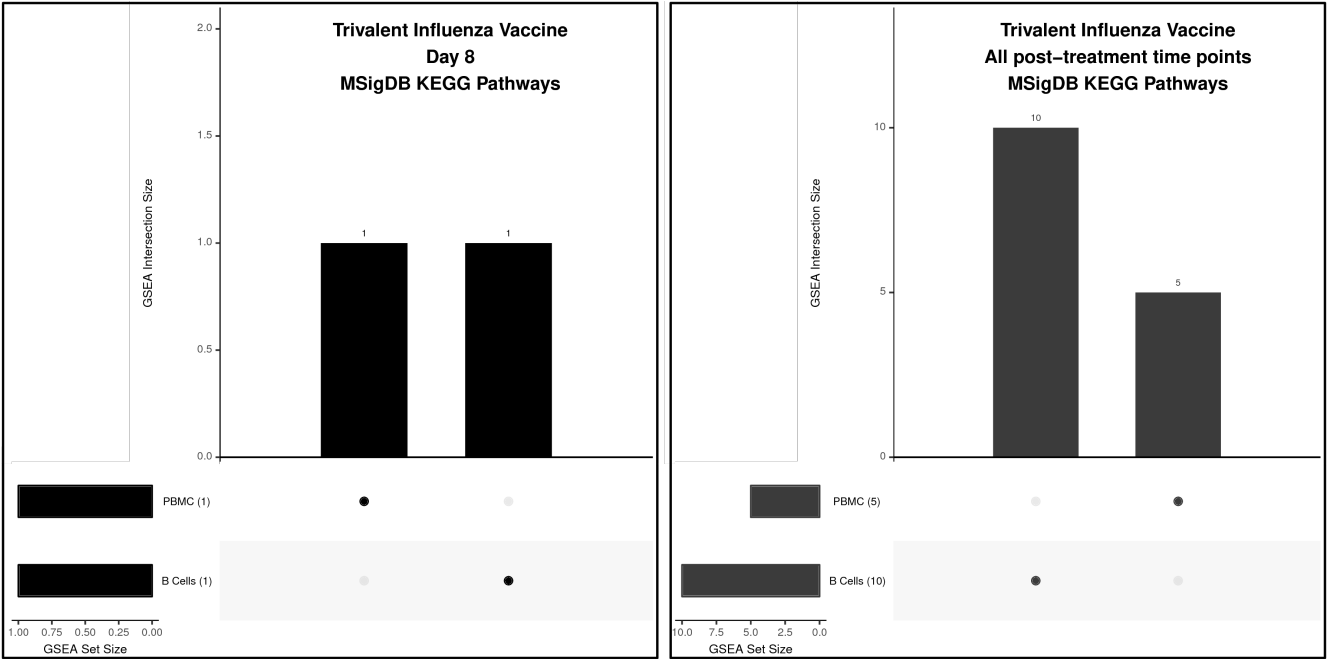


Figure 96: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB KEGG Pathways).

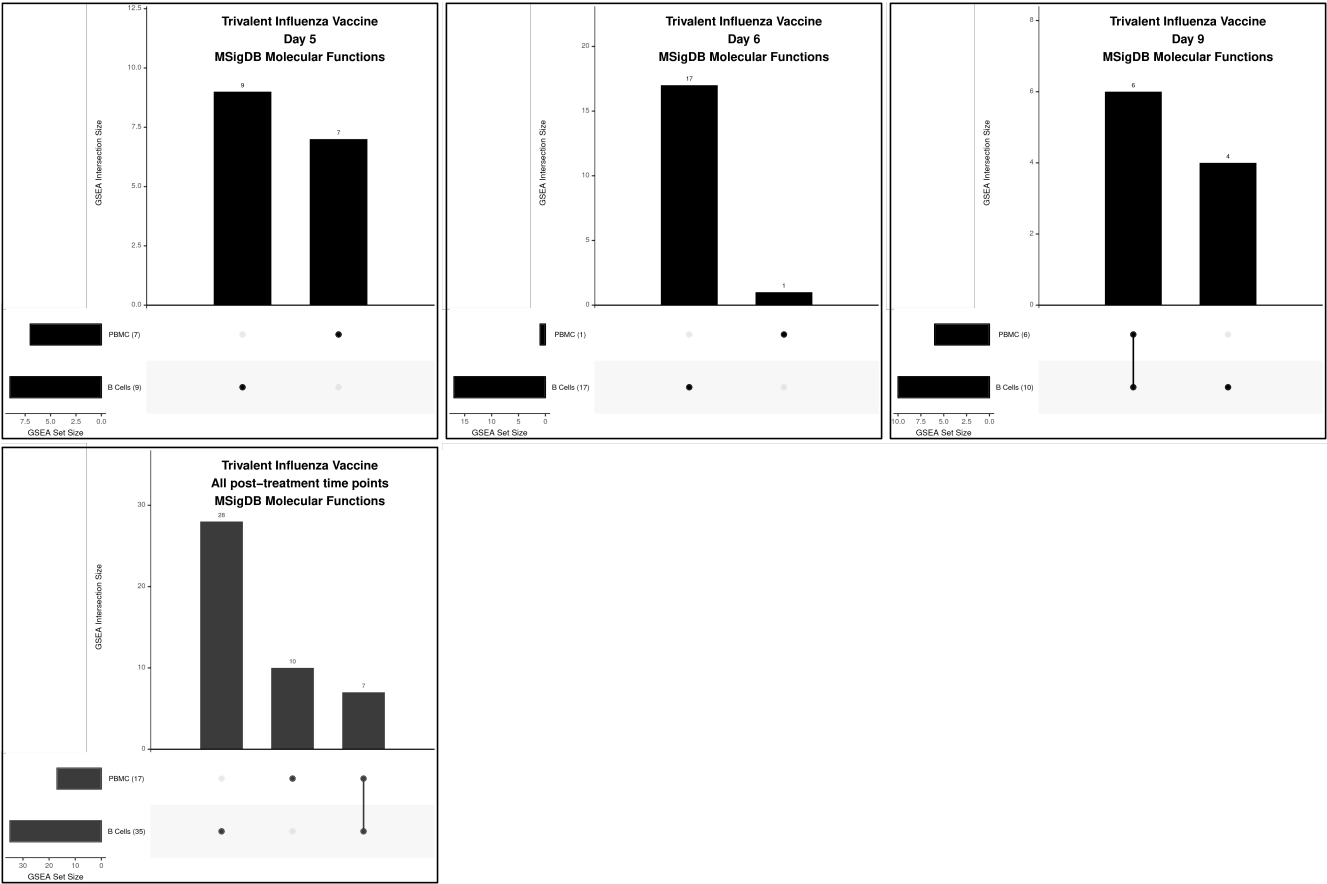


Figure 97: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB Molecular Functions).

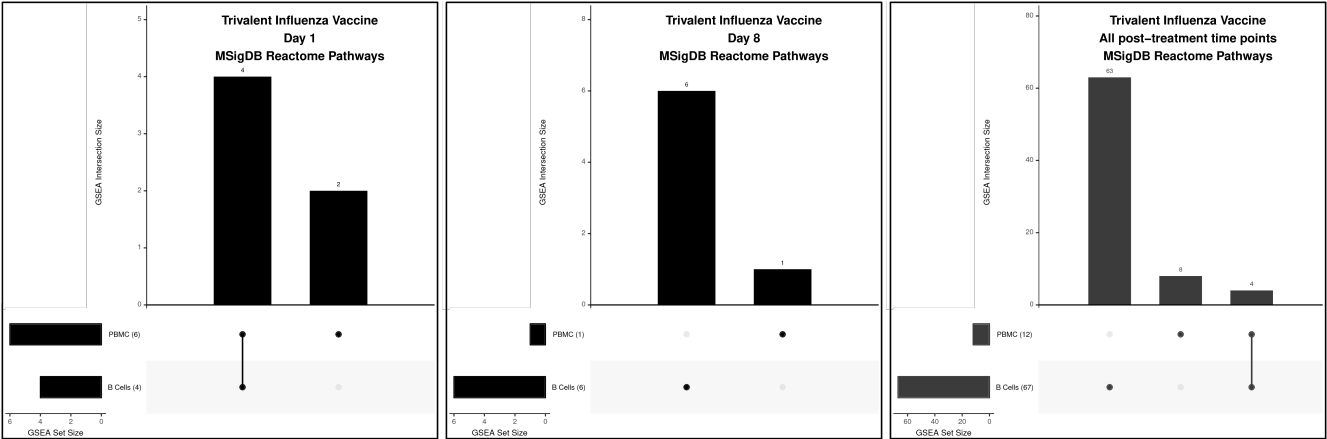


Figure 98: UpSet plots of enriched gene sets between specimen types (Trivalent Influenza Vaccine, MSigDB Reactome Pathways).

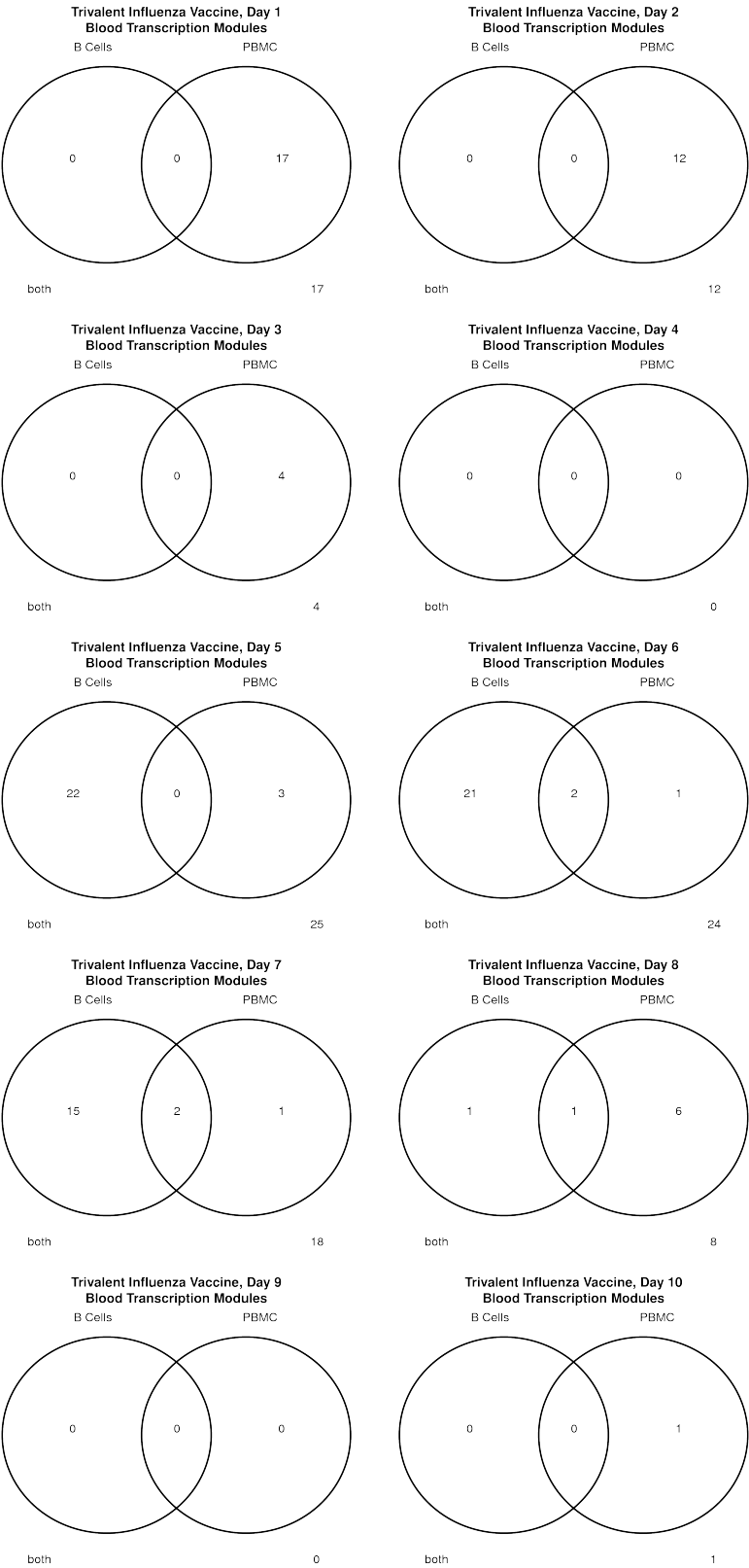
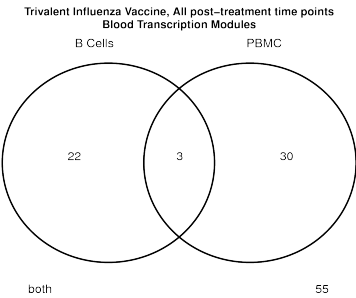


Figure 99: Venn diagrams of enriched Blood Transcription Modules between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 100:** Venn diagrams of enriched Blood Transcription Modules between specimen types 2 of 2 (Trivalent Influenza Vaccine).

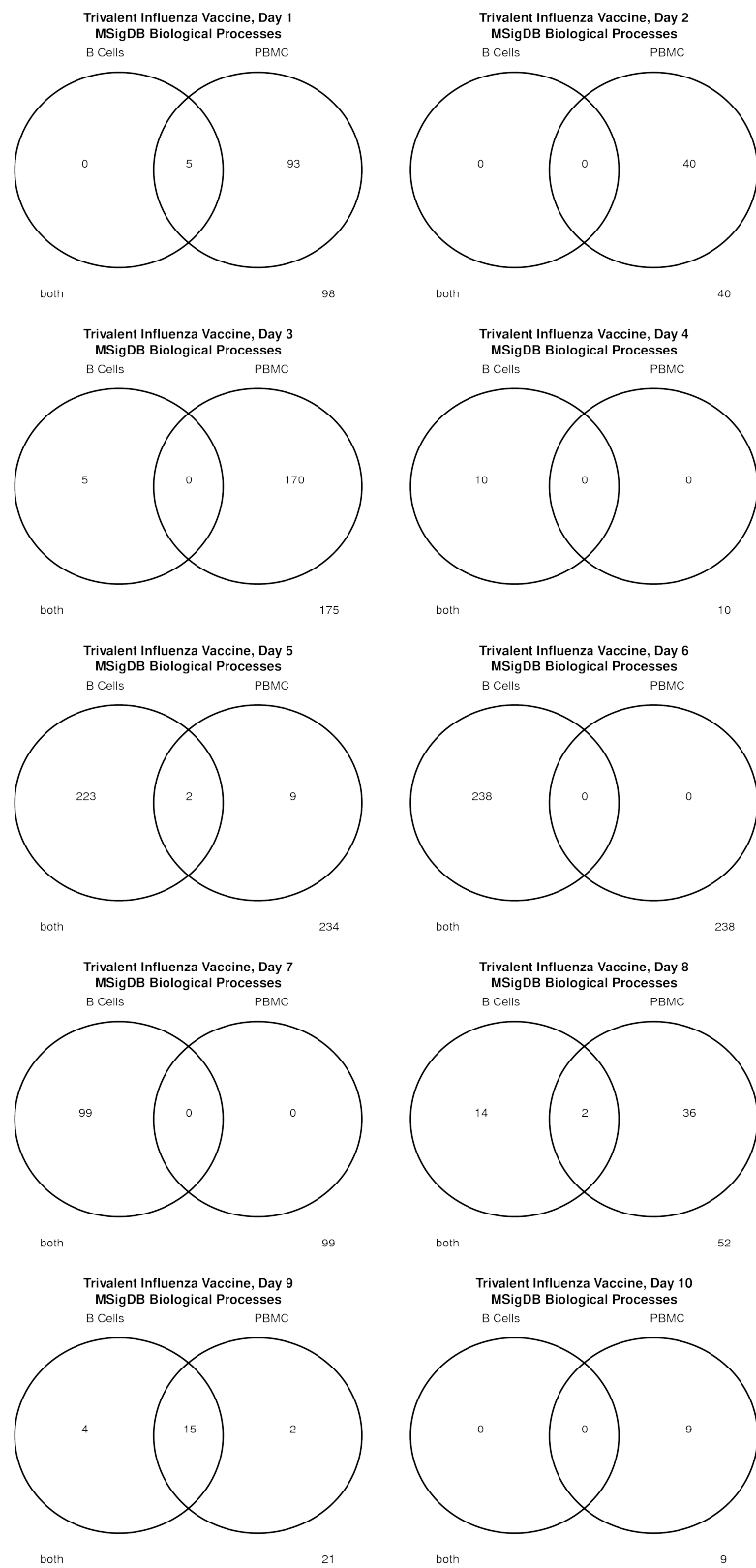
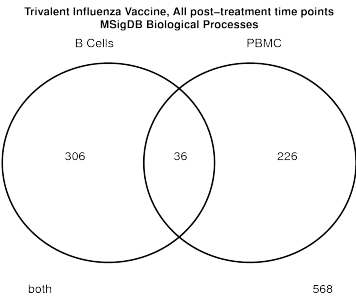


Figure 101: Venn diagrams of enriched MSigDB Biological Processes between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 102:** Venn diagrams of enriched MSigDB Biological Processes between specimen types 2 of 2 (Trivalent Influenza Vaccine).



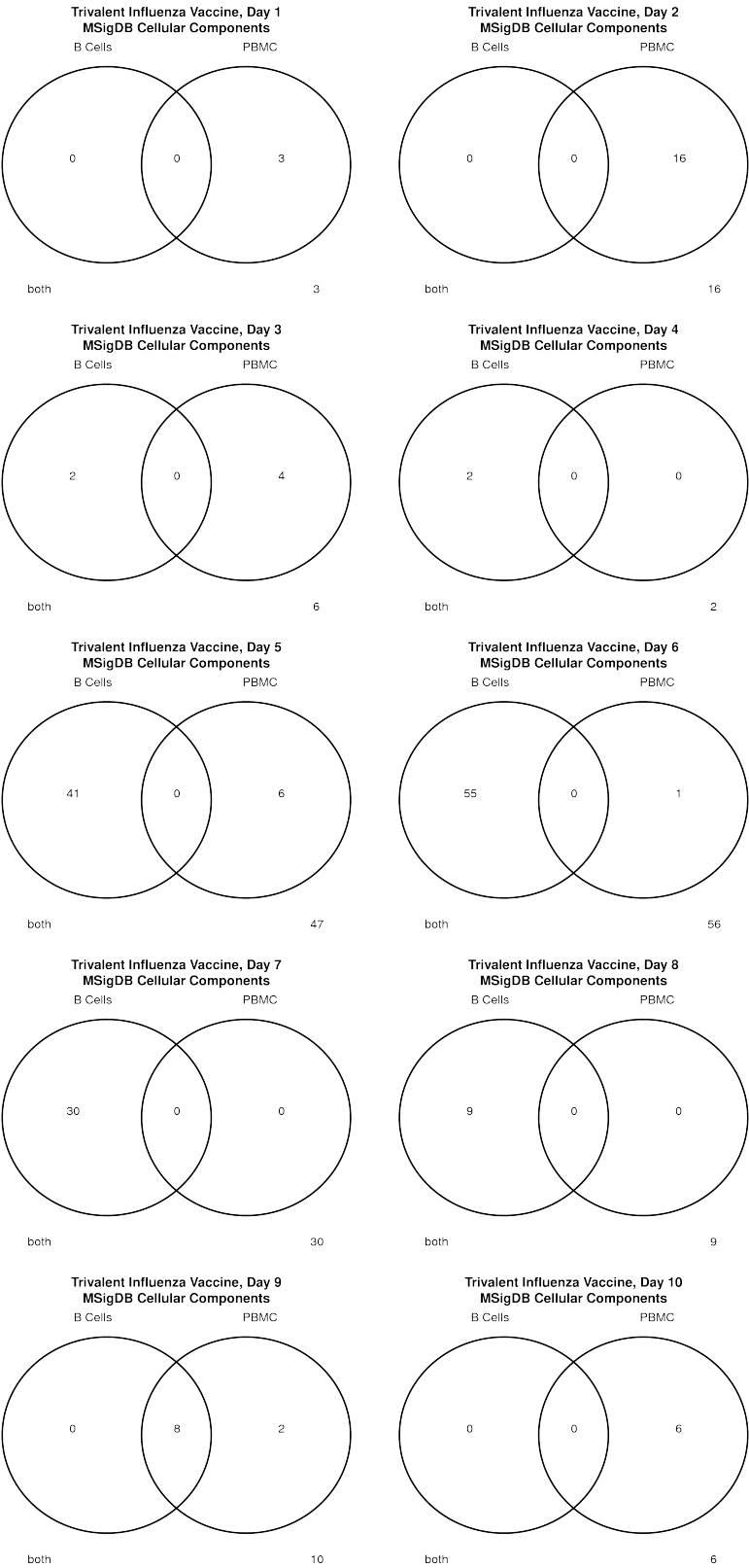
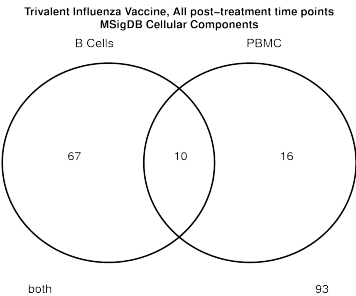


Figure 103: Venn diagrams of enriched MSigDB Cellular Components between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 104:** Venn diagrams of enriched MSigDB Cellular Components between specimen types 2 of 2 (Trivalent Influenza Vaccine).

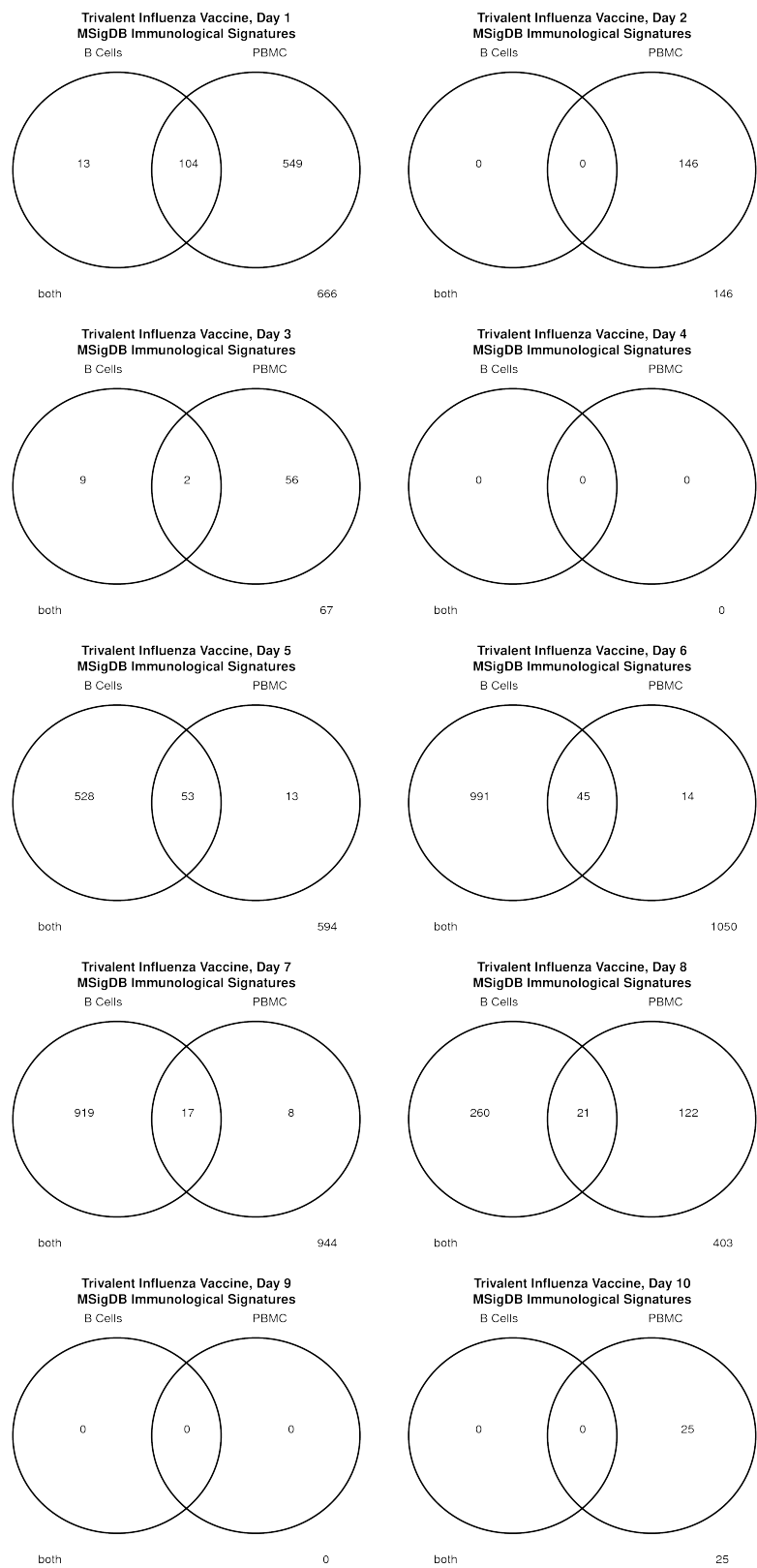
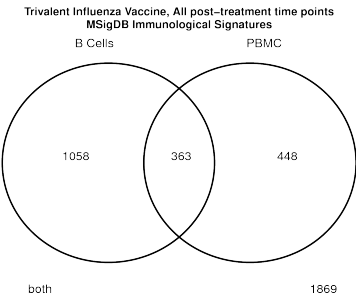
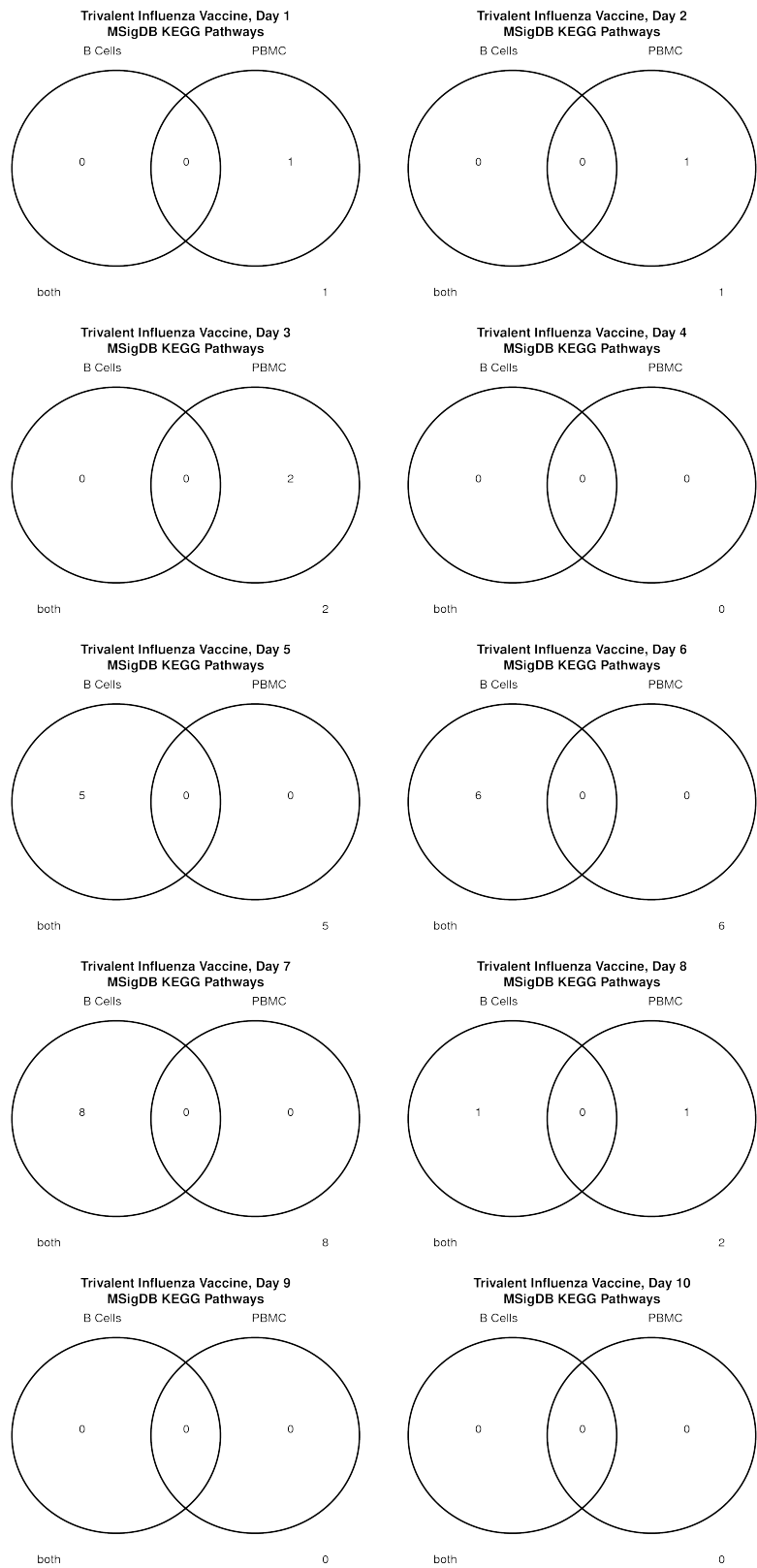


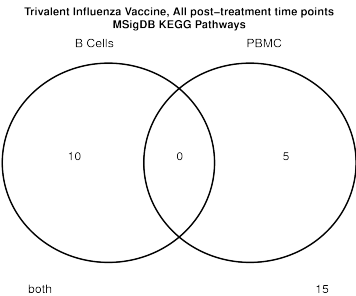
Figure 105: Venn diagrams of enriched MSigDB Immunological Signatures between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 106:** Venn diagrams of enriched MSigDB Immunological Signatures between specimen types 2 of 2 (Trivalent Influenza Vaccine).



**Figure 107:** Venn diagrams of enriched MSigDB KEGG Pathways between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 108:** Venn diagrams of enriched MSigDB KEGG Pathways between specimen types 2 of 2 (Trivalent Influenza Vaccine).

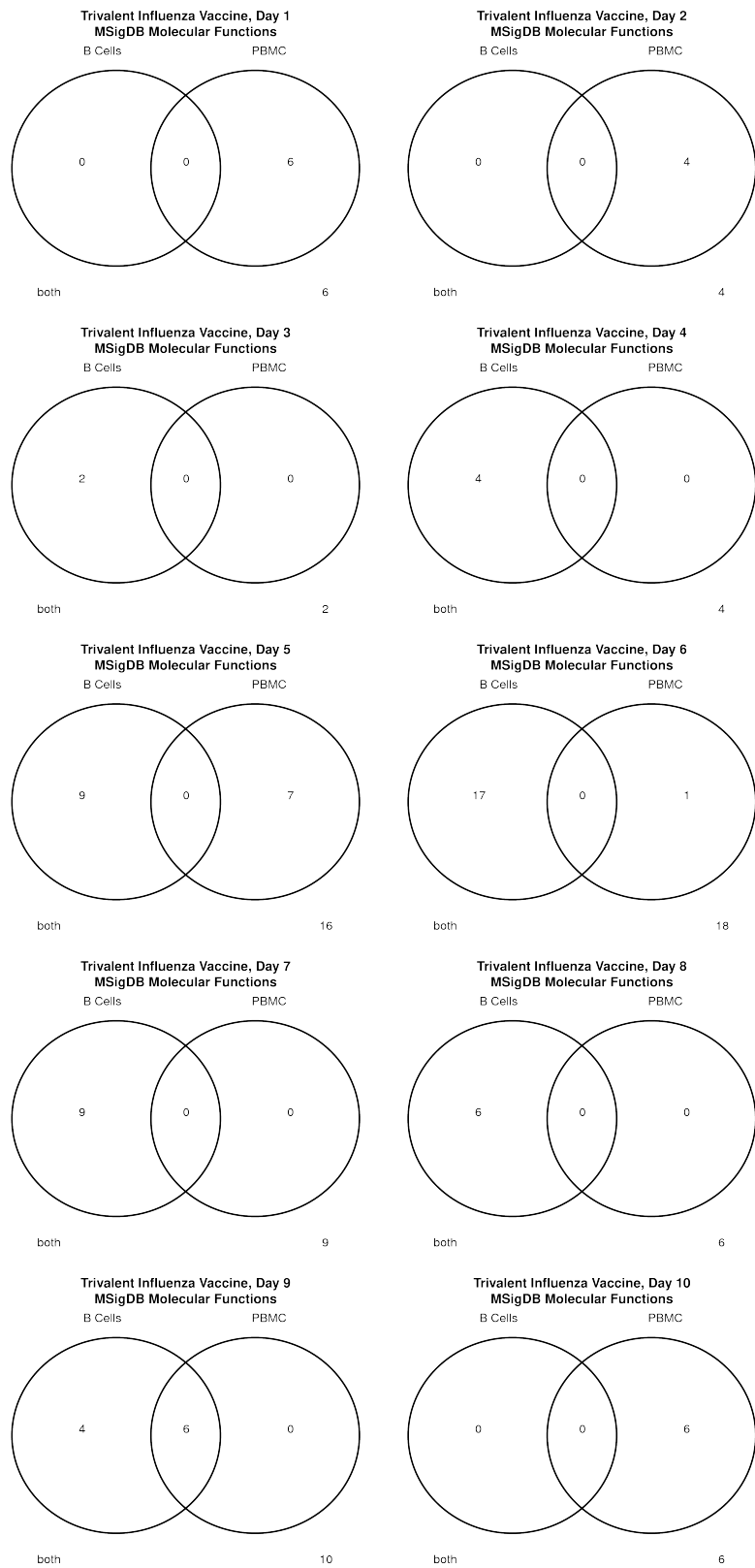
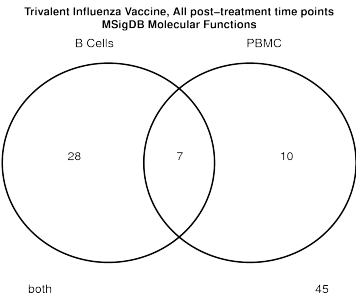


Figure 109: Venn diagrams of enriched MSigDB Molecular Functions between specimen types 1 of 2 (Trivalent Influenza Vaccine).



**Figure 110:** Venn diagrams of enriched MSigDB Molecular Functions between specimen types 2 of 2 (Trivalent Influenza Vaccine).



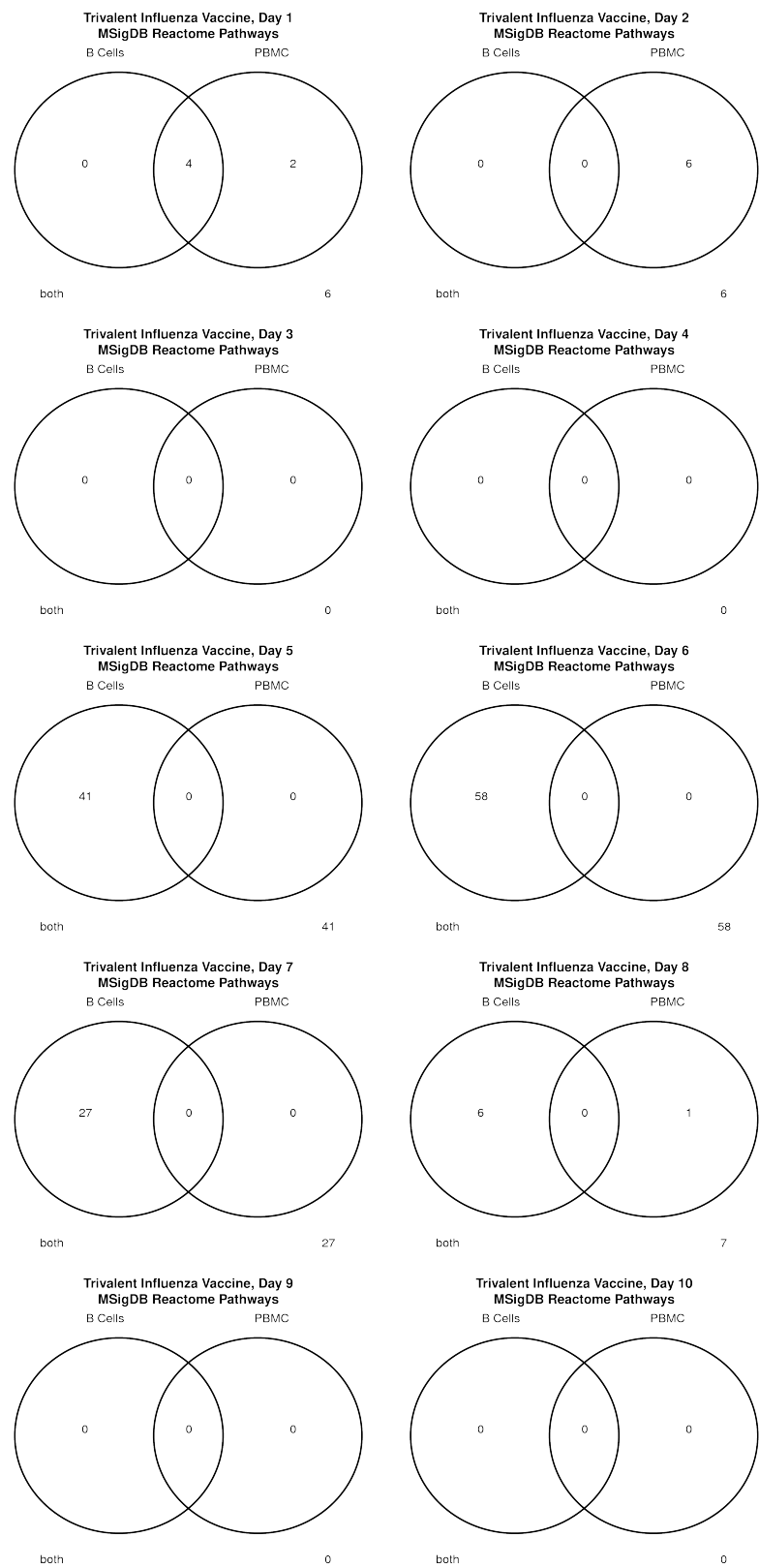
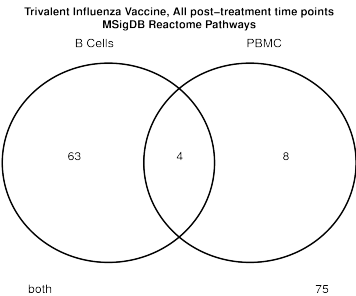
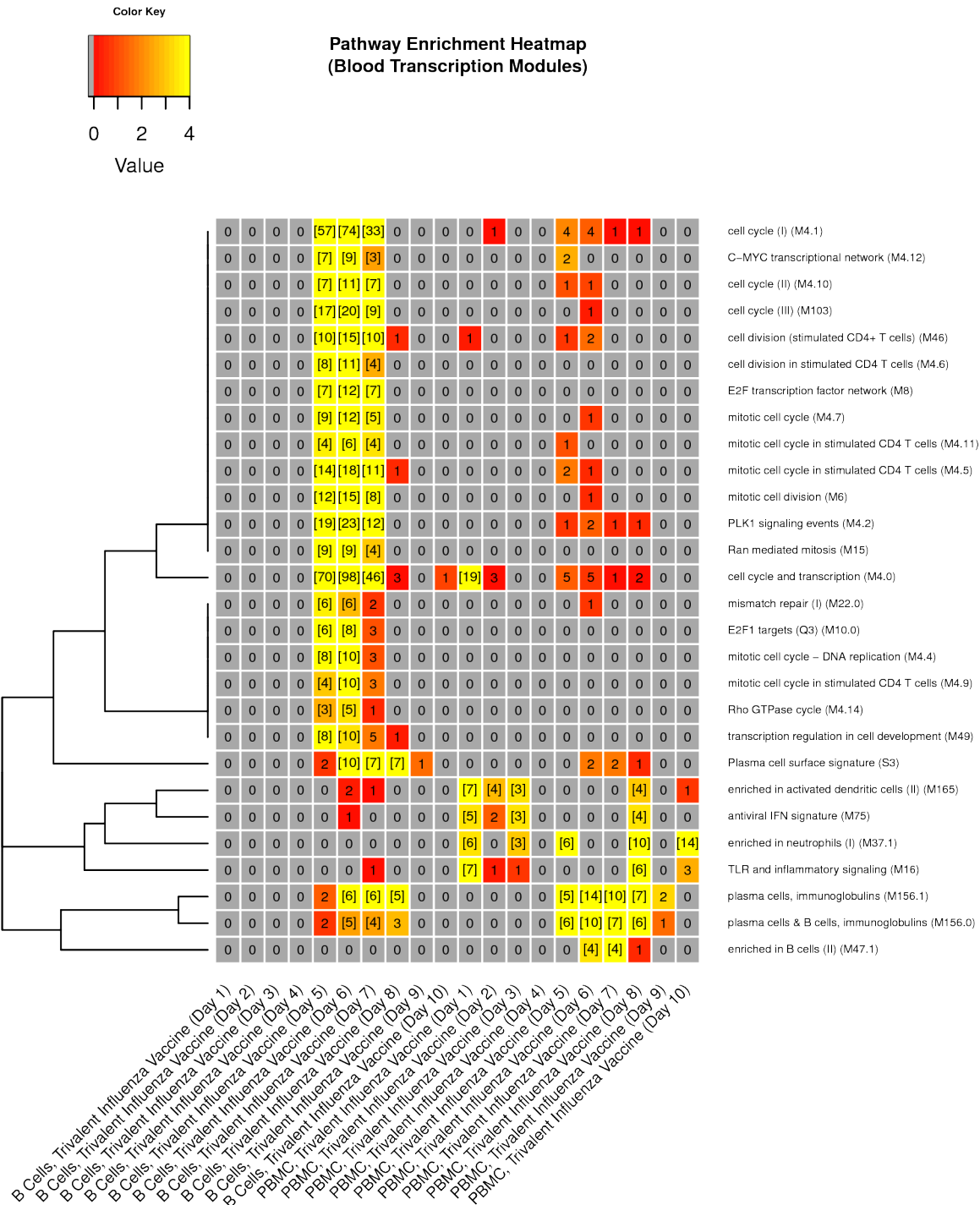


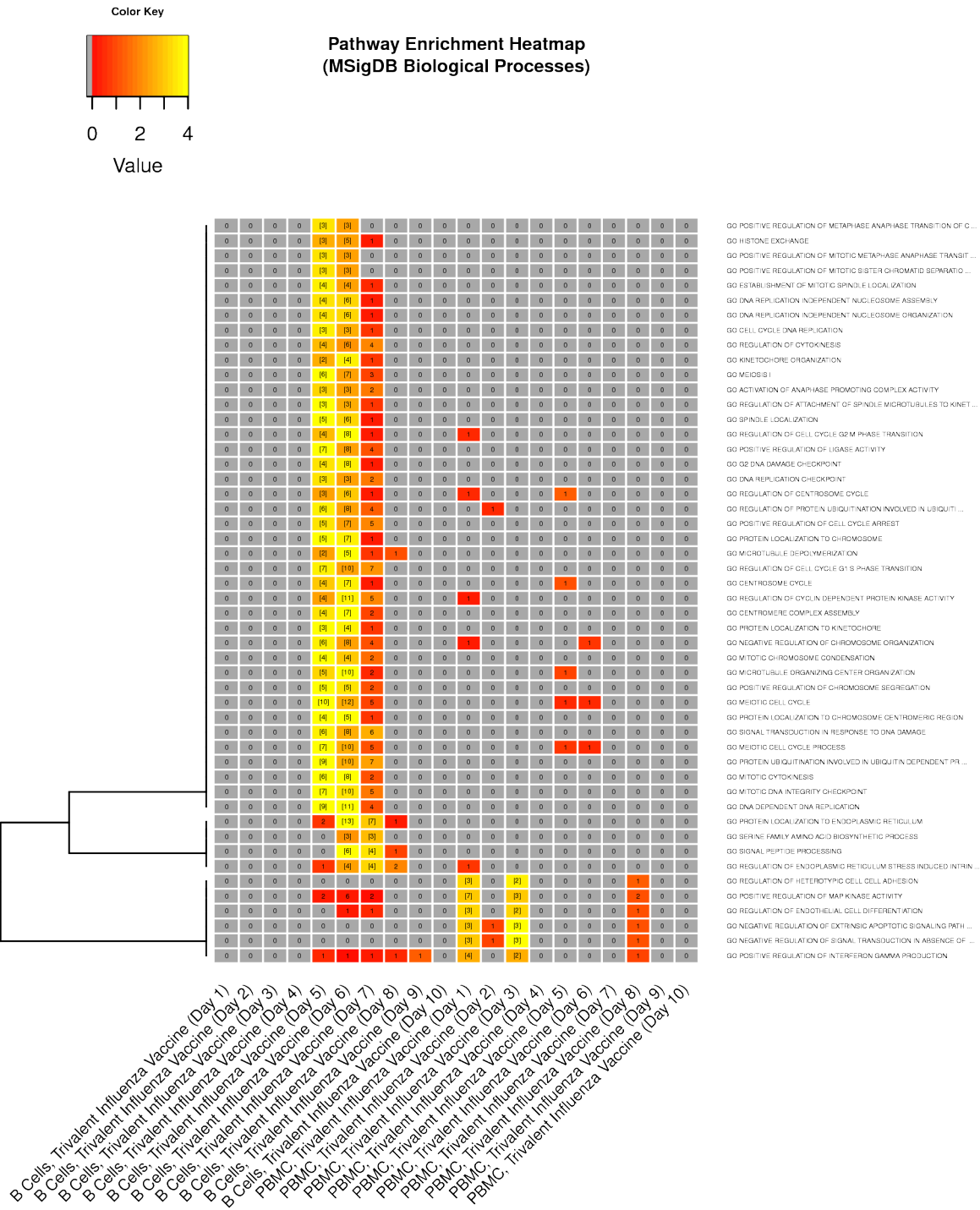
Figure 111: Venn diagrams of enriched MSigDB Reactome Pathways between specimen types 1 of 2 (Trivalent Influenza Vaccine).



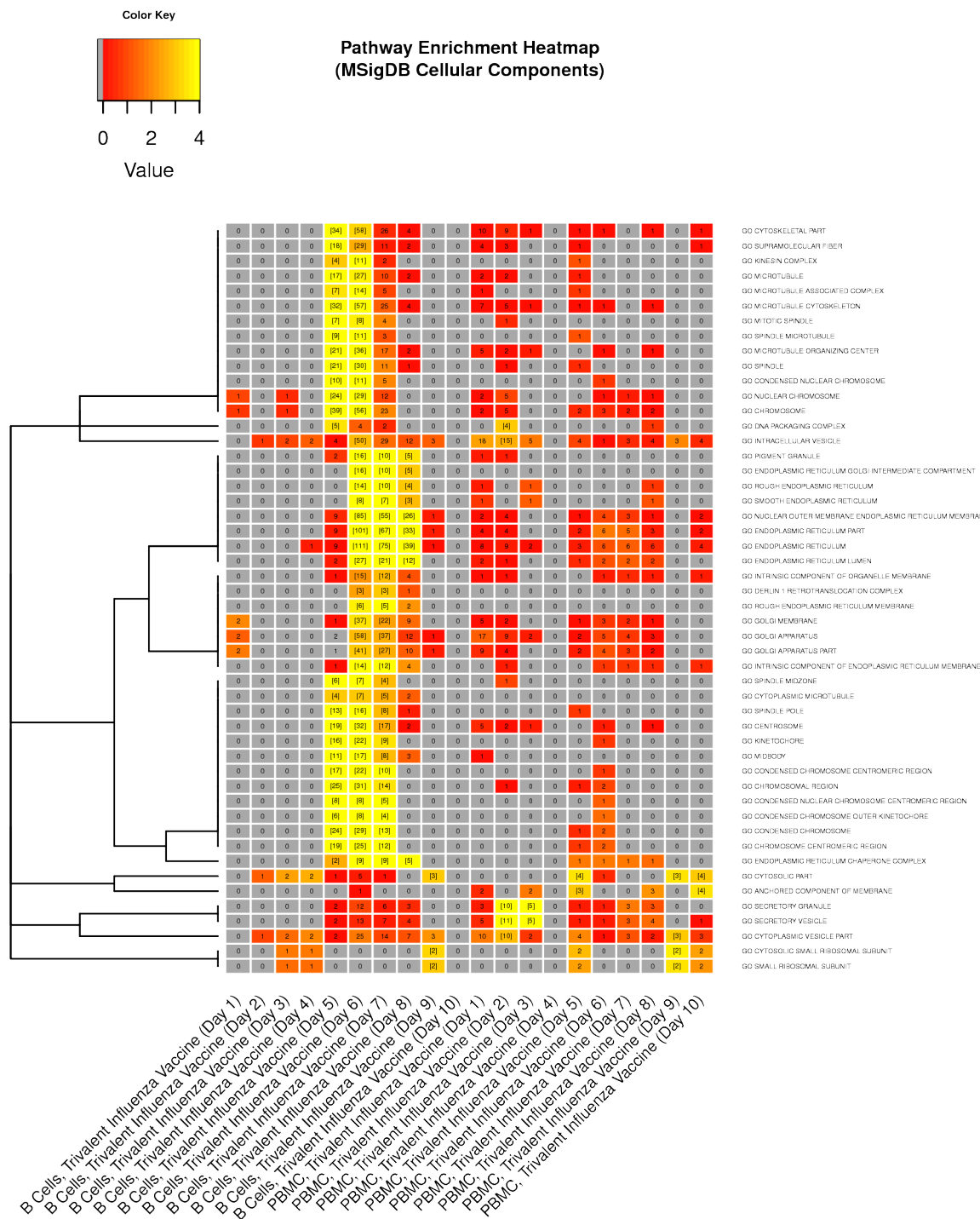
**Figure 112:** Venn diagrams of enriched MSigDB Reactome Pathways between specimen types 2 of 2 (Trivalent Influenza Vaccine).



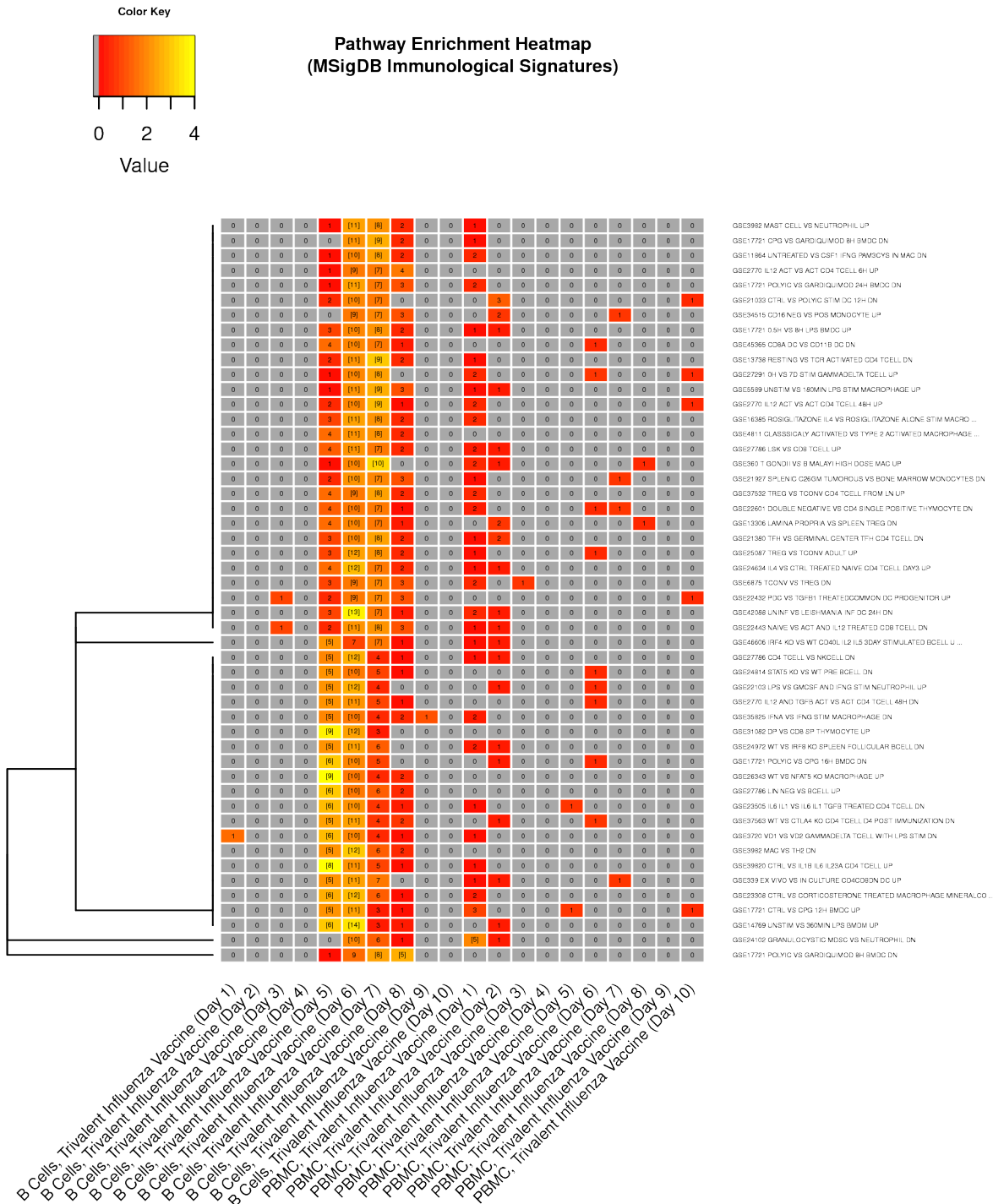
**Figure 113:** Heatmap of enriched Blood Transcription Modules (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.

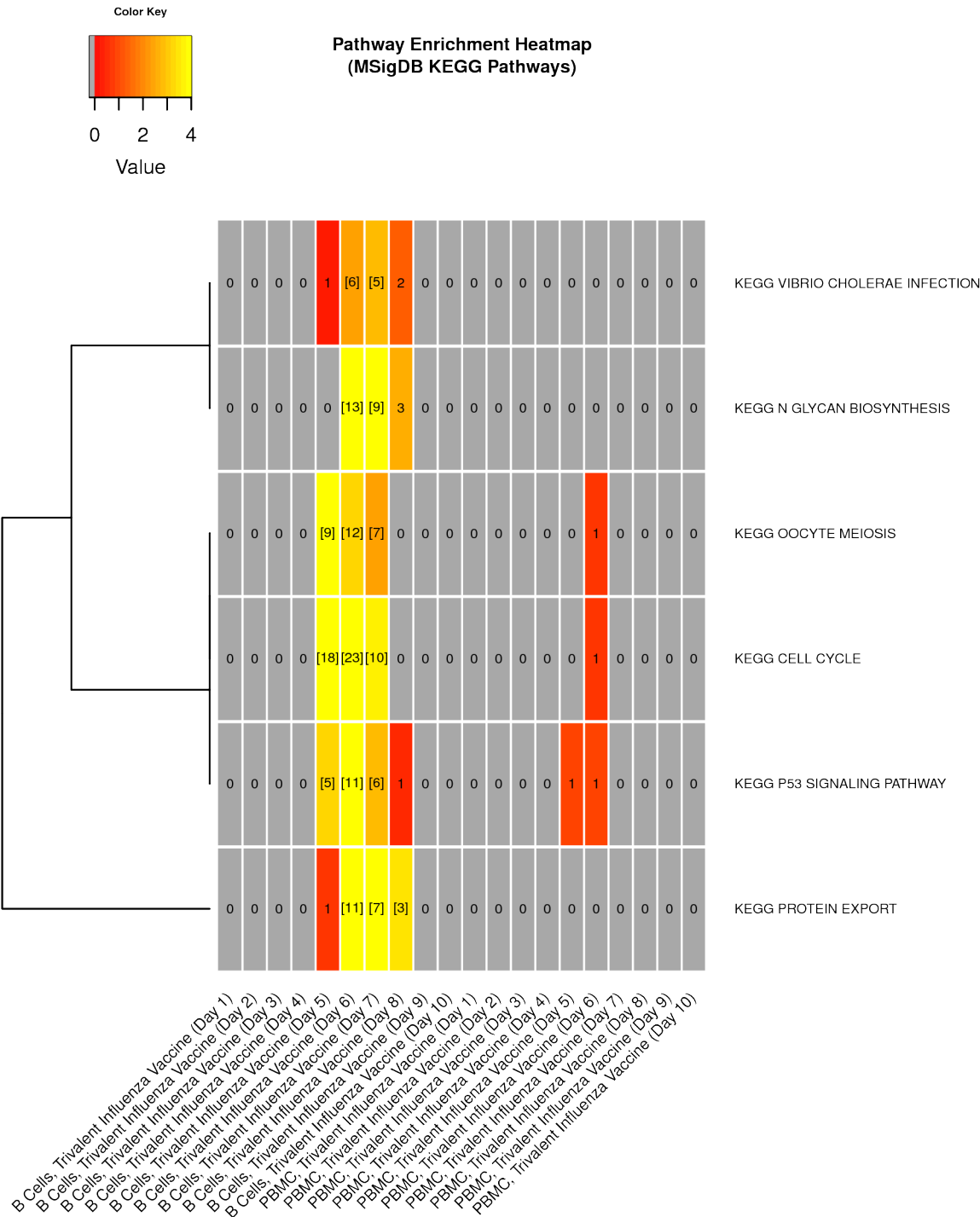


**Figure 114:** Heatmap of enriched MSigDB Biological Processes (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.

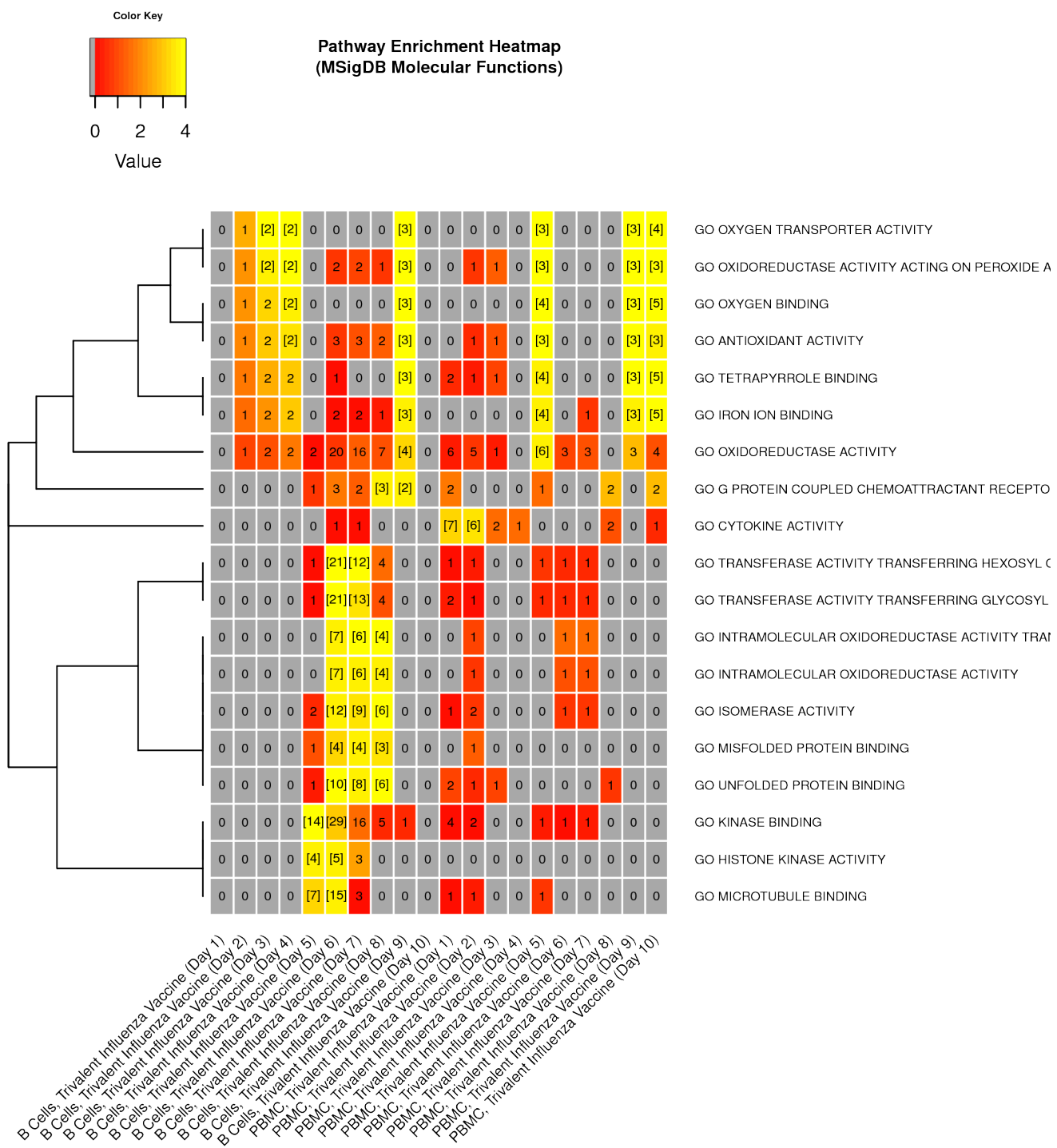


**Figure 115:** Heatmap of enriched MSigDB Cellular Components (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.



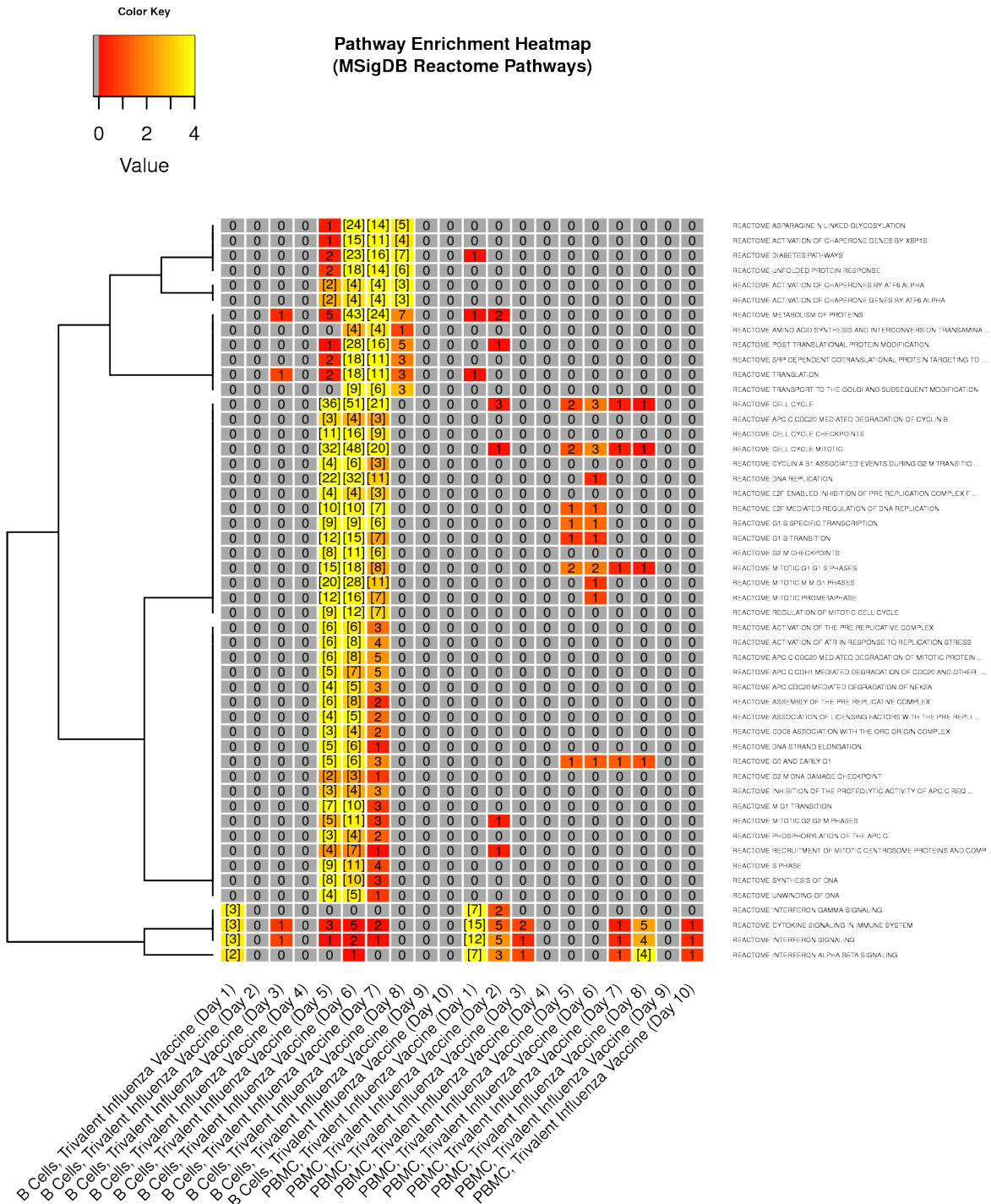


**Figure 117:** Heatmap of enriched MSigDB KEGG Pathways (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.



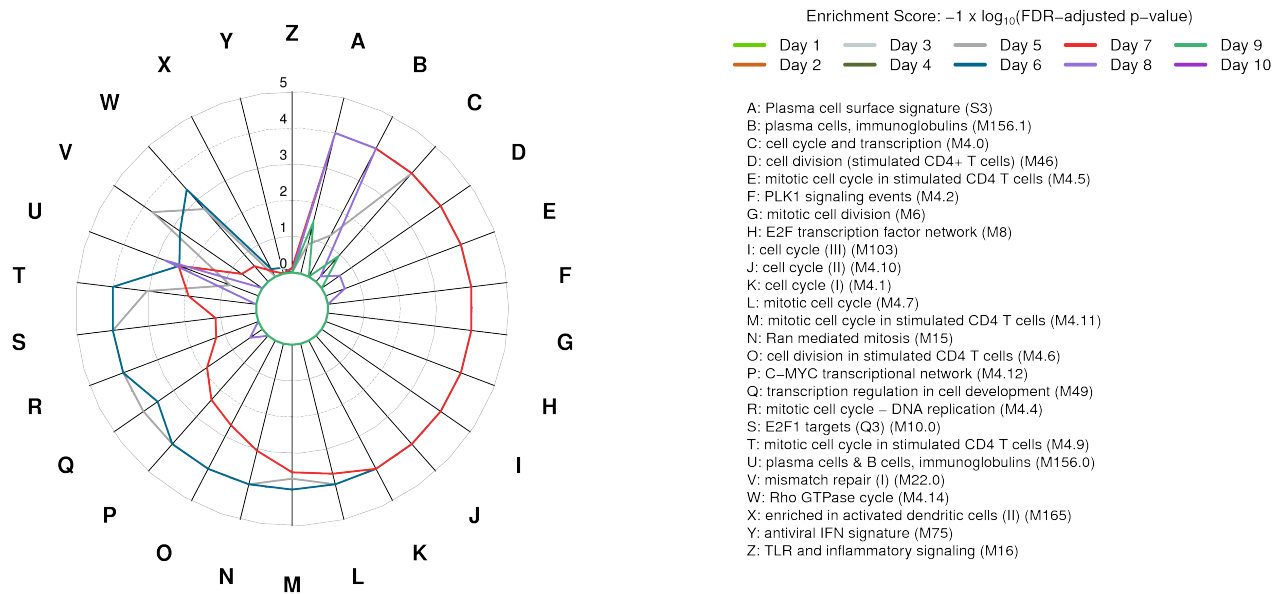
**Figure 118:** Heatmap of enriched MSigDB Molecular Functions (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.





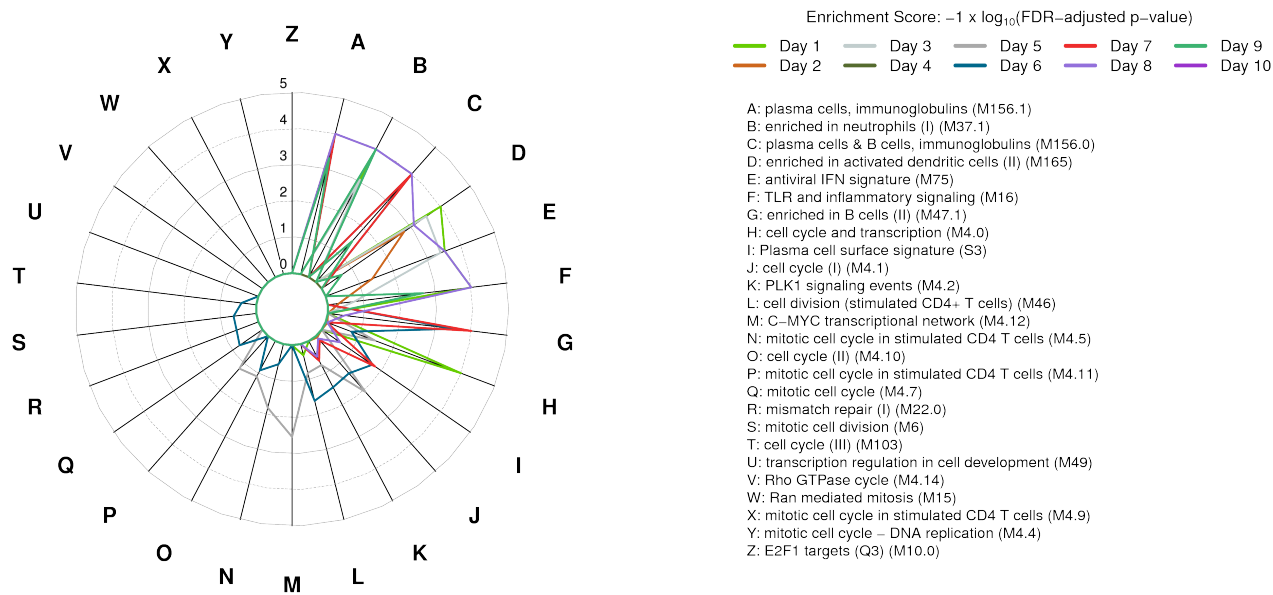
**Figure 119:** Heatmap of enriched MSigDB Reactome Pathways (RNA-Seq). Gene sets significantly enriched in at least two conditions are shown. Cells are color-coded by the enrichment score ( $-1 \times \log_{10}(\text{FDR-adjusted p-value})$ ). Cells contain the number of significant genes in the gene set with gene numbers in brackets indicating significantly enriched sets. Sets were clustered based on the euclidean distance between their enrichment score pattern. If there were more than 50 gene sets in the results, gene sets were further filtered to only include sets whose sum of enrichment score across conditions was the top 50 of all sets. Cells colored in grey have an enrichment score equal to zero.

B Cells, Trivalent Influenza Vaccine



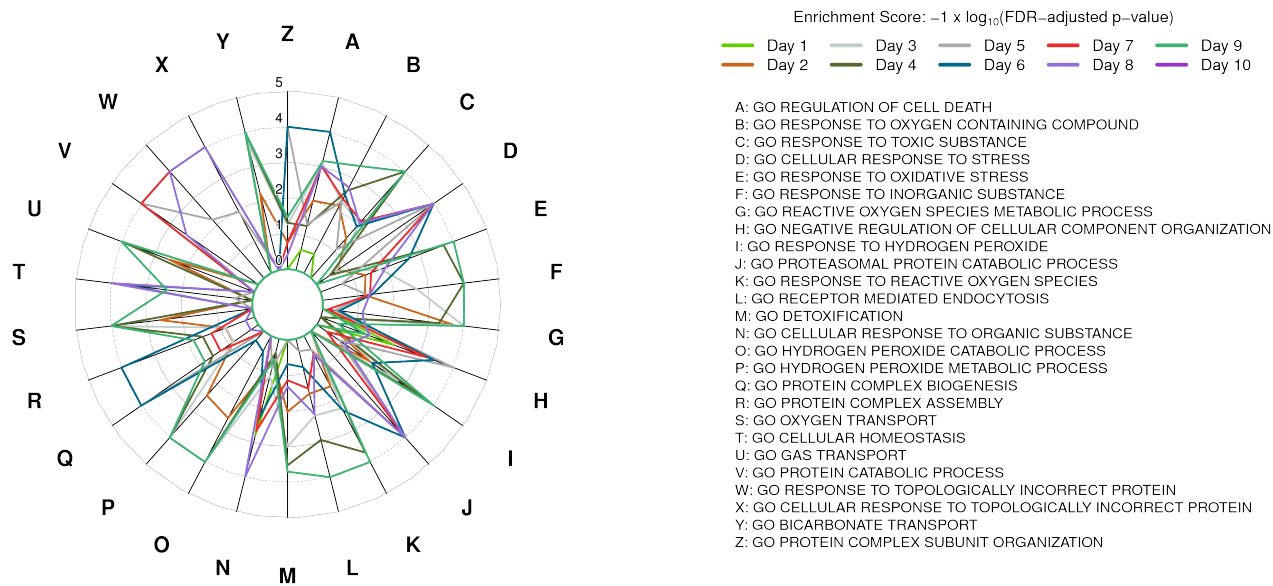
**Figure 120:** Radar Plot of enriched Blood Transcription Modules (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



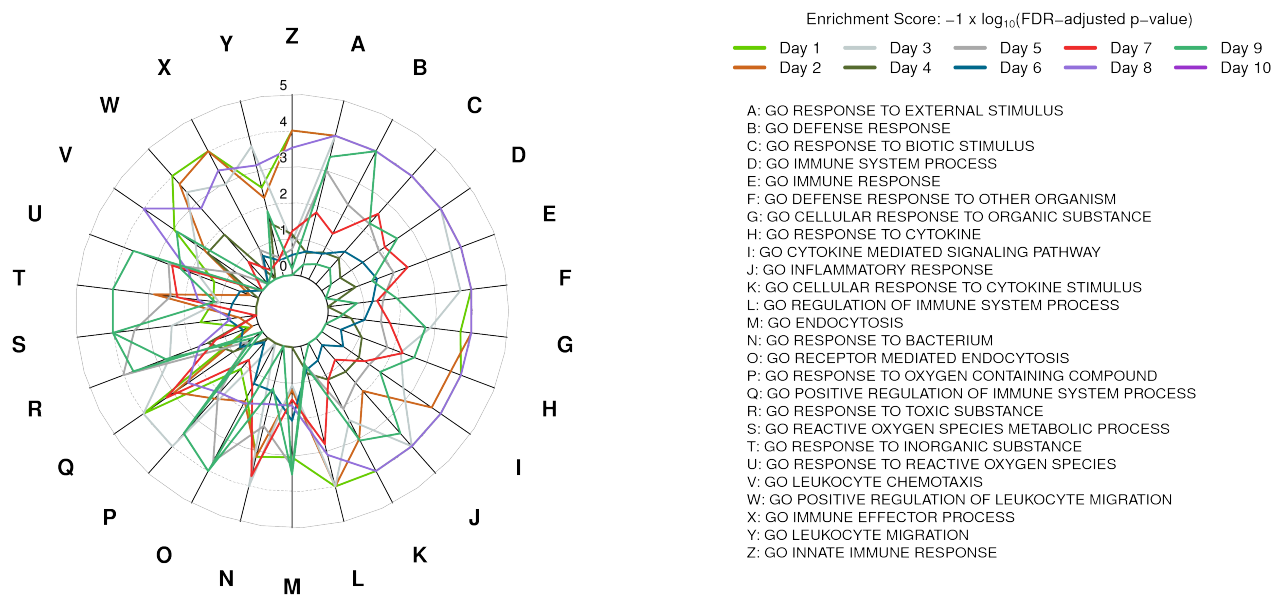
**Figure 121:** Radar Plot of enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

B Cells, Trivalent Influenza Vaccine



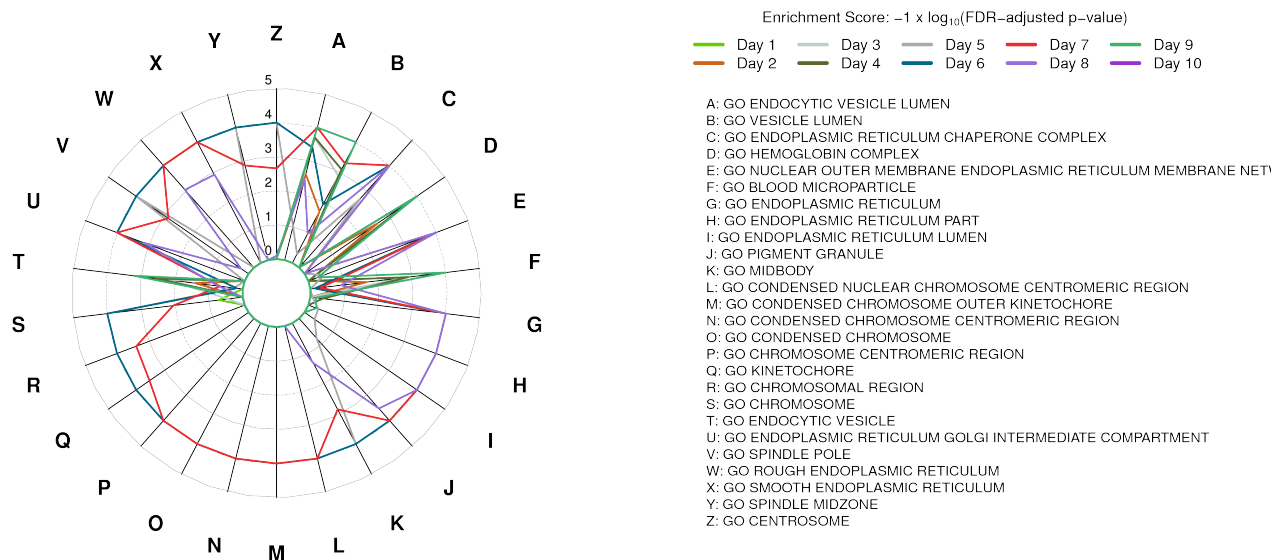
**Figure 122:** Radar Plot of enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



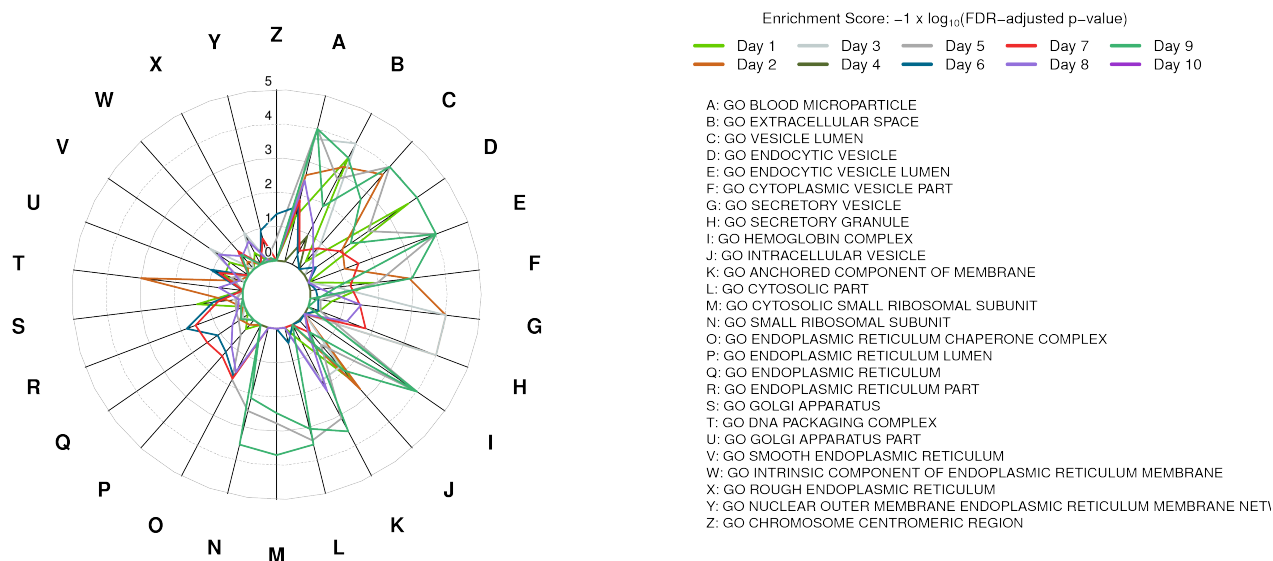
**Figure 123:** Radar Plot of enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

B Cells, Trivalent Influenza Vaccine



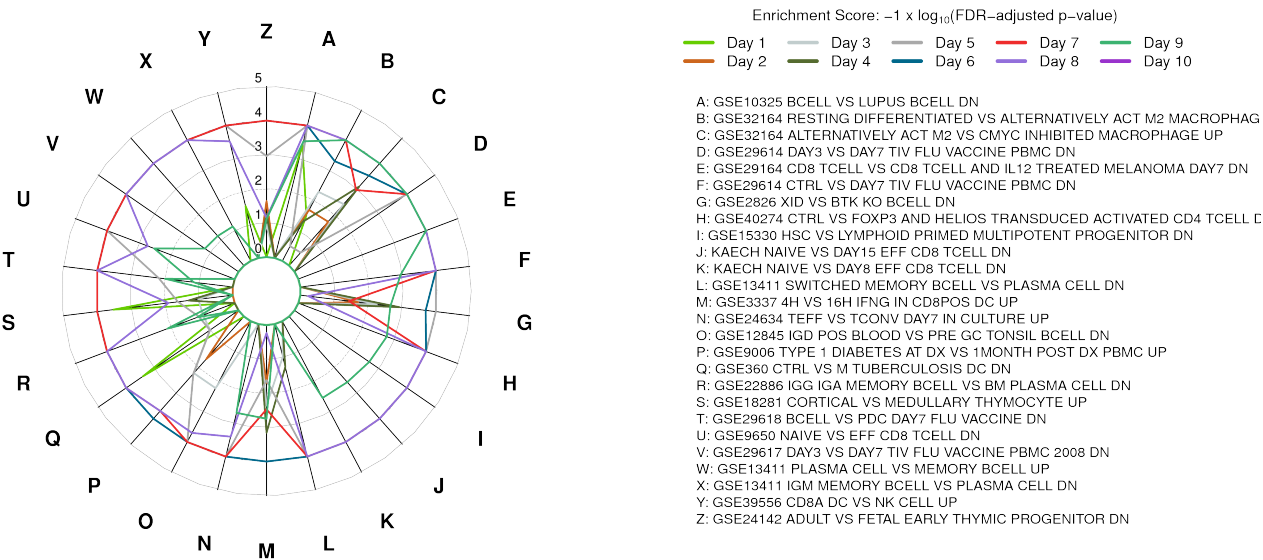
**Figure 124:** Radar Plot of enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



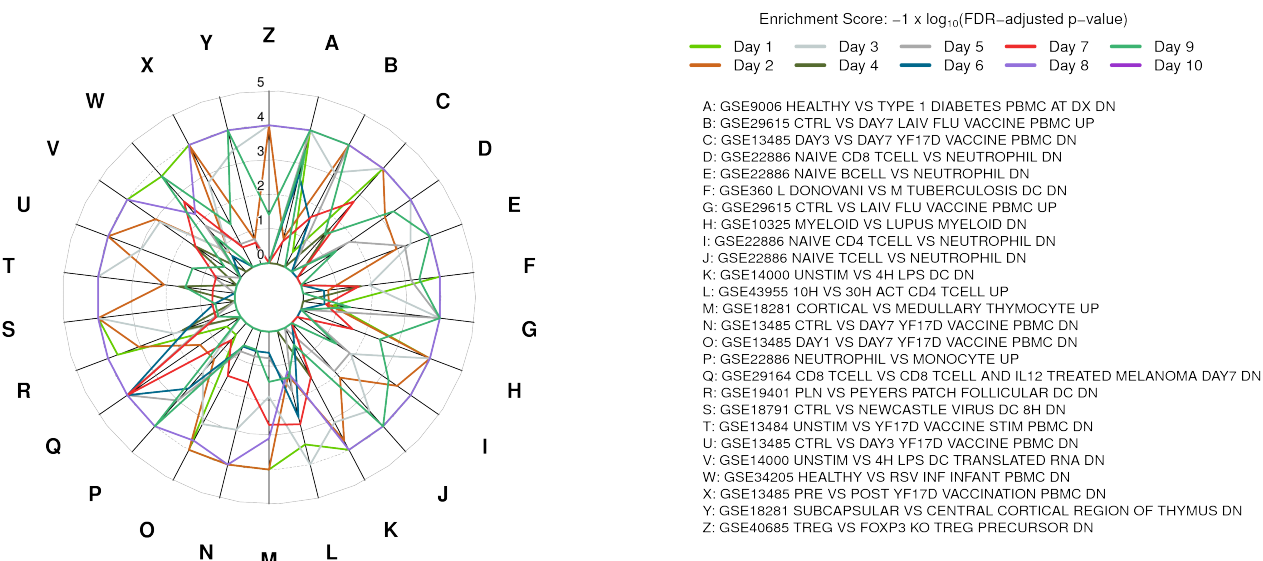
**Figure 125:** Radar Plot of enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

B Cells, Trivalent Influenza Vaccine



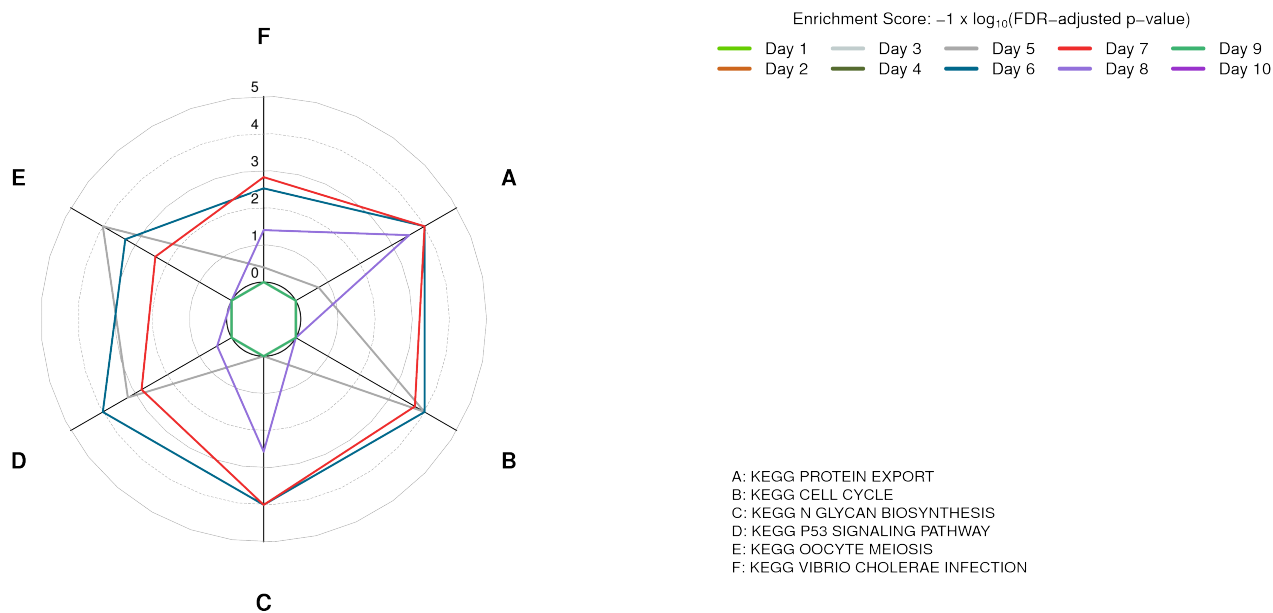
**Figure 126:** Radar Plot of enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



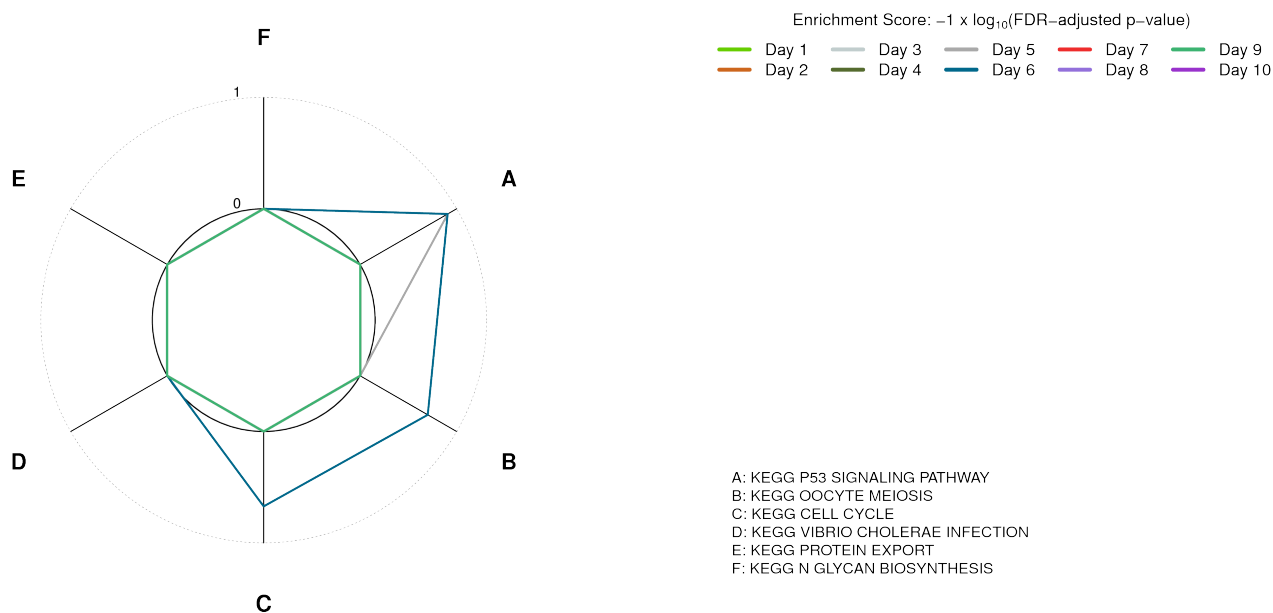
**Figure 127:** Radar Plot of enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

B Cells, Trivalent Influenza Vaccine



**Figure 128:** Radar Plot of enriched MSigDB KEGG Pathways (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

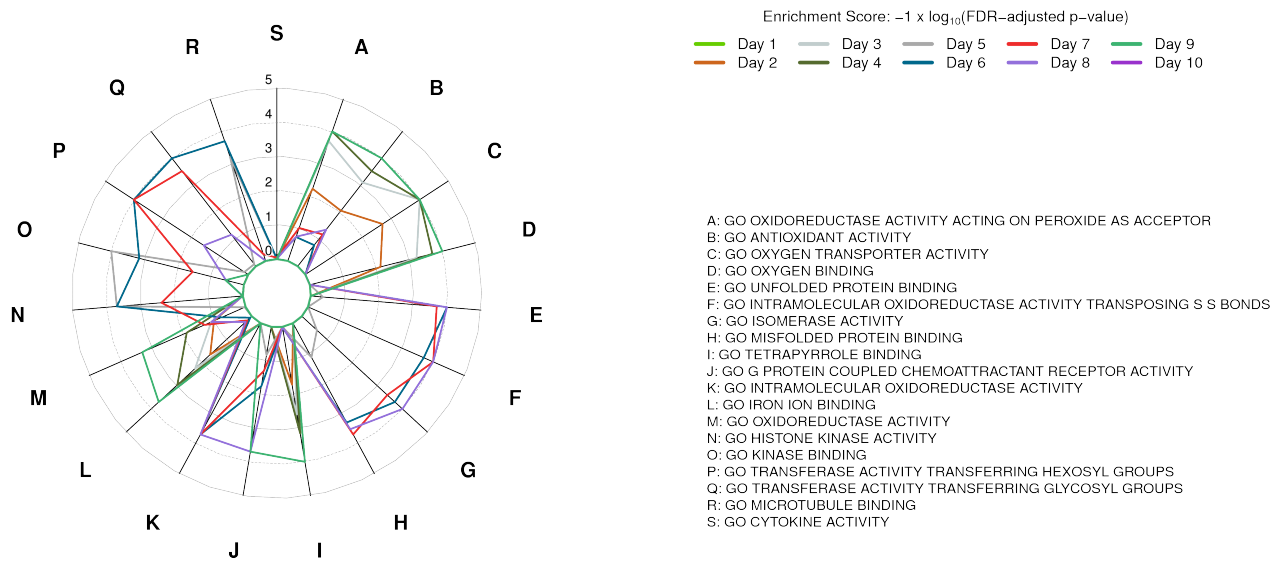
PBMC, Trivalent Influenza Vaccine



**Figure 129:** Radar Plot of enriched MSigDB KEGG Pathways (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

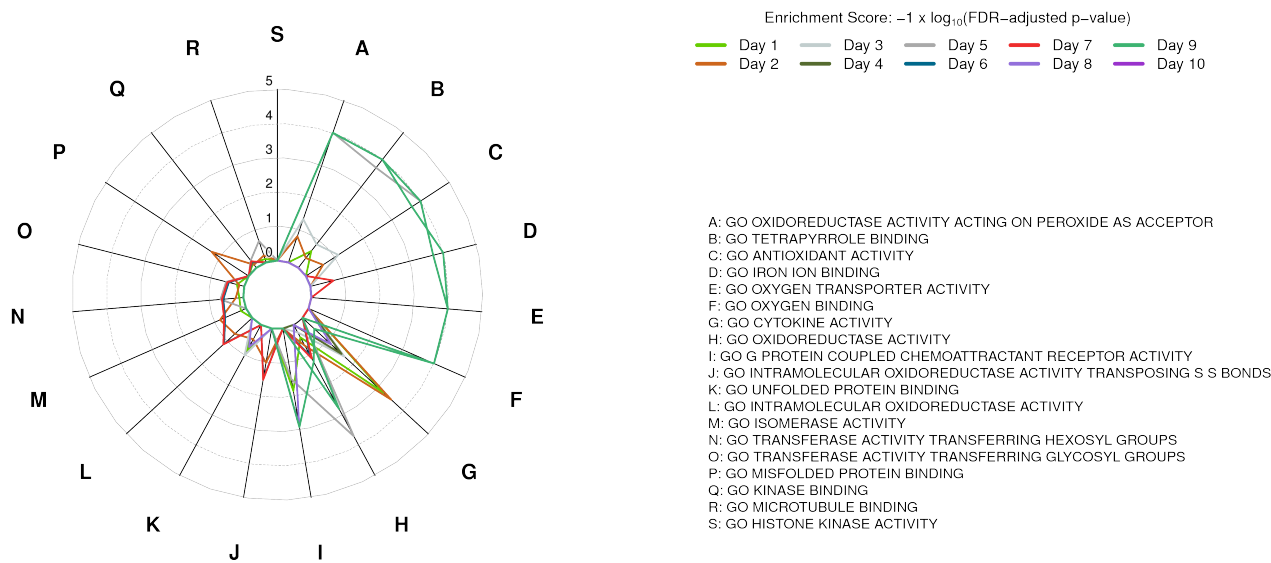


B Cells, Trivalent Influenza Vaccine



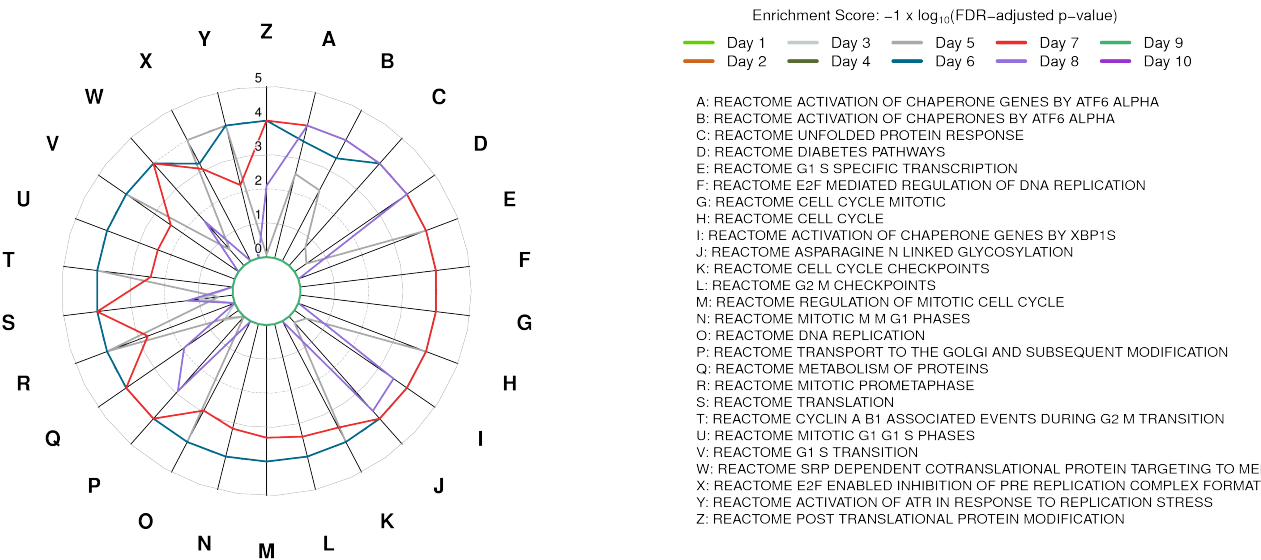
**Figure 130:** Radar Plot of enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



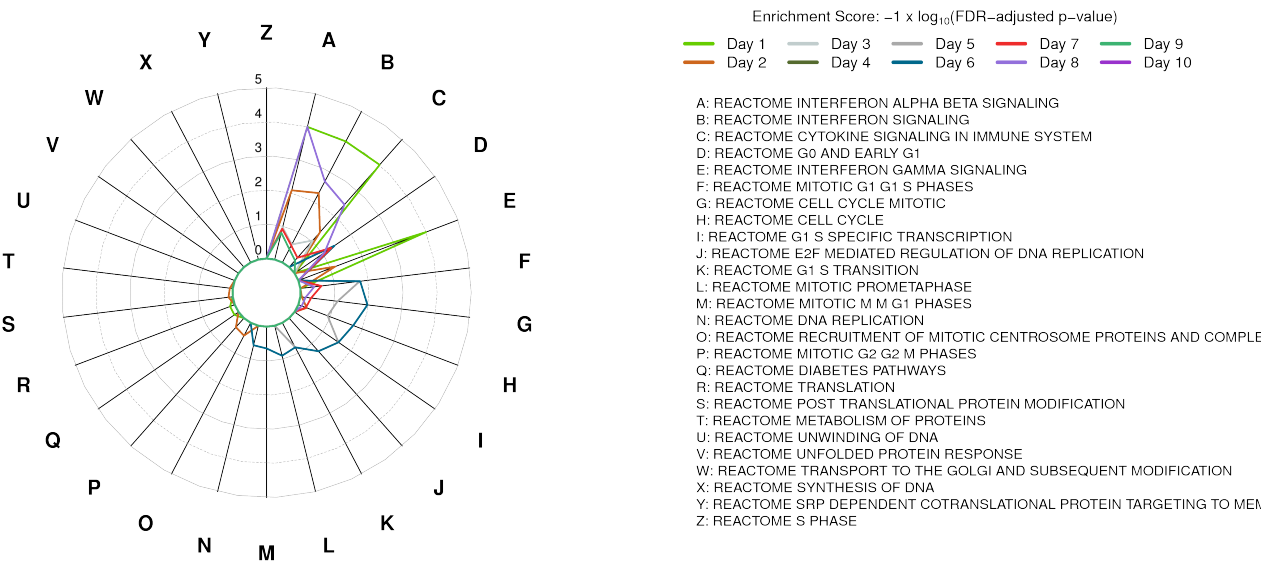
**Figure 131:** Radar Plot of enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

B Cells, Trivalent Influenza Vaccine



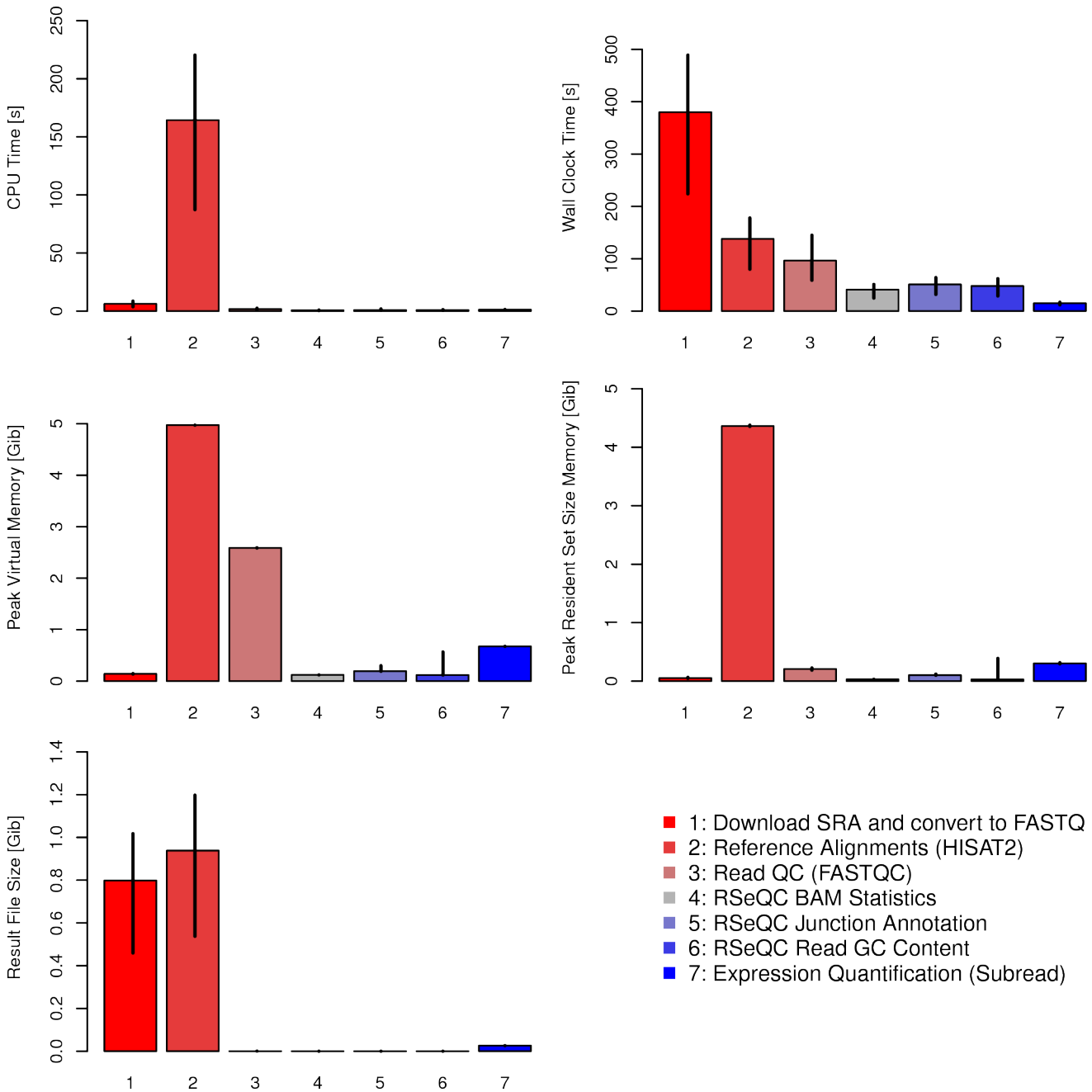
**Figure 132:** Radar Plot of enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.

PBMC, Trivalent Influenza Vaccine



**Figure 133:** Radar Plot of enriched MSigDB Reactome Pathways (PBMC, Trivalent Influenza Vaccine). Gene sets significantly enriched in at least two conditions are shown. If there were more than 26 gene sets in the results, gene sets were further filtered to only include sets whose enrichment score was the top 26 of all sets.





**Figure 134:** Summary of preprocessing benchmarks. Barplot height represents the median metric across samples. The vertical lines represent the range of the metric (minimum to maximum) across samples.

### 3.2 Tables

| Category/Chromosome                   | #Genes |
|---------------------------------------|--------|
| mitochondrial ribosomal RNA (Mt_rRNA) | 2      |
| mitochondrial transfer RNA (Mt_tRNA)  | 22     |
| ribosomal RNA (rRNA)                  | 543    |
| Total                                 | 567    |

**Table 1:** Number of excluded genes by gene type (RNA-Seq).

|                                                   | Min   | Q1    | Median | Mean  | Q3    | Max   | SD   | MAD  | N   |
|---------------------------------------------------|-------|-------|--------|-------|-------|-------|------|------|-----|
| Total Mapped Reads [10 <sup>6</sup> ]             | 7.43  | 10.97 | 12.37  | 12.25 | 13.50 | 16.08 | 1.88 | 1.75 | 110 |
| Unmapped Reads [10 <sup>6</sup> ]                 | 0.78  | 1.20  | 1.42   | 1.48  | 1.69  | 2.60  | 0.41 | 0.35 | 110 |
| Uniquely Mapped Reads [10 <sup>6</sup> ]          | 6.71  | 9.97  | 11.23  | 11.09 | 12.23 | 14.58 | 1.75 | 1.67 | 110 |
| Uniquely Mapped Reads [%]                         | 57.50 | 90.20 | 91.00  | 90.54 | 91.50 | 92.60 | 3.33 | 0.89 | 110 |
| Counted Fragments [10 <sup>6</sup> ]              | 5.28  | 8.05  | 8.96   | 8.84  | 9.74  | 11.88 | 1.42 | 1.31 | 110 |
| Uniquely Mapped Reads + Strand [10 <sup>6</sup> ] | 3.37  | 4.99  | 5.62   | 5.55  | 6.12  | 7.30  | 0.87 | 0.84 | 110 |
| Uniquely Mapped Reads - Strand [10 <sup>6</sup> ] | 3.34  | 4.99  | 5.61   | 5.53  | 6.12  | 7.29  | 0.88 | 0.85 | 110 |
| Median GC [%]                                     | 46.15 | 47.69 | 49.23  | 48.66 | 49.23 | 50.77 | 0.98 | 0.00 | 110 |
| Mean GC [%]                                       | 46.12 | 48.26 | 48.62  | 48.66 | 49.12 | 50.52 | 0.73 | 0.66 | 110 |

**Table 2:** Summary human reference genome alignment statistics for study samples (All Specimen Types)

|                                                   | Min   | Q1    | Median | Mean  | Q3    | Max   | SD   | MAD  | N  |
|---------------------------------------------------|-------|-------|--------|-------|-------|-------|------|------|----|
| Total Mapped Reads [10 <sup>6</sup> ]             | 7.43  | 10.81 | 12.37  | 12.00 | 13.27 | 15.70 | 2.06 | 1.67 | 55 |
| Unmapped Reads [10 <sup>6</sup> ]                 | 0.79  | 1.20  | 1.61   | 1.59  | 1.97  | 2.60  | 0.47 | 0.58 | 55 |
| Uniquely Mapped Reads [10 <sup>6</sup> ]          | 6.71  | 9.73  | 11.21  | 10.83 | 12.02 | 14.21 | 1.83 | 1.56 | 55 |
| Uniquely Mapped Reads [%]                         | 87.60 | 89.80 | 90.50  | 90.35 | 91.00 | 91.80 | 0.89 | 0.89 | 55 |
| Counted Fragments [10 <sup>6</sup> ]              | 5.28  | 7.67  | 8.76   | 8.53  | 9.48  | 11.26 | 1.45 | 1.17 | 55 |
| Uniquely Mapped Reads + Strand [10 <sup>6</sup> ] | 3.37  | 4.88  | 5.62   | 5.43  | 6.01  | 7.12  | 0.91 | 0.79 | 55 |
| Uniquely Mapped Reads - Strand [10 <sup>6</sup> ] | 3.34  | 4.84  | 5.59   | 5.40  | 6.00  | 7.09  | 0.92 | 0.79 | 55 |
| Median GC [%]                                     | 46.15 | 47.69 | 49.23  | 48.67 | 49.23 | 50.77 | 1.08 | 0.00 | 55 |
| Mean GC [%]                                       | 46.51 | 48.14 | 48.69  | 48.67 | 49.33 | 50.52 | 0.85 | 0.88 | 55 |

**Table 3:** Summary human reference genome alignment statistics for study samples (B Cells)

|                                                   | Min   | Q1    | Median | Mean  | Q3    | Max   | SD   | MAD  | N  |
|---------------------------------------------------|-------|-------|--------|-------|-------|-------|------|------|----|
| Total Mapped Reads [10 <sup>6</sup> ]             | 8.96  | 11.14 | 12.37  | 12.49 | 13.59 | 16.08 | 1.66 | 1.89 | 55 |
| Unmapped Reads [10 <sup>6</sup> ]                 | 0.78  | 1.21  | 1.36   | 1.37  | 1.51  | 2.53  | 0.30 | 0.23 | 55 |
| Uniquely Mapped Reads [10 <sup>6</sup> ]          | 7.22  | 10.11 | 11.24  | 11.34 | 12.43 | 14.58 | 1.64 | 1.76 | 55 |
| Uniquely Mapped Reads [%]                         | 57.50 | 91.00 | 91.50  | 90.73 | 91.85 | 92.60 | 4.64 | 0.59 | 55 |
| Counted Fragments [10 <sup>6</sup> ]              | 5.53  | 8.13  | 9.06   | 9.15  | 10.03 | 11.88 | 1.33 | 1.40 | 55 |
| Uniquely Mapped Reads + Strand [10 <sup>6</sup> ] | 3.63  | 5.06  | 5.62   | 5.67  | 6.22  | 7.30  | 0.82 | 0.89 | 55 |
| Uniquely Mapped Reads - Strand [10 <sup>6</sup> ] | 3.59  | 5.05  | 5.62   | 5.66  | 6.21  | 7.29  | 0.82 | 0.87 | 55 |
| Median GC [%]                                     | 46.15 | 47.69 | 49.23  | 48.64 | 49.23 | 50.77 | 0.86 | 0.00 | 55 |
| Mean GC [%]                                       | 46.12 | 48.36 | 48.58  | 48.65 | 48.94 | 50.13 | 0.59 | 0.42 | 55 |

**Table 4:** Summary human reference genome alignment statistics for study samples (PBMC)

| Subject ID | Sequence Library ID | Specimen Type | Timepoint |
|------------|---------------------|---------------|-----------|
| T13        | T13_d08_pmc         | PBMC          | Day 8     |
| T12        | T12_d04_pmc         | PBMC          | Day 4     |

**Table 5:** Outlying observations (RNA-Seq).

|         | # Genes |
|---------|---------|
| B Cells | 11435   |
| PBMC    | 11511   |

**Table 6:** Number of genes that passed the low expression cut off (RNA-Seq).

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                               | Gene Type      | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|----------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000117228 | GBP1              | guanylate binding protein 1 [Source:HGNC Symbol;Acc:HGNC:4182]                         | protein coding | 0.90                                     |                | 4.49                         | 26.41                           | 0.00    | 0.00                 |
| ENSG00000115415 | STAT1             | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362] | protein coding | 0.70                                     |                | 7.73                         | 32.26                           | 0.00    | 0.00                 |
| ENSG00000162645 | GBP2              | guanylate binding protein 2 [Source:HGNC Symbol;Acc:HGNC:4183]                         | protein coding | 0.62                                     |                | 5.42                         | 25.11                           | 0.00    | 0.00                 |

**Table 7:** Genes differentially expressed at Day 1 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 1 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                           | Gene Type      | Log <sub>2</sub> Change 2 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000004799 | PDK4              | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812] | protein coding | 1.05                                     |                | 2.69                         | 20.94                           | 0.00    | 0.01                 |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]         | protein coding | -0.87                                    |                | 8.38                         | 22.20                           | 0.00    | 0.01                 |

**Table 8:** Genes differentially expressed at Day 2 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 2 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type      | Log <sub>2</sub> Change 3 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                             | protein coding | -1.70                                    |                | 4.95                         | 13.32                           | 0.00    | 0.03                 |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                | protein coding | -1.67                                    |                | 8.41                         | 19.52                           | 0.00    | 0.00                 |
| ENSG00000168209 | DDIT4             | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                     | protein coding | -1.00                                    |                | 4.52                         | 36.43                           | 0.00    | 0.00                 |
| ENSG00000110848 | CD69              | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                          | protein coding | -0.85                                    |                | 6.70                         | 24.54                           | 0.00    | 0.00                 |
| ENSG00000197714 | ZNF460            | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                               | protein coding | -0.80                                    |                | 3.05                         | 23.65                           | 0.00    | 0.00                 |
| ENSG00000171223 | JUNB              | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205] | protein coding | -0.76                                    |                | 7.51                         | 36.78                           | 0.00    | 0.00                 |
| ENSG00000181800 | CELF2-AS1         | CELF2 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:23515]                                 | antisense      | -0.75                                    |                | 3.08                         | 22.69                           | 0.00    | 0.00                 |
| ENSG00000279192 | PWAR5             | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                    | TEC            | -0.70                                    |                | 3.24                         | 23.42                           | 0.00    | 0.00                 |
| ENSG00000144182 | LIPT1             | lipoyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:29569]                                   | protein coding | 0.63                                     |                | 2.86                         | 14.29                           | 0.00    | 0.02                 |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                        | Gene Type      | $Log_2$ Change<br>3 vs. pre-treatment) | Fold (Day pre-CPM | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------|----------------|----------------------------------------|-------------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000100906 | NFKBIA            | NFKB inhibitor alpha [Source:HGNC Symbol;Acc:HGNC:7797]                         | protein coding | -0.63                                  |                   | 7.41                | 40.23                           | 0.00    | 0.00 |                  |
| ENSG00000181722 | ZBTB20            | zinc finger and BTB domain containing 20 [Source:HGNC Symbol;Acc:HGNC:13503]    | protein coding | -0.62                                  |                   | 5.00                | 36.87                           | 0.00    | 0.00 |                  |
| ENSG00000279759 |                   |                                                                                 | TEC            | -0.60                                  |                   | 2.81                | 11.98                           | 0.00    | 0.05 |                  |
| ENSG00000280138 |                   |                                                                                 | TEC            | -0.60                                  |                   | 5.43                | 38.18                           | 0.00    | 0.00 |                  |
| ENSG00000161960 | EIF4A1            | eukaryotic translation initiation factor 4A1 [Source:HGNC Symbol;Acc:HGNC:3282] | protein coding | -0.60                                  |                   | 4.84                | 17.25                           | 0.00    | 0.01 |                  |
| ENSG00000227155 |                   |                                                                                 | antisense      | -0.59                                  |                   | 3.77                | 19.96                           | 0.00    | 0.00 |                  |

**Table 9:** Genes differentially expressed at Day 3 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute  $log_2$  fold change (Day 3 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type      | $Log_2$ Change<br>4 vs. pre-treatment) | Fold (Day pre-CPM | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|----------------|----------------------------------------|-------------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                               | protein coding | -1.37                                  |                   | 8.12                | 36.17                           | 0.00    | 0.00 |                  |
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                            | protein coding | -1.31                                  |                   | 4.69                | 24.05                           | 0.00    | 0.00 |                  |
| ENSG00000149516 | MS4A3             | membrane spanning 4-domains A3 [Source:HGNC Symbol;Acc:HGNC:7317]                        | protein coding | 1.02                                   |                   | 4.86                | 24.57                           | 0.00    | 0.00 |                  |
| ENSG00000170345 | FOS               | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796] | protein coding | 1.00                                   |                   | 6.11                | 21.42                           | 0.00    | 0.01 |                  |
| ENSG00000197714 | ZNF460            | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                              | protein coding | -0.76                                  |                   | 3.04                | 20.37                           | 0.00    | 0.01 |                  |

**Table 10:** Genes differentially expressed at Day 4 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute  $log_2$  fold change (Day 4 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                        | Gene Type      | $Log_2$ Change<br>5 vs. pre-treatment) | Fold (Day pre-CPM | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------|----------------|----------------------------------------|-------------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000153093 | ACOXL             | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]       | protein coding | 2.53                                   |                   | 1.44                | 18.85                           | 0.00    | 0.01 |                  |
| ENSG00000168078 | PBK               | PDZ binding kinase [Source:HGNC Symbol;Acc:HGNC:18282]          | protein coding | 2.09                                   |                   | 1.58                | 17.56                           | 0.00    | 0.01 |                  |
| ENSG00000093009 | CDC45             | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]       | protein coding | 2.05                                   |                   | 2.61                | 23.15                           | 0.00    | 0.00 |                  |
| ENSG00000139734 | DIAPH3            | diaphanous related formin 3 [Source:HGNC Symbol;Acc:HGNC:15480] | protein coding | 2.03                                   |                   | 1.83                | 16.05                           | 0.00    | 0.02 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change<br>5 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000165304 | MELK              | maternal embryonic leucine zipper kinase [Source:HGNC Symbol;Acc:HGNC:16870]          | protein coding | 1.89                                           |                      | 2.29                               | 15.19                                    | 0.00    | 0.02 |                           |
| ENSG00000115163 | CENPA             | centromere protein A [Source:HGNC Symbol;Acc:HGNC:1851]                               | protein coding | 1.89                                           |                      | 1.57                               | 13.41                                    | 0.00    | 0.03 |                           |
| ENSG00000146670 | CDCA5             | cell division cycle associated 5 [Source:HGNC Symbol;Acc:HGNC:14626]                  | protein coding | 1.86                                           |                      | 3.42                               | 29.57                                    | 0.00    | 0.00 |                           |
| ENSG00000123485 | HJURP             | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]             | protein coding | 1.85                                           |                      | 2.91                               | 20.98                                    | 0.00    | 0.00 |                           |
| ENSG00000154277 | UCHL1             | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                 | protein coding | 1.85                                           |                      | 1.44                               | 16.74                                    | 0.00    | 0.01 |                           |
| ENSG00000176890 | TYMS              | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                            | protein coding | 1.82                                           |                      | 3.69                               | 30.21                                    | 0.00    | 0.00 |                           |
| ENSG00000184661 | CDCA2             | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                  | protein coding | 1.82                                           |                      | 2.39                               | 14.38                                    | 0.00    | 0.02 |                           |
| ENSG00000171848 | RRM2              | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]    | protein coding | 1.80                                           |                      | 6.11                               | 25.19                                    | 0.00    | 0.00 |                           |
| ENSG00000011426 | ANLN              | anillin actin binding protein [Source:HGNC Symbol;Acc:HGNC:14082]                     | protein coding | 1.79                                           |                      | 2.27                               | 15.13                                    | 0.00    | 0.02 |                           |
| ENSG00000164045 | CDC25A            | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                            | protein coding | 1.71                                           |                      | 2.29                               | 13.41                                    | 0.00    | 0.03 |                           |
| ENSG00000149516 | MS4A3             | membrane spanning 4-domains A3 [Source:HGNC Symbol;Acc:HGNC:7317]                     | protein coding | 1.68                                           |                      | 4.70                               | 21.82                                    | 0.00    | 0.00 |                           |
| ENSG00000143476 | DTL               | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288]  | protein coding | 1.68                                           |                      | 3.41                               | 21.67                                    | 0.00    | 0.00 |                           |
| ENSG00000186185 | KIF18B            | kinesin family member 18B [Source:HGNC Symbol;Acc:HGNC:27102]                         | protein coding | 1.66                                           |                      | 2.23                               | 12.58                                    | 0.00    | 0.04 |                           |
| ENSG00000089685 | BIRC5             | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                 | protein coding | 1.65                                           |                      | 3.53                               | 17.13                                    | 0.00    | 0.01 |                           |
| ENSG00000169679 | BUB1              | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]    | protein coding | 1.63                                           |                      | 5.12                               | 24.34                                    | 0.00    | 0.00 |                           |
| ENSG00000109805 | NCAPG             | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]             | protein coding | 1.63                                           |                      | 3.63                               | 22.85                                    | 0.00    | 0.00 |                           |
| ENSG00000117399 | CDC20             | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                             | protein coding | 1.60                                           |                      | 3.92                               | 17.00                                    | 0.00    | 0.01 |                           |
| ENSG00000122952 | ZWINT             | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]              | protein coding | 1.60                                           |                      | 3.84                               | 18.55                                    | 0.00    | 0.01 |                           |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525] | IG C gene      | 1.59                                           |                      | 12.44                              | 20.69                                    | 0.00    | 0.00 |                           |
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                         | protein coding | 1.56                                           |                      | 4.30                               | 18.47                                    | 0.00    | 0.01 |                           |
| ENSG00000126787 | DLGAP5            | DLG associated protein 5 [Source:HGNC Symbol;Acc:HGNC:16864]                          | protein coding | 1.54                                           |                      | 3.47                               | 16.02                                    | 0.00    | 0.02 |                           |
| ENSG00000171241 | SHCBP1            | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]              | protein coding | 1.54                                           |                      | 4.95                               | 18.15                                    | 0.00    | 0.01 |                           |
| ENSG00000071539 | TRIP13            | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]            | protein coding | 1.52                                           |                      | 3.03                               | 15.85                                    | 0.00    | 0.02 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type          | Log <sub>2</sub> Change<br>5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|--------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000174371 | EXO1              | exonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3511]                                          | Sym-protein coding | 1.52                                        |                | 2.31                         | 15.01                           | 0.00    | 0.02 |                  |
| ENSG00000137807 | KIF23             | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                               | Sym-protein coding | 1.52                                        |                | 2.71                         | 18.63                           | 0.00    | 0.01 |                  |
| ENSG00000169607 | CKAP2L            | cytoskeleton associated protein 2 like [Source:HGNC Symbol;Acc:HGNC:26877]                | Sym-protein coding | 1.52                                        |                | 1.97                         | 14.81                           | 0.00    | 0.02 |                  |
| ENSG00000119326 | CTNNAL1           | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                                   | Sym-protein coding | 1.49                                        |                | 2.76                         | 15.39                           | 0.00    | 0.02 |                  |
| ENSG00000085840 | ORC1              | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                   | Sym-protein coding | 1.47                                        |                | 2.84                         | 14.07                           | 0.00    | 0.03 |                  |
| ENSG00000088325 | TPX2              | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                    | Sym-protein coding | 1.46                                        |                | 4.23                         | 18.74                           | 0.00    | 0.01 |                  |
| ENSG00000170312 | CDK1              | cyclin dependent kinase 1 [Source:HGNC Symbol;Acc:HGNC:1722]                              | Sym-protein coding | 1.45                                        |                | 3.27                         | 15.96                           | 0.00    | 0.02 |                  |
| ENSG00000178999 | AURKB             | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                       | Sym-protein coding | 1.45                                        |                | 2.84                         | 15.37                           | 0.00    | 0.02 |                  |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                              | Sym-protein coding | 1.44                                        |                | 6.48                         | 15.57                           | 0.00    | 0.02 |                  |
| ENSG00000094804 | CDC6              | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                  | Sym-protein coding | 1.44                                        |                | 3.72                         | 15.34                           | 0.00    | 0.02 |                  |
| ENSG00000075218 | GTSE1             | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                            | Sym-protein coding | 1.43                                        |                | 2.89                         | 13.17                           | 0.00    | 0.03 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudogene    | 1.43                                        |                | 7.45                         | 20.43                           | 0.00    | 0.00 |                  |
| ENSG00000087586 | AURKA             | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                       | Sym-protein coding | 1.42                                        |                | 2.84                         | 18.78                           | 0.00    | 0.01 |                  |
| ENSG00000148773 | MKI67             | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                          | Sym-protein coding | 1.42                                        |                | 6.88                         | 15.63                           | 0.00    | 0.02 |                  |
| ENSG00000029993 | HMGB3             | high mobility group box 3 [Source:HGNC Symbol;Acc:HGNC:5004]                              | Sym-protein coding | 1.42                                        |                | 3.06                         | 13.99                           | 0.00    | 0.03 |                  |
| ENSG00000138166 | DUSP5             | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                         | Sym-protein coding | 1.41                                        |                | 5.25                         | 16.23                           | 0.00    | 0.02 |                  |
| ENSG00000163751 | CPA3              | carboxypeptidase A3 [Source:HGNC Symbol;Acc:HGNC:2298]                                    | Sym-protein coding | 1.41                                        |                | 5.08                         | 18.55                           | 0.00    | 0.01 |                  |
| ENSG00000138778 | CENPE             | centromere protein E [Source:HGNC Symbol;Acc:HGNC:1856]                                   | Sym-protein coding | 1.38                                        |                | 3.96                         | 16.30                           | 0.00    | 0.02 |                  |
| ENSG00000135476 | ESPL1             | extra spindle pole bodies like 1, separase [Source:HGNC Symbol;Acc:HGNC:16856]            | Sym-protein coding | 1.38                                        |                | 3.36                         | 13.50                           | 0.00    | 0.03 |                  |
| ENSG00000167900 | TK1               | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                    | Sym-protein coding | 1.38                                        |                | 4.47                         | 20.55                           | 0.00    | 0.00 |                  |
| ENSG00000117650 | NEK2              | NIMA related kinase 2 [Source:HGNC Symbol;Acc:HGNC:7745]                                  | Sym-protein coding | 1.37                                        |                | 2.09                         | 12.30                           | 0.00    | 0.04 |                  |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                         | Sym-protein coding | 1.37                                        |                | 6.10                         | 14.24                           | 0.00    | 0.02 |                  |
| ENSG00000162676 | GFI1              | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]  | Sym-protein coding | 1.36                                        |                | 2.53                         | 12.48                           | 0.00    | 0.04 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                             | Gene Type      | Log <sub>2</sub> Change 5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000111206 | FOXM1             | forkhead box M1 [Source:HGNC Symbol;Acc:HGNC:3818]                                   | protein coding | 1.36                                     |                | 3.70                         | 19.23                           | 0.00    | 0.01 |                  |
| ENSG00000121152 | NCAPH             | non-SMC condensin I complex subunit H [Source:HGNC Symbol;Acc:HGNC:1112]             | protein coding | 1.34                                     |                | 3.11                         | 13.05                           | 0.00    | 0.03 |                  |
| ENSG00000137563 | GGH               | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                          | protein coding | 1.34                                     |                | 4.11                         | 15.18                           | 0.00    | 0.02 |                  |
| ENSG00000138180 | CEP55             | centrosomal protein 55 [Source:HGNC Symbol;Acc:HGNC:1161]                            | protein coding | 1.31                                     |                | 2.88                         | 11.97                           | 0.00    | 0.05 |                  |
| ENSG00000035499 | DEPDC1B           | DEP domain containing 1B [Source:HGNC Symbol;Acc:HGNC:24902]                         | protein coding | 1.30                                     |                | 2.64                         | 14.52                           | 0.00    | 0.02 |                  |
| ENSG00000072571 | HMMR              | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]             | protein coding | 1.29                                     |                | 3.11                         | 14.49                           | 0.00    | 0.02 |                  |
| ENSG00000167513 | CDT1              | chromatin licensing and DNA replication factor 1 [Source:HGNC Symbol;Acc:HGNC:24576] | protein coding | 1.28                                     |                | 2.73                         | 12.83                           | 0.00    | 0.04 |                  |
| ENSG00000025039 | RRAGD             | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                        | protein coding | 1.27                                     |                | 2.97                         | 19.13                           | 0.00    | 0.01 |                  |
| ENSG00000107104 | KANK1             | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]            | protein coding | 1.27                                     |                | 3.08                         | 13.04                           | 0.00    | 0.03 |                  |
| ENSG00000164611 | PTTG1             | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                    | protein coding | 1.26                                     |                | 3.82                         | 14.25                           | 0.00    | 0.02 |                  |
| ENSG00000076382 | SPAG5             | sperm associated antigen 5 [Source:HGNC Symbol;Acc:HGNC:13452]                       | protein coding | 1.24                                     |                | 4.19                         | 13.88                           | 0.00    | 0.03 |                  |
| ENSG00000151725 | CENPU             | centromere protein U [Source:HGNC Symbol;Acc:HGNC:21348]                             | protein coding | 1.22                                     |                | 3.37                         | 17.31                           | 0.00    | 0.01 |                  |
| ENSG00000131747 | TOP2A             | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                     | protein coding | 1.22                                     |                | 5.39                         | 16.49                           | 0.00    | 0.01 |                  |
| ENSG00000105011 | ASF1B             | anti-silencing function 1B histone chaperone [Source:HGNC Symbol;Acc:HGNC:20996]     | protein coding | 1.21                                     |                | 3.46                         | 13.01                           | 0.00    | 0.03 |                  |
| ENSG00000134489 | HRH4              | histamine receptor H4 [Source:HGNC Symbol;Acc:HGNC:17383]                            | protein coding | 1.21                                     |                | 3.55                         | 14.74                           | 0.00    | 0.02 |                  |
| ENSG00000134057 | CCNB1             | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                         | protein coding | 1.19                                     |                | 3.71                         | 16.21                           | 0.00    | 0.02 |                  |
| ENSG00000100219 | XBP1              | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                          | protein coding | 1.18                                     |                | 8.71                         | 14.15                           | 0.00    | 0.02 |                  |
| ENSG00000128228 | SDF2L1            | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]             | protein coding | 1.18                                     |                | 5.35                         | 14.98                           | 0.00    | 0.02 |                  |
| ENSG00000131153 | GINS2             | GINS complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:24575]                           | protein coding | 1.16                                     |                | 2.63                         | 12.32                           | 0.00    | 0.04 |                  |
| ENSG00000138160 | KIF11             | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                          | protein coding | 1.14                                     |                | 4.90                         | 19.42                           | 0.00    | 0.01 |                  |
| ENSG00000166851 | PLK1              | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                                | protein coding | 1.09                                     |                | 3.76                         | 15.64                           | 0.00    | 0.02 |                  |
| ENSG00000143228 | NUF2              | NUF2, NDC80 kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:14621]        | protein coding | 1.09                                     |                | 2.80                         | 12.68                           | 0.00    | 0.04 |                  |
| ENSG00000173848 | NET1              | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]              | protein coding | 1.09                                     |                | 4.51                         | 13.46                           | 0.00    | 0.03 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type             | Log <sub>2</sub> Change 5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000166598 | HSP90B1           | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]             | protein coding        | 1.07                                     |                | 10.85                        | 12.45                           | 0.00    | 0.04 |                  |
| ENSG00000104738 | MCM4              | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947]          | protein coding        | 1.07                                     |                | 5.57                         | 20.28                           | 0.00    | 0.00 |                  |
| ENSG00000164109 | MAD2L1            | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]            | protein coding        | 1.06                                     |                | 3.47                         | 19.34                           | 0.00    | 0.01 |                  |
| ENSG00000145050 | MANF              | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]    | protein coding        | 1.05                                     |                | 6.57                         | 13.11                           | 0.00    | 0.03 |                  |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                     | protein coding        | 1.03                                     |                | 6.64                         | 14.59                           | 0.00    | 0.02 |                  |
| ENSG00000259706 | HSP90B2P          | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099] | processed pseudo-gene | 1.03                                     |                | 5.15                         | 13.22                           | 0.00    | 0.03 |                  |
| ENSG00000137804 | NUSAP1            | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]             | protein coding        | 1.03                                     |                | 4.54                         | 13.84                           | 0.00    | 0.03 |                  |
| ENSG00000156970 | BUB1B             | BUB1 mitotic checkpoint serine/threonine kinase B [Source:HGNC Symbol;Acc:HGNC:1149]       | protein coding        | 1.01                                     |                | 3.03                         | 12.02                           | 0.00    | 0.05 |                  |
| ENSG00000211946 | IGHV3-20          | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                      | IG V gene             | 1.00                                     |                | 4.47                         | 18.95                           | 0.00    | 0.01 |                  |
| ENSG00000280411 | IGHV1-69-2        | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                    | IG V gene             | 0.98                                     |                | 5.43                         | 14.90                           | 0.00    | 0.02 |                  |
| ENSG00000123080 | CDKN2C            | cyclin dependent kinase inhibitor 2C [Source:HGNC Symbol;Acc:HGNC:1789]                    | protein coding        | 0.97                                     |                | 2.98                         | 12.68                           | 0.00    | 0.04 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                     | IG V gene             | 0.96                                     |                | 7.46                         | 19.11                           | 0.00    | 0.01 |                  |
| ENSG00000080986 | NDC80             | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                   | protein coding        | 0.96                                     |                | 3.30                         | 11.88                           | 0.00    | 0.05 |                  |
| ENSG00000068489 | PRR11             | proline rich 11 [Source:HGNC Symbol;Acc:HGNC:25619]                                        | protein coding        | 0.94                                     |                | 3.84                         | 14.17                           | 0.00    | 0.02 |                  |
| ENSG00000242076 | IGKV1-33          | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                      | IG V gene             | 0.94                                     |                | 4.78                         | 12.05                           | 0.00    | 0.05 |                  |
| ENSG00000074416 | MGLL              | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                   | protein coding        | 0.94                                     |                | 3.89                         | 14.26                           | 0.00    | 0.02 |                  |
| ENSG00000160712 | IL6R              | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                                  | protein coding        | 0.93                                     |                | 6.64                         | 13.83                           | 0.00    | 0.03 |                  |
| ENSG00000070214 | SLC44A1           | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                      | protein coding        | 0.92                                     |                | 7.25                         | 11.96                           | 0.00    | 0.05 |                  |
| ENSG00000211669 | IGLV3-10          | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                     | IG V gene             | 0.91                                     |                | 5.96                         | 17.76                           | 0.00    | 0.01 |                  |
| ENSG00000076003 | MCM6              | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949]          | protein coding        | 0.90                                     |                | 5.36                         | 12.50                           | 0.00    | 0.04 |                  |
| ENSG00000132432 | SEC61G            | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                         | protein coding        | 0.90                                     |                | 5.39                         | 18.04                           | 0.00    | 0.01 |                  |
| ENSG00000182481 | KPNA2             | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                             | protein coding        | 0.89                                     |                | 5.21                         | 14.30                           | 0.00    | 0.02 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change 5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000244575 | IGKV1-27          | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                 | IG V gene      | 0.88                                     |                | 5.55                         | 33.21                           | 0.00    | 0.00 |                  |
| ENSG00000196189 | SEMA4A            | semaphorin 4A [Source:HGNC Symbol;Acc:HGNC:10729]                                     | protein coding | 0.87                                     |                | 6.85                         | 12.34                           | 0.00    | 0.04 |                  |
| ENSG00000007968 | E2F2              | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                         | protein coding | 0.86                                     |                | 5.11                         | 13.12                           | 0.00    | 0.03 |                  |
| ENSG00000140525 | FANCI             | Fanconi anemia complementation group I [Source:HGNC Symbol;Acc:HGNC:25568]            | protein coding | 0.86                                     |                | 4.70                         | 13.21                           | 0.00    | 0.03 |                  |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528] | IG C gene      | 0.85                                     |                | 7.17                         | 12.26                           | 0.00    | 0.04 |                  |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                | IG V gene      | 0.84                                     |                | 7.93                         | 19.33                           | 0.00    | 0.01 |                  |
| ENSG00000108106 | UBE2S             | ubiquitin conjugating enzyme E2 S [Source:HGNC Symbol;Acc:HGNC:17895]                 | protein coding | 0.83                                     |                | 3.49                         | 11.99                           | 0.00    | 0.05 |                  |
| ENSG00000173540 | GMPPB             | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                   | protein coding | 0.83                                     |                | 5.54                         | 12.22                           | 0.00    | 0.04 |                  |
| ENSG00000113368 | LMNB1             | lamin B1 [Source:HGNC Symbol;Acc:HGNC:6637]                                           | protein coding | 0.82                                     |                | 5.73                         | 18.91                           | 0.00    | 0.01 |                  |
| ENSG00000188486 | H2AFX             | H2A histone family member X [Source:HGNC Symbol;Acc:HGNC:4739]                        | protein coding | 0.81                                     |                | 4.39                         | 13.64                           | 0.00    | 0.03 |                  |
| ENSG00000114850 | SSR3              | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                | protein coding | 0.79                                     |                | 7.82                         | 12.12                           | 0.00    | 0.05 |                  |
| ENSG00000168209 | DDIT4             | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                 | protein coding | -0.79                                    |                | 4.61                         | 27.04                           | 0.00    | 0.00 |                  |
| ENSG00000167553 | TUBA1C            | tubulin alpha 1c [Source:HGNC Symbol;Acc:HGNC:20768]                                  | protein coding | 0.75                                     |                | 3.80                         | 14.39                           | 0.00    | 0.02 |                  |
| ENSG00000146918 | NCAPG2            | non-SMC condensin II complex subunit G2 [Source:HGNC Symbol;Acc:HGNC:21904]           | protein coding | 0.71                                     |                | 4.52                         | 12.98                           | 0.00    | 0.03 |                  |
| ENSG00000132646 | PCNA              | proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:HGNC:8729]                 | protein coding | 0.70                                     |                | 5.78                         | 13.89                           | 0.00    | 0.03 |                  |
| ENSG00000117632 | STMN1             | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                         | protein coding | 0.69                                     |                | 5.85                         | 14.63                           | 0.00    | 0.02 |                  |
| ENSG00000134291 | TMEM106C          | transmembrane protein 106C [Source:HGNC Symbol;Acc:HGNC:28775]                        | protein coding | 0.68                                     |                | 4.94                         | 15.26                           | 0.00    | 0.02 |                  |
| ENSG00000251546 | IGKV1D-39         | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                | IG V gene      | 0.68                                     |                | 4.71                         | 12.99                           | 0.00    | 0.03 |                  |
| ENSG00000163507 | KIAA1524          | KIAA1524 [Source:HGNC Symbol;Acc:HGNC:29302]                                          | protein coding | 0.67                                     |                | 3.76                         | 14.69                           | 0.00    | 0.02 |                  |
| ENSG00000271533 |                   |                                                                                       | sense intronic | -0.67                                    |                | 3.61                         | 13.80                           | 0.00    | 0.03 |                  |
| ENSG00000123416 | TUBA1B            | tubulin alpha 1b [Source:HGNC Symbol;Acc:HGNC:18809]                                  | protein coding | 0.65                                     |                | 5.35                         | 12.99                           | 0.00    | 0.03 |                  |
| ENSG00000164032 | H2AFZ             | H2A histone family member Z [Source:HGNC Symbol;Acc:HGNC:4741]                        | protein coding | 0.63                                     |                | 6.58                         | 13.02                           | 0.00    | 0.03 |                  |
| ENSG00000104889 | RNASEH2A          | ribonuclease H2 subunit A [Source:HGNC Symbol;Acc:HGNC:18518]                         | protein coding | 0.62                                     |                | 3.74                         | 12.55                           | 0.00    | 0.04 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                               | Gene Type      | $Log_2$ Change<br>5 vs. pre-treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------|----------------|----------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]  | IG V gene      | 0.62                                   |                | 6.20                | 14.02                           | 0.00    | 0.03 |                  |
| ENSG00000244116 | IGKV2-28          | immunoglobulin kappa variable 2-28 [Source:HGNC Symbol;Acc:HGNC:5783]  | IG V gene      | 0.61                                   |                | 3.88                | 14.63                           | 0.00    | 0.02 |                  |
| ENSG00000164104 | HMGB2             | high mobility group box 2 [Source:HGNC Symbol;Acc:HGNC:5000]           | protein coding | 0.61                                   |                | 7.10                | 13.54                           | 0.00    | 0.03 |                  |
| ENSG00000080546 | SESN1             | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                          | protein coding | -0.59                                  |                | 6.66                | 28.01                           | 0.00    | 0.00 |                  |
| ENSG00000211625 | IGKV3D-20         | immunoglobulin kappa variable 3D-20 [Source:HGNC Symbol;Acc:HGNC:5825] | IG V gene      | 0.59                                   |                | 5.42                | 13.31                           | 0.00    | 0.03 |                  |
| ENSG00000198900 | TOP1              | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]              | protein coding | 0.59                                   |                | 6.91                | 12.13                           | 0.00    | 0.05 |                  |

**Table 11:** Genes differentially expressed at Day 5 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute  $log_2$  fold change (Day 5 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                               | Gene Type       | $Log_2$ Change<br>6 vs. pre-treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|----------------------------------------------------------------------------------------|-----------------|----------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000259997 | IGHV1OR16-4       | immunoglobulin heavy variable 1/OR16-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5573] | IG V pseudogene | 2.86                                   |                | -0.04               | 11.82                           | 0.00    | 0.01 |                  |
| ENSG00000148468 | FAM171A1          | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]      | protein coding  | 2.55                                   |                | 0.79                | 22.53                           | 0.00    | 0.00 |                  |
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                   | IG V gene       | 2.29                                   |                | 9.88                | 19.87                           | 0.00    | 0.00 |                  |
| ENSG00000153093 | ACOXL             | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                              | protein coding  | 2.29                                   |                | 1.12                | 15.48                           | 0.00    | 0.00 |                  |
| ENSG00000111186 | WNT5B             | Wnt family member 5B [Source:HGNC Symbol;Acc:HGNC:16265]                               | protein coding  | 2.23                                   |                | 1.16                | 19.80                           | 0.00    | 0.00 |                  |
| ENSG00000253131 | IGHV7-56          | immunoglobulin heavy variable 7-56 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5667]     | IG V pseudogene | 2.17                                   |                | 0.94                | 13.07                           | 0.00    | 0.01 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]  | IG C gene       | 2.14                                   |                | 12.71               | 37.50                           | 0.00    | 0.00 |                  |
| ENSG00000113140 | SPARC             | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]          | protein coding  | 2.06                                   |                | 1.61                | 11.51                           | 0.00    | 0.01 |                  |
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                          | protein coding  | 1.96                                   |                | 4.28                | 43.38                           | 0.00    | 0.00 |                  |
| ENSG00000168078 | PBK               | PDZ binding kinase [Source:HGNC Symbol;Acc:HGNC:18282]                                 | protein coding  | 1.94                                   |                | 1.37                | 17.30                           | 0.00    | 0.00 |                  |
| ENSG00000254174 | IGHV1-12          | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]     | IG V pseudogene | 1.92                                   |                | 0.50                | 10.47                           | 0.00    | 0.02 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type                       | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold<br>(Day pre- | Average<br>Log <sub>2</sub> CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------|-------------------|---------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000088340 | FER1L4            | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]                | transcribed unitary pseudo-gene | 1.91                                        |                   | 2.51                            | 16.37                                    | 0.00    | 0.00 |                           |
| ENSG00000154277 | UCHL1             | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                     | protein coding                  | 1.91                                        |                   | 1.44                            | 22.93                                    | 0.00    | 0.00 |                           |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudo-gene                | 1.85                                        |                   | 7.63                            | 35.00                                    | 0.00    | 0.00 |                           |
| ENSG00000115163 | CENPA             | centromere protein A [Source:HGNC Symbol;Acc:HGNC:1851]                                   | protein coding                  | 1.81                                        |                   | 1.36                            | 14.06                                    | 0.00    | 0.00 |                           |
| ENSG00000163053 | SLC16A14          | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                    | protein coding                  | 1.76                                        |                   | 2.53                            | 22.76                                    | 0.00    | 0.00 |                           |
| ENSG00000129173 | E2F8              | E2F transcription factor 8 [Source:HGNC Symbol;Acc:HGNC:24727]                            | protein coding                  | 1.75                                        |                   | 1.65                            | 14.21                                    | 0.00    | 0.00 |                           |
| ENSG00000024526 | DEPDC1            | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                               | protein coding                  | 1.71                                        |                   | 1.58                            | 13.15                                    | 0.00    | 0.01 |                           |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | IG V gene                       | 1.70                                        |                   | 8.37                            | 22.32                                    | 0.00    | 0.00 |                           |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | protein coding                  | 1.69                                        |                   | 4.16                            | 18.89                                    | 0.00    | 0.00 |                           |
| ENSG00000248571 |                   |                                                                                           | antisense                       | 1.69                                        |                   | 2.23                            | 19.44                                    | 0.00    | 0.00 |                           |
| ENSG00000171848 | RRM2              | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]        | protein coding                  | 1.68                                        |                   | 5.72                            | 35.36                                    | 0.00    | 0.00 |                           |
| ENSG00000211973 | IGHV1-69          | immunoglobulin heavy variable 1-69 [Source:HGNC Symbol;Acc:HGNC:5558]                     | IG V gene                       | 1.66                                        |                   | 4.85                            | 13.96                                    | 0.00    | 0.00 |                           |
| ENSG00000138166 | DUSP5             | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                         | protein coding                  | 1.65                                        |                   | 5.16                            | 30.19                                    | 0.00    | 0.00 |                           |
| ENSG00000211651 | IGLV1-44          | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                    | IG V gene                       | 1.64                                        |                   | 8.25                            | 8.31                                     | 0.00    | 0.04 |                           |
| ENSG00000164045 | CDC25A            | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                                | protein coding                  | 1.64                                        |                   | 2.14                            | 14.62                                    | 0.00    | 0.00 |                           |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    | IG V gene                       | 1.62                                        |                   | 8.45                            | 46.36                                    | 0.00    | 0.00 |                           |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                         | protein coding                  | 1.62                                        |                   | 6.01                            | 42.67                                    | 0.00    | 0.00 |                           |
| ENSG00000184661 | CDCA2             | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                      | protein coding                  | 1.61                                        |                   | 2.11                            | 17.75                                    | 0.00    | 0.00 |                           |
| ENSG00000093009 | CDC45             | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]                                 | protein coding                  | 1.60                                        |                   | 2.12                            | 17.37                                    | 0.00    | 0.00 |                           |
| ENSG00000239975 | IGKV1D-33         | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                    | IG V gene                       | 1.60                                        |                   | 4.35                            | 20.76                                    | 0.00    | 0.00 |                           |
| ENSG00000136010 | ALDH1L2           | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]             | protein coding                  | 1.59                                        |                   | 3.85                            | 26.41                                    | 0.00    | 0.00 |                           |
| ENSG00000169679 | BUB1              | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]        | protein coding                  | 1.59                                        |                   | 4.86                            | 39.96                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type                                          | Log <sub>2</sub> Change<br>6 vs.<br>treatment) | Fold<br>(Day<br>pre-<br>CPM | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000197476 |                   |                                                                                            | processed<br>pseudo-<br>gene                       | 1.58                                           |                             | 3.78                               | 10.93                                    | 0.00    | 0.01 |                           |
| ENSG00000162676 | GFI1              | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]   | protein<br>coding                                  | 1.56                                           |                             | 2.58                               | 22.37                                    | 0.00    | 0.00 |                           |
| ENSG00000090104 | RGS1              | regulator of G-protein signaling 1 [Source:HGNC Symbol;Acc:HGNC:9991]                      | protein<br>coding                                  | 1.56                                           |                             | 3.15                               | 24.02                                    | 0.00    | 0.00 |                           |
| ENSG00000139734 | DIAPH3            | diaphanous related formin 3 [Source:HGNC Symbol;Acc:HGNC:15480]                            | protein<br>coding                                  | 1.56                                           |                             | 1.46                               | 11.41                                    | 0.00    | 0.01 |                           |
| ENSG00000137563 | GGH               | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                                | protein<br>coding                                  | 1.55                                           |                             | 4.01                               | 37.07                                    | 0.00    | 0.00 |                           |
| ENSG00000075420 | FNDC3B            | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]              | protein<br>coding                                  | 1.55                                           |                             | 5.71                               | 28.60                                    | 0.00    | 0.00 |                           |
| ENSG00000122952 | ZWINT             | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]                   | protein<br>coding                                  | 1.55                                           |                             | 3.58                               | 25.71                                    | 0.00    | 0.00 |                           |
| ENSG00000270472 | IGHV3OR16-9       | immunoglobulin heavy variable 3/OR16-9 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5644] | IG V gene                                          | 1.54                                           |                             | 4.26                               | 14.51                                    | 0.00    | 0.00 |                           |
| ENSG00000165409 | TSHR              | thyroid stimulating hormone receptor [Source:HGNC Symbol;Acc:HGNC:12373]                   | protein<br>coding                                  | 1.54                                           |                             | 2.79                               | 16.37                                    | 0.00    | 0.00 |                           |
| ENSG00000171241 | SHCBP1            | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                   | protein<br>coding                                  | 1.53                                           |                             | 4.70                               | 30.84                                    | 0.00    | 0.00 |                           |
| ENSG00000109805 | NCAPG             | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]                  | protein<br>coding                                  | 1.53                                           |                             | 3.36                               | 26.95                                    | 0.00    | 0.00 |                           |
| ENSG00000216775 |                   |                                                                                            | transcribed<br>unpro-<br>cessed<br>pseudo-<br>gene | 1.53                                           |                             | 1.83                               | 12.21                                    | 0.00    | 0.01 |                           |
| ENSG00000211645 | IGLV1-50          | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]    | IG V gene                                          | 1.53                                           |                             | 1.30                               | 9.18                                     | 0.00    | 0.03 |                           |
| ENSG00000123485 | HJURP             | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]                  | protein<br>coding                                  | 1.52                                           |                             | 2.56                               | 16.25                                    | 0.00    | 0.00 |                           |
| ENSG00000165304 | MELK              | maternal embryonic leucine zipper kinase [Source:HGNC Symbol;Acc:HGNC:16870]               | protein<br>coding                                  | 1.52                                           |                             | 1.83                               | 14.57                                    | 0.00    | 0.00 |                           |
| ENSG00000280411 | IGHV1-69-2        | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                    | IG V gene                                          | 1.52                                           |                             | 5.87                               | 21.35                                    | 0.00    | 0.00 |                           |
| ENSG00000126787 | DLGAP5            | DLG associated protein 5 [Source:HGNC Symbol;Acc:HGNC:16864]                               | protein<br>coding                                  | 1.51                                           |                             | 3.25                               | 25.83                                    | 0.00    | 0.00 |                           |
| ENSG00000100219 | XBP1              | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                | protein<br>coding                                  | 1.50                                           |                             | 8.71                               | 41.49                                    | 0.00    | 0.00 |                           |
| ENSG00000203914 | HSP90B3P          | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100] | processed<br>pseudo-<br>gene                       | 1.49                                           |                             | 2.99                               | 28.60                                    | 0.00    | 0.00 |                           |
| ENSG00000259706 | HSP90B2P          | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099] | processed<br>pseudo-<br>gene                       | 1.49                                           |                             | 5.26                               | 64.73                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                        | Gene Type       | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------------|-----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000094804 | CDC6              | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                        | protein coding  | 1.47                                     |                | 3.51                         | 29.32                           | 0.00    | 0.00 |                  |
| ENSG00000143476 | DTL               | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288]            | protein coding  | 1.47                                     |                | 3.16                         | 21.56                           | 0.00    | 0.00 |                  |
| ENSG00000166598 | HSP90B1           | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]                  | protein coding  | 1.47                                     |                | 10.91                        | 44.94                           | 0.00    | 0.00 |                  |
| ENSG00000253691 | IGKV2OR22-4       | immunoglobulin kappa variable 2/OR22-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5813]          | IG V pseudogene | 1.47                                     |                | 3.86                         | 18.92                           | 0.00    | 0.00 |                  |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                        | protein coding  | 1.47                                     |                | 5.19                         | 22.25                           | 0.00    | 0.00 |                  |
| ENSG00000089685 | BIRC5             | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                           | protein coding  | 1.46                                     |                | 3.23                         | 19.89                           | 0.00    | 0.00 |                  |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                             | protein coding  | 1.45                                     |                | 5.08                         | 29.66                           | 0.00    | 0.00 |                  |
| ENSG00000112984 | KIF20A            | kinesin family member 20A [Source:HGNC Symbol;Acc:HGNC:9787]                                    | protein coding  | 1.44                                     |                | 1.84                         | 13.77                           | 0.00    | 0.00 |                  |
| ENSG00000170312 | CDK1              | cyclin dependent kinase 1 [Source:HGNC Symbol;Acc:HGNC:1722]                                    | protein coding  | 1.43                                     |                | 3.09                         | 18.89                           | 0.00    | 0.00 |                  |
| ENSG00000074842 | MYDGF             | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                               | protein coding  | 1.43                                     |                | 6.74                         | 36.94                           | 0.00    | 0.00 |                  |
| ENSG00000065485 | PDIA5             | protein disulfide isomerase family A member 5 [Source:HGNC Symbol;Acc:HGNC:24811]               | protein coding  | 1.43                                     |                | 4.52                         | 29.72                           | 0.00    | 0.00 |                  |
| ENSG00000243238 | IGKV2-30          | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                           | IG V gene       | 1.42                                     |                | 6.08                         | 10.14                           | 0.00    | 0.02 |                  |
| ENSG00000176890 | TYMS              | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                                      | protein coding  | 1.41                                     |                | 3.24                         | 23.27                           | 0.00    | 0.00 |                  |
| ENSG00000239571 | IGKV2D-30         | immunoglobulin kappa variable 2D-30 [Source:HGNC Symbol;Acc:HGNC:5801]                          | IG V gene       | 1.40                                     |                | 4.06                         | 8.23                            | 0.00    | 0.04 |                  |
| ENSG00000088325 | TPX2              | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                          | protein coding  | 1.40                                     |                | 4.03                         | 32.04                           | 0.00    | 0.00 |                  |
| ENSG00000253818 | IGLV1-41          | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]             | IG V pseudogene | 1.39                                     |                | 5.33                         | 9.81                            | 0.00    | 0.02 |                  |
| ENSG00000137807 | KIF23             | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                                     | protein coding  | 1.39                                     |                | 2.48                         | 19.19                           | 0.00    | 0.00 |                  |
| ENSG00000065328 | MCM10             | minichromosome maintenance 10 replication initiation factor [Source:HGNC Symbol;Acc:HGNC:18043] | protein coding  | 1.39                                     |                | 2.26                         | 14.10                           | 0.00    | 0.00 |                  |
| ENSG00000025039 | RRAGD             | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                                   | protein coding  | 1.38                                     |                | 3.01                         | 37.33                           | 0.00    | 0.00 |                  |
| ENSG00000155660 | PDIA4             | protein disulfide isomerase family A member 4 [Source:HGNC Symbol;Acc:HGNC:30167]               | protein coding  | 1.37                                     |                | 8.84                         | 35.12                           | 0.00    | 0.00 |                  |
| ENSG00000118985 | ELL2              | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]                   | protein coding  | 1.37                                     |                | 7.37                         | 35.51                           | 0.00    | 0.00 |                  |
| ENSG00000100629 | CEP128            | centrosomal protein 128 [Source:HGNC Symbol;Acc:HGNC:20359]                                     | protein coding  | 1.36                                     |                | 4.66                         | 30.82                           | 0.00    | 0.00 |                  |
| ENSG00000029993 | HMGB3             | high mobility group box 3 [Source:HGNC Symbol;Acc:HGNC:5004]                                    | protein coding  | 1.36                                     |                | 2.90                         | 20.55                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type      | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000138778 | CENPE             | centromere protein E [Source:HGNC Symbol;Acc:HGNC:1856]                                     | protein coding | 1.36                                        |                | 3.78                         | 25.82                           | 0.00    | 0.00 |                  |
| ENSG00000198722 | UNC13B            | unc-13 homolog B [Source:HGNC Symbol;Acc:HGNC:12566]                                        | protein coding | 1.35                                        |                | 2.18                         | 14.91                           | 0.00    | 0.00 |                  |
| ENSG00000108641 | B9D1              | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                                  | protein coding | 1.34                                        |                | 2.17                         | 18.47                           | 0.00    | 0.00 |                  |
| ENSG00000148773 | MKI67             | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                            | protein coding | 1.34                                        |                | 6.50                         | 30.16                           | 0.00    | 0.00 |                  |
| ENSG00000072571 | HMMR              | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]                    | protein coding | 1.33                                        |                | 3.04                         | 19.69                           | 0.00    | 0.00 |                  |
| ENSG00000119326 | CTNNAL1           | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                                     | protein coding | 1.33                                        |                | 2.51                         | 21.66                           | 0.00    | 0.00 |                  |
| ENSG00000026751 | SLAMF7            | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                                    | protein coding | 1.33                                        |                | 7.71                         | 28.70                           | 0.00    | 0.00 |                  |
| ENSG00000271178 | IGHV3OR16-13      | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | IG V gene      | 1.32                                        |                | 4.14                         | 15.33                           | 0.00    | 0.00 |                  |
| ENSG00000102471 | NDFIP2            | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                      | protein coding | 1.29                                        |                | 2.17                         | 13.62                           | 0.00    | 0.00 |                  |
| ENSG00000242076 | IGKV1-33          | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                       | IG V gene      | 1.29                                        |                | 5.08                         | 13.71                           | 0.00    | 0.00 |                  |
| ENSG00000107104 | KANK1             | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                   | protein coding | 1.29                                        |                | 3.14                         | 14.41                           | 0.00    | 0.00 |                  |
| ENSG00000186185 | KIF18B            | kinesin family member 18B [Source:HGNC Symbol;Acc:HGNC:27102]                               | protein coding | 1.27                                        |                | 1.85                         | 7.99                            | 0.00    | 0.05 |                  |
| ENSG00000186810 | CXCR3             | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                         | protein coding | 1.27                                        |                | 4.16                         | 23.33                           | 0.00    | 0.00 |                  |
| ENSG00000173578 | XCR1              | X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1625]                           | protein coding | 1.27                                        |                | 2.64                         | 9.81                            | 0.00    | 0.02 |                  |
| ENSG00000111885 | MAN1A1            | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                      | protein coding | 1.26                                        |                | 8.25                         | 35.53                           | 0.00    | 0.00 |                  |
| ENSG00000004468 | CD38              | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                            | protein coding | 1.26                                        |                | 7.89                         | 37.15                           | 0.00    | 0.00 |                  |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                      | protein coding | 1.26                                        |                | 6.60                         | 39.89                           | 0.00    | 0.00 |                  |
| ENSG00000145050 | MANF              | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]     | protein coding | 1.25                                        |                | 6.51                         | 44.05                           | 0.00    | 0.00 |                  |
| ENSG00000100526 | CDKN3             | cyclin dependent kinase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:1791]                      | protein coding | 1.25                                        |                | 1.71                         | 8.96                            | 0.00    | 0.03 |                  |
| ENSG00000123131 | PRDX4             | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                         | protein coding | 1.25                                        |                | 5.39                         | 26.27                           | 0.00    | 0.00 |                  |
| ENSG00000172965 | MIR4435-2HG       | MIR4435-2 host gene [Source:HGNC Symbol;Acc:HGNC:35163]                                     | lincRNA        | 1.25                                        |                | 2.70                         | 19.74                           | 0.00    | 0.00 |                  |
| ENSG00000044574 | HSPA5             | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]             | protein coding | 1.25                                        |                | 9.35                         | 41.58                           | 0.00    | 0.00 |                  |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                | protein coding | 1.24                                        |                | 6.14                         | 27.12                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type             | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000128228 | SDF2L1            | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                   | protein coding        | 1.24                                     |                | 5.17                         | 31.30                           | 0.00    | 0.00 |                  |
| ENSG00000011426 | ANLN              | anillin actin binding protein [Source:HGNC Symbol;Acc:HGNC:14082]                          | protein coding        | 1.23                                     |                | 1.83                         | 9.35                            | 0.00    | 0.03 |                  |
| ENSG00000242766 | IGKV1D-17         | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                     | IG V gene             | 1.23                                     |                | 3.41                         | 16.00                           | 0.00    | 0.00 |                  |
| ENSG00000173334 | TRIB1             | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                                | protein coding        | 1.23                                     |                | 6.09                         | 25.98                           | 0.00    | 0.00 |                  |
| ENSG00000085840 | ORC1              | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                    | protein coding        | 1.22                                     |                | 2.56                         | 17.00                           | 0.00    | 0.00 |                  |
| ENSG00000111424 | VDR               | vitamin D (1,25- dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]         | protein coding        | 1.22                                     |                | 3.71                         | 23.89                           | 0.00    | 0.00 |                  |
| ENSG00000211648 | IGLV1-47          | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                     | IG V gene             | 1.21                                     |                | 7.27                         | 8.51                            | 0.00    | 0.04 |                  |
| ENSG00000227295 | ELL2P1            | elongation factor for RNA polymerase II 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39343] | processed pseudo-gene | 1.21                                     |                | 2.21                         | 17.10                           | 0.00    | 0.00 |                  |
| ENSG00000171444 | MCC               | mutated in colorectal cancers [Source:HGNC Symbol;Acc:HGNC:6935]                           | protein coding        | 1.21                                     |                | 2.19                         | 16.52                           | 0.00    | 0.00 |                  |
| ENSG00000169607 | CKAP2L            | cytoskeleton associated protein 2 like [Source:HGNC Symbol;Acc:HGNC:26877]                 | protein coding        | 1.21                                     |                | 1.67                         | 9.91                            | 0.00    | 0.02 |                  |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                        | IG C gene             | 1.21                                     |                | 10.20                        | 29.40                           | 0.00    | 0.00 |                  |
| ENSG00000185164 | NOMO2             | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                      | protein coding        | 1.21                                     |                | 4.42                         | 21.84                           | 0.00    | 0.00 |                  |
| ENSG00000105976 | MET               | MET proto-oncogene, receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:7029]            | protein coding        | 1.20                                     |                | 1.94                         | 11.08                           | 0.00    | 0.01 |                  |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                 | protein coding        | 1.20                                     |                | 11.84                        | 20.14                           | 0.00    | 0.00 |                  |
| ENSG00000079931 | MOXD1             | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                               | protein coding        | 1.20                                     |                | 4.02                         | 26.77                           | 0.00    | 0.00 |                  |
| ENSG00000186594 | MIR22HG           | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                                        | lincRNA               | 1.20                                     |                | 3.21                         | 26.00                           | 0.00    | 0.00 |                  |
| ENSG00000173848 | NET1              | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                    | protein coding        | 1.20                                     |                | 4.44                         | 40.79                           | 0.00    | 0.00 |                  |
| ENSG00000146670 | CDCA5             | cell division cycle associated 5 [Source:HGNC Symbol;Acc:HGNC:14626]                       | protein coding        | 1.20                                     |                | 2.83                         | 11.28                           | 0.00    | 0.01 |                  |
| ENSG00000138180 | CEP55             | centrosomal protein 55 [Source:HGNC Symbol;Acc:HGNC:1161]                                  | protein coding        | 1.20                                     |                | 2.69                         | 18.27                           | 0.00    | 0.00 |                  |
| ENSG00000075218 | GTSE1             | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                             | protein coding        | 1.19                                     |                | 2.53                         | 13.34                           | 0.00    | 0.01 |                  |
| ENSG00000178999 | AURKB             | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                        | protein coding        | 1.19                                     |                | 2.51                         | 16.89                           | 0.00    | 0.00 |                  |
| ENSG00000070081 | NUCB2             | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                          | protein coding        | 1.19                                     |                | 5.73                         | 29.98                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type       | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|-----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000143333 | RGS16             | regulator of G-protein signaling 16 [Source:HGNC Symbol;Acc:HGNC:9997]                | protein coding  | 1.18                                     |                | 2.26                         | 9.59                            | 0.00    | 0.02 |                  |
| ENSG00000071539 | TRIP13            | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]            | protein coding  | 1.18                                     |                | 2.68                         | 17.04                           | 0.00    | 0.00 |                  |
| ENSG00000164611 | PTTG1             | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                     | protein coding  | 1.18                                     |                | 3.58                         | 28.87                           | 0.00    | 0.00 |                  |
| ENSG00000166794 | PPIB              | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                         | protein coding  | 1.17                                     |                | 7.76                         | 35.31                           | 0.00    | 0.00 |                  |
| ENSG00000070214 | SLC44A1           | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                 | protein coding  | 1.17                                     |                | 7.27                         | 37.23                           | 0.00    | 0.00 |                  |
| ENSG00000131747 | TOP2A             | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                      | protein coding  | 1.16                                     |                | 5.16                         | 26.25                           | 0.00    | 0.00 |                  |
| ENSG00000198794 | SCAMP5            | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]              | protein coding  | 1.16                                     |                | 3.61                         | 16.23                           | 0.00    | 0.00 |                  |
| ENSG00000224607 | IGKV1D-27         | immunoglobulin kappa variable 1D-27 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5751]   | IG V pseudogene | 1.16                                     |                | 2.24                         | 16.38                           | 0.00    | 0.00 |                  |
| ENSG00000175063 | UBE2C             | ubiquitin conjugating enzyme E2 C [Source:HGNC Symbol;Acc:HGNC:15937]                 | protein coding  | 1.16                                     |                | 2.29                         | 9.99                            | 0.00    | 0.02 |                  |
| ENSG00000117650 | NEK2              | NIMA related kinase 2 [Source:HGNC Symbol;Acc:HGNC:7745]                              | protein coding  | 1.16                                     |                | 1.86                         | 8.55                            | 0.00    | 0.04 |                  |
| ENSG00000135916 | ITM2C             | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                       | protein coding  | 1.16                                     |                | 8.86                         | 21.17                           | 0.00    | 0.00 |                  |
| ENSG00000166562 | SEC11C            | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400] | protein coding  | 1.15                                     |                | 7.45                         | 31.65                           | 0.00    | 0.00 |                  |
| ENSG00000113615 | SEC24A            | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]     | protein coding  | 1.15                                     |                | 6.74                         | 32.35                           | 0.00    | 0.00 |                  |
| ENSG00000121152 | NCAPH             | non-SMC condensin I complex subunit H [Source:HGNC Symbol;Acc:HGNC:1112]              | protein coding  | 1.15                                     |                | 2.85                         | 14.35                           | 0.00    | 0.00 |                  |
| ENSG00000167861 | HID1              | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                            | protein coding  | 1.13                                     |                | 4.25                         | 16.86                           | 0.00    | 0.00 |                  |
| ENSG00000168268 | NT5DC2            | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]               | protein coding  | 1.13                                     |                | 5.59                         | 26.75                           | 0.00    | 0.00 |                  |
| ENSG00000118515 | SGK1              | serum/glucocorticoid regulated kinase 1 [Source:HGNC Symbol;Acc:HGNC:10810]           | protein coding  | 1.13                                     |                | 4.47                         | 32.63                           | 0.00    | 0.00 |                  |
| ENSG00000066279 | ASPM              | abnormal spindle microtubule assembly [Source:HGNC Symbol;Acc:HGNC:19048]             | protein coding  | 1.13                                     |                | 4.14                         | 18.24                           | 0.00    | 0.00 |                  |
| ENSG00000183010 | PYCR1             | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]                | protein coding  | 1.13                                     |                | 2.67                         | 18.09                           | 0.00    | 0.00 |                  |
| ENSG00000211946 | IGHV3-20          | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                 | IG V gene       | 1.12                                     |                | 4.62                         | 22.88                           | 0.00    | 0.00 |                  |
| ENSG00000174132 | FAM174A           | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]      | protein coding  | 1.12                                     |                | 1.98                         | 7.85                            | 0.01    | 0.05 |                  |
| ENSG00000112378 | PERP              | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                     | protein coding  | 1.12                                     |                | 3.95                         | 19.10                           | 0.00    | 0.00 |                  |
| ENSG00000167634 | NLRP7             | NLR family pyrin domain containing 7 [Source:HGNC Symbol;Acc:HGNC:22947]              | protein coding  | 1.12                                     |                | 1.97                         | 7.72                            | 0.01    | 0.05 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000074695 | LMAN1             | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                          | protein coding | 1.12                                        |                | 8.04                         | 30.89                           | 0.00    | 0.00 |                  |
| ENSG00000185155 | MIXL1             | Mix paired-like homeobox [Source:HGNC Symbol;Acc:HGNC:13363]                          | protein coding | 1.11                                        |                | 2.93                         | 13.92                           | 0.00    | 0.00 |                  |
| ENSG00000103257 | SLC7A5            | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                  | protein coding | 1.11                                        |                | 5.44                         | 22.43                           | 0.00    | 0.00 |                  |
| ENSG00000182985 | CADM1             | cell adhesion molecule 1 [Source:HGNC Symbol;Acc:HGNC:5951]                           | protein coding | 1.11                                        |                | 3.50                         | 17.99                           | 0.00    | 0.00 |                  |
| ENSG00000134285 | FKBP11            | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                          | protein coding | 1.10                                        |                | 6.38                         | 24.28                           | 0.00    | 0.00 |                  |
| ENSG00000111665 | CDCA3             | cell division cycle associated 3 [Source:HGNC Symbol;Acc:HGNC:14624]                  | protein coding | 1.10                                        |                | 2.27                         | 10.46                           | 0.00    | 0.02 |                  |
| ENSG00000090889 | KIF4A             | kinesin family member 4A [Source:HGNC Symbol;Acc:HGNC:13339]                          | protein coding | 1.10                                        |                | 2.45                         | 15.66                           | 0.00    | 0.00 |                  |
| ENSG00000068912 | ERLEC1            | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                    | protein coding | 1.10                                        |                | 6.77                         | 30.22                           | 0.00    | 0.00 |                  |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528] | IG C gene      | 1.10                                        |                | 7.27                         | 19.42                           | 0.00    | 0.00 |                  |
| ENSG00000157456 | CCNB2             | cyclin B2 [Source:HGNC Symbol;Acc:HGNC:1580]                                          | protein coding | 1.09                                        |                | 3.16                         | 16.06                           | 0.00    | 0.00 |                  |
| ENSG00000174371 | EXO1              | exonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3511]                                      | protein coding | 1.09                                        |                | 1.91                         | 12.46                           | 0.00    | 0.01 |                  |
| ENSG00000211972 | IGHV3-66          | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                 | IG V gene      | 1.09                                        |                | 4.70                         | 15.42                           | 0.00    | 0.00 |                  |
| ENSG00000092853 | CLSPN             | claspin [Source:HGNC Symbol;Acc:HGNC:19715]                                           | protein coding | 1.09                                        |                | 2.57                         | 12.97                           | 0.00    | 0.01 |                  |
| ENSG00000237649 | KIFC1             | kinesin family member C1 [Source:HGNC Symbol;Acc:HGNC:6389]                           | protein coding | 1.08                                        |                | 3.34                         | 18.82                           | 0.00    | 0.00 |                  |
| ENSG00000065308 | TRAM2             | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]       | protein coding | 1.08                                        |                | 7.25                         | 25.43                           | 0.00    | 0.00 |                  |
| ENSG00000198876 | DCAF12            | DDB1 and CUL4 associated factor 12 [Source:HGNC Symbol;Acc:HGNC:19911]                | protein coding | 1.08                                        |                | 4.62                         | 27.92                           | 0.00    | 0.00 |                  |
| ENSG00000196189 | SEMA4A            | semaphorin 4A [Source:HGNC Symbol;Acc:HGNC:10729]                                     | protein coding | 1.08                                        |                | 6.80                         | 36.95                           | 0.00    | 0.00 |                  |
| ENSG00000222041 | CYTOR             | cytoskeleton regulator RNA [Source:HGNC Symbol;Acc:HGNC:28717]                        | lincRNA        | 1.07                                        |                | 2.23                         | 13.34                           | 0.00    | 0.01 |                  |
| ENSG00000186818 | LILRB4            | leukocyte immunoglobulin like receptor B4 [Source:HGNC Symbol;Acc:HGNC:6608]          | protein coding | 1.07                                        |                | 3.86                         | 14.82                           | 0.00    | 0.00 |                  |
| ENSG00000117399 | CDC20             | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                             | protein coding | 1.07                                        |                | 3.49                         | 13.98                           | 0.00    | 0.00 |                  |
| ENSG00000239264 | TXNDC5            | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                   | protein coding | 1.07                                        |                | 5.77                         | 20.40                           | 0.00    | 0.00 |                  |
| ENSG00000111206 | FOXM1             | forkhead box M1 [Source:HGNC Symbol;Acc:HGNC:3818]                                    | protein coding | 1.07                                        |                | 3.37                         | 18.95                           | 0.00    | 0.00 |                  |
| ENSG00000180535 | BHLHA15           | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]          | protein coding | 1.06                                        |                | 3.35                         | 15.31                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                             | Gene Type      | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000153066 | TXNDC11           | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                                 | protein coding | 1.06                                        |                | 7.80                         | 27.06                           | 0.00    | 0.00 |                  |
| ENSG00000163694 | RBM47             | RNA binding motif protein 47 [Source:HGNC Symbol;Acc:HGNC:30358]                                     | protein coding | 1.06                                        |                | 4.95                         | 20.77                           | 0.00    | 0.00 |                  |
| ENSG00000177301 | KCNA2             | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220]              | protein coding | 1.06                                        |                | 3.14                         | 12.14                           | 0.00    | 0.01 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                                | IG V gene      | 1.06                                        |                | 7.88                         | 42.61                           | 0.00    | 0.00 |                  |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]                     | protein coding | 1.06                                        |                | 8.58                         | 20.36                           | 0.00    | 0.00 |                  |
| ENSG00000143603 | KCNN3             | potassium calcium-activated channel subfamily N member 3 [Source:HGNC Symbol;Acc:HGNC:6292]          | protein coding | 1.06                                        |                | 3.01                         | 13.36                           | 0.00    | 0.01 |                  |
| ENSG00000143942 | CHAC2             | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]                        | protein coding | 1.06                                        |                | 3.21                         | 22.88                           | 0.00    | 0.00 |                  |
| ENSG00000136026 | CKAP4             | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                                | protein coding | 1.05                                        |                | 6.75                         | 30.57                           | 0.00    | 0.00 |                  |
| ENSG00000118705 | RPN2              | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                                    | protein coding | 1.05                                        |                | 8.46                         | 26.50                           | 0.00    | 0.00 |                  |
| ENSG00000128595 | CALU              | calumenin [Source:HGNC Symbol;Acc:HGNC:1458]                                                         | protein coding | 1.05                                        |                | 6.30                         | 32.36                           | 0.00    | 0.00 |                  |
| ENSG00000150961 | SEC24D            | SEC24 homolog D, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10706]                    | protein coding | 1.05                                        |                | 6.61                         | 29.15                           | 0.00    | 0.00 |                  |
| ENSG00000153162 | BMP6              | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                                      | protein coding | 1.04                                        |                | 2.43                         | 8.64                            | 0.00    | 0.04 |                  |
| ENSG00000142945 | KIF2C             | kinesin family member 2C [Source:HGNC Symbol;Acc:HGNC:6393]                                          | protein coding | 1.04                                        |                | 2.80                         | 19.60                           | 0.00    | 0.00 |                  |
| ENSG00000241294 | IGKV2-24          | immunoglobulin kappa variable 2-24 [Source:HGNC Symbol;Acc:HGNC:5781]                                | IG V gene      | 1.04                                        |                | 5.25                         | 12.16                           | 0.00    | 0.01 |                  |
| ENSG00000211897 | IGHG3             | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]                | IG C gene      | 1.04                                        |                | 9.26                         | 14.98                           | 0.00    | 0.00 |                  |
| ENSG00000134910 | STT3A             | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172] | protein coding | 1.04                                        |                | 7.40                         | 32.09                           | 0.00    | 0.00 |                  |
| ENSG00000155304 | HSPA13            | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]                    | protein coding | 1.03                                        |                | 6.30                         | 32.29                           | 0.00    | 0.00 |                  |
| ENSG00000158089 | GALNT14           | polypeptide N-acetylgalactosaminyltransferase 14 [Source:HGNC Symbol;Acc:HGNC:22946]                 | protein coding | 1.03                                        |                | 1.57                         | 8.24                            | 0.00    | 0.04 |                  |
| ENSG00000145386 | CCNA2             | cyclin A2 [Source:HGNC Symbol;Acc:HGNC:1578]                                                         | protein coding | 1.03                                        |                | 3.67                         | 19.98                           | 0.00    | 0.00 |                  |
| ENSG00000131871 | SELENOS           | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                                  | protein coding | 1.03                                        |                | 5.62                         | 28.70                           | 0.00    | 0.00 |                  |
| ENSG00000183508 | FAM46C            | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]                      | protein coding | 1.03                                        |                | 8.59                         | 29.80                           | 0.00    | 0.00 |                  |
| ENSG00000172469 | MANEA             | mannosidase endo-alpha [Source:HGNC Symbol;Acc:HGNC:21072]                                           | protein coding | 1.03                                        |                | 6.01                         | 26.63                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type      | Log <sub>2</sub> Change<br>6 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|----------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000184232 | OAF               | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                | protein coding | 1.03                                           |                      | 2.27                               | 13.19                                    | 0.00    | 0.01 |                           |
| ENSG00000125844 | RRBP1             | ribosome binding protein 1 [Source:HGNC Symbol;Acc:HGNC:10448]                          | protein coding | 1.02                                           |                      | 7.32                               | 20.42                                    | 0.00    | 0.00 |                           |
| ENSG00000186522 | SEPT10            | septin 10 [Source:HGNC Symbol;Acc:HGNC:14349]                                           | protein coding | 1.02                                           |                      | 2.15                               | 11.89                                    | 0.00    | 0.01 |                           |
| ENSG00000149428 | HYOU1             | hypoxia up-regulated 1 [Source:HGNC Symbol;Acc:HGNC:16931]                              | protein coding | 1.02                                           |                      | 7.84                               | 29.75                                    | 0.00    | 0.00 |                           |
| ENSG00000092621 | PHGDH             | phosphoglycerate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:8923]                       | protein coding | 1.02                                           |                      | 3.86                               | 28.26                                    | 0.00    | 0.00 |                           |
| ENSG00000166803 | KIAA0101          | KIAA0101 [Source:HGNC Symbol;Acc:HGNC:28961]                                            | protein coding | 1.01                                           |                      | 1.52                               | 7.92                                     | 0.00    | 0.05 |                           |
| ENSG00000118193 | KIF14             | kinesin family member 14 [Source:HGNC Symbol;Acc:HGNC:19181]                            | protein coding | 1.01                                           |                      | 2.53                               | 11.59                                    | 0.00    | 0.01 |                           |
| ENSG00000151725 | CENPU             | centromere protein U [Source:HGNC Symbol;Acc:HGNC:21348]                                | protein coding | 1.01                                           |                      | 3.18                               | 21.51                                    | 0.00    | 0.00 |                           |
| ENSG00000211659 | IGLV3-25          | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                  | IG V gene      | 1.01                                           |                      | 7.14                               | 30.89                                    | 0.00    | 0.00 |                           |
| ENSG00000114850 | SSR3              | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                  | protein coding | 1.01                                           |                      | 7.86                               | 34.45                                    | 0.00    | 0.00 |                           |
| ENSG00000143870 | PDIA6             | protein disulfide isomerase family A member 6 [Source:HGNC Symbol;Acc:HGNC:30168]       | protein coding | 1.00                                           |                      | 7.75                               | 31.47                                    | 0.00    | 0.00 |                           |
| ENSG00000167900 | TK1               | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                  | protein coding | 1.00                                           |                      | 3.93                               | 35.18                                    | 0.00    | 0.00 |                           |
| ENSG00000078900 | TP73              | tumor protein p73 [Source:HGNC Symbol;Acc:HGNC:12003]                                   | protein coding | 1.00                                           |                      | 2.00                               | 8.05                                     | 0.00    | 0.04 |                           |
| ENSG00000244575 | IGKV1-27          | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                   | IG V gene      | 1.00                                           |                      | 5.65                               | 66.03                                    | 0.00    | 0.00 |                           |
| ENSG00000258572 |                   |                                                                                         | lincRNA        | 1.00                                           |                      | 2.63                               | 10.36                                    | 0.00    | 0.02 |                           |
| ENSG00000111291 | GPRC5D            | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310] | protein coding | 1.00                                           |                      | 3.91                               | 20.56                                    | 0.00    | 0.00 |                           |
| ENSG00000189233 | NUGGC             | nuclear GTPase, germinal center associated [Source:HGNC Symbol;Acc:HGNC:33550]          | protein coding | 0.99                                           |                      | 4.95                               | 19.04                                    | 0.00    | 0.00 |                           |
| ENSG00000171155 | C1GALT1C1         | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                        | protein coding | 0.99                                           |                      | 4.14                               | 19.78                                    | 0.00    | 0.00 |                           |
| ENSG00000132432 | SEC61G            | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                      | protein coding | 0.99                                           |                      | 5.36                               | 37.96                                    | 0.00    | 0.00 |                           |
| ENSG00000211669 | IGLV3-10          | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                  | IG V gene      | 0.99                                           |                      | 5.88                               | 23.17                                    | 0.00    | 0.00 |                           |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                   | IG V gene      | 0.98                                           |                      | 6.51                               | 19.49                                    | 0.00    | 0.00 |                           |
| ENSG00000108829 | LRRC59            | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                   | protein coding | 0.98                                           |                      | 6.63                               | 31.60                                    | 0.00    | 0.00 |                           |
| ENSG00000051341 | POLQ              | DNA polymerase theta [Source:HGNC Symbol;Acc:HGNC:9186]                                 | protein coding | 0.98                                           |                      | 3.02                               | 24.35                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                      | Gene Type       | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------|-----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000124788 | ATXN1             | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                                  | protein coding  | 0.98                                        |                | 5.03                         | 25.84                           | 0.00    | 0.00 |                  |
| ENSG00000156970 | BUB1B             | BUB1 mitotic checkpoint serine/threonine kinase B [Source:HGNC Symbol;Acc:HGNC:1149]          | protein coding  | 0.98                                        |                | 2.88                         | 16.22                           | 0.00    | 0.00 |                  |
| ENSG00000106415 | GLCC11            | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                                  | protein coding  | 0.97                                        |                | 6.79                         | 35.12                           | 0.00    | 0.00 |                  |
| ENSG00000179750 | APOBEC3B          | apolipoprotein B mRNA editing enzyme catalytic subunit 3B [Source:HGNC Symbol;Acc:HGNC:17352] | protein coding  | 0.97                                        |                | 2.88                         | 12.57                           | 0.00    | 0.01 |                  |
| ENSG00000017483 | SLC38A5           | solute carrier family 38 member 5 [Source:HGNC Symbol;Acc:HGNC:18070]                         | protein coding  | 0.97                                        |                | 5.11                         | 23.88                           | 0.00    | 0.00 |                  |
| ENSG00000087586 | AURKA             | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                           | protein coding  | 0.96                                        |                | 2.46                         | 10.84                           | 0.00    | 0.01 |                  |
| ENSG00000136770 | DNAJC1            | DnaJ heat shock protein family (Hsp40) member C1 [Source:HGNC Symbol;Acc:HGNC:20090]          | protein coding  | 0.96                                        |                | 4.94                         | 19.69                           | 0.00    | 0.00 |                  |
| ENSG00000123352 | SPATS2            | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]                  | protein coding  | 0.95                                        |                | 5.70                         | 25.96                           | 0.00    | 0.00 |                  |
| ENSG00000165948 | IFI27L1           | interferon alpha inducible protein 27 like 1 [Source:HGNC Symbol;Acc:HGNC:19754]              | protein coding  | 0.95                                        |                | 2.59                         | 11.66                           | 0.00    | 0.01 |                  |
| ENSG00000198855 | FICD              | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                                     | protein coding  | 0.95                                        |                | 3.29                         | 17.16                           | 0.00    | 0.00 |                  |
| ENSG00000185624 | P4HB              | prolyl 4-hydroxylase subunit beta [Source:HGNC Symbol;Acc:HGNC:8548]                          | protein coding  | 0.95                                        |                | 8.44                         | 24.79                           | 0.00    | 0.00 |                  |
| ENSG00000135069 | PSAT1             | phosphoserine aminotransferase 1 [Source:HGNC Symbol;Acc:HGNC:19129]                          | protein coding  | 0.95                                        |                | 3.62                         | 24.40                           | 0.00    | 0.00 |                  |
| ENSG00000154839 | SKA1              | spindle and kinetochore associated complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28109]      | protein coding  | 0.95                                        |                | 2.29                         | 9.22                            | 0.00    | 0.03 |                  |
| ENSG00000057657 | PRDM1             | PR/SET domain 1 [Source:HGNC Symbol;Acc:HGNC:9346]                                            | protein coding  | 0.94                                        |                | 6.32                         | 22.06                           | 0.00    | 0.00 |                  |
| ENSG00000254395 | IGHV4-55          | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]            | IG V pseudogene | 0.94                                        |                | 4.19                         | 14.43                           | 0.00    | 0.00 |                  |
| ENSG00000137804 | NUSAP1            | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]                | protein coding  | 0.94                                        |                | 4.33                         | 24.73                           | 0.00    | 0.00 |                  |
| ENSG00000074416 | MGLL              | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                      | protein coding  | 0.94                                        |                | 3.79                         | 20.74                           | 0.00    | 0.00 |                  |
| ENSG00000117143 | UAP1              | UDP-N-acetylglucosamine pyrophosphorylase 1 [Source:HGNC Symbol;Acc:HGNC:12457]               | protein coding  | 0.94                                        |                | 5.73                         | 23.71                           | 0.00    | 0.00 |                  |
| ENSG00000134057 | CCNB1             | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                                  | protein coding  | 0.94                                        |                | 3.49                         | 14.57                           | 0.00    | 0.00 |                  |
| ENSG00000165272 | AQP3              | aquaporin 3 (Gill blood group) [Source:HGNC Symbol;Acc:HGNC:636]                              | protein coding  | 0.94                                        |                | 6.16                         | 19.11                           | 0.00    | 0.00 |                  |
| ENSG00000131153 | GINS2             | GINS complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:24575]                                    | protein coding  | 0.94                                        |                | 2.45                         | 13.18                           | 0.00    | 0.01 |                  |
| ENSG00000090520 | DNAJB11           | DnaJ heat shock protein family (Hsp40) member B11 [Source:HGNC Symbol;Acc:HGNC:14889]         | protein coding  | 0.93                                        |                | 6.17                         | 35.76                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                | Gene Type      | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000106803 | SEC61B            | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                                       | protein coding | 0.93                                     |                | 6.16                         | 22.82                           | 0.00    | 0.00 |                  |
| ENSG00000100342 | APOL1             | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                                                     | protein coding | 0.93                                     |                | 4.82                         | 18.24                           | 0.00    | 0.00 |                  |
| ENSG00000241755 | IGKV1-9           | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                                                    | IG V gene      | 0.93                                     |                | 6.19                         | 8.66                            | 0.00    | 0.04 |                  |
| ENSG00000070540 | WIPI1             | WD repeat domain, phosphoinositide interacting 1 [Source:HGNC Symbol;Acc:HGNC:25471]                                    | protein coding | 0.93                                     |                | 4.29                         | 12.99                           | 0.00    | 0.01 |                  |
| ENSG00000167476 | JSRP1             | junctional sarcoplasmic reticulum protein 1 [Source:HGNC Symbol;Acc:HGNC:24963]                                         | protein coding | 0.92                                     |                | 2.50                         | 8.28                            | 0.00    | 0.04 |                  |
| ENSG00000160712 | IL6R              | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                                                               | protein coding | 0.92                                     |                | 6.53                         | 24.81                           | 0.00    | 0.00 |                  |
| ENSG00000211943 | IGHV3-15          | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                                                   | IG V gene      | 0.92                                     |                | 7.06                         | 11.83                           | 0.00    | 0.01 |                  |
| ENSG00000163902 | RPN1              | ribophorin I [Source:HGNC Symbol;Acc:HGNC:10381]                                                                        | protein coding | 0.91                                     |                | 7.98                         | 29.71                           | 0.00    | 0.00 |                  |
| ENSG00000102580 | DNAJC3            | DnaJ heat shock protein family (Hsp40) member C3 [Source:HGNC Symbol;Acc:HGNC:9439]                                     | protein coding | 0.91                                     |                | 6.80                         | 30.69                           | 0.00    | 0.00 |                  |
| ENSG00000035499 | DEPDC1B           | DEP domain containing 1B [Source:HGNC Symbol;Acc:HGNC:24902]                                                            | protein coding | 0.91                                     |                | 2.26                         | 9.07                            | 0.00    | 0.03 |                  |
| ENSG00000080986 | NDC80             | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                                                | protein coding | 0.91                                     |                | 3.20                         | 14.42                           | 0.00    | 0.00 |                  |
| ENSG00000138160 | KIF11             | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                                                             | protein coding | 0.91                                     |                | 4.65                         | 24.89                           | 0.00    | 0.00 |                  |
| ENSG00000241666 |                   |                                                                                                                         | antisense      | -0.91                                    |                | 2.89                         | 21.76                           | 0.00    | 0.00 |                  |
| ENSG00000149554 | CHEK1             | checkpoint kinase 1 [Source:HGNC Symbol;Acc:HGNC:1925]                                                                  | protein coding | 0.91                                     |                | 3.04                         | 13.17                           | 0.00    | 0.01 |                  |
| ENSG00000064763 | FAR2              | fatty acyl-CoA reductase 2 [Source:HGNC Symbol;Acc:HGNC:25531]                                                          | protein coding | 0.91                                     |                | 2.16                         | 9.04                            | 0.00    | 0.03 |                  |
| ENSG00000117724 | CENPF             | centromere protein F [Source:HGNC Symbol;Acc:HGNC:1857]                                                                 | protein coding | 0.91                                     |                | 4.59                         | 18.72                           | 0.00    | 0.00 |                  |
| ENSG00000143228 | NUF2              | NUF2, NDC80 kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:14621]                                           | protein coding | 0.91                                     |                | 2.59                         | 14.44                           | 0.00    | 0.00 |                  |
| ENSG00000150967 | ABCB9             | ATP binding cassette subfamily B member 9 [Source:HGNC Symbol;Acc:HGNC:50]                                              | protein coding | 0.91                                     |                | 4.01                         | 8.67                            | 0.00    | 0.04 |                  |
| ENSG00000251546 | IGKV1D-39         | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                                                  | IG V gene      | 0.91                                     |                | 4.82                         | 18.19                           | 0.00    | 0.00 |                  |
| ENSG00000071537 | SEL1L             | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]                                                | protein coding | 0.90                                     |                | 7.66                         | 24.57                           | 0.00    | 0.00 |                  |
| ENSG00000244116 | IGKV2-28          | immunoglobulin kappa variable 2-28 [Source:HGNC Symbol;Acc:HGNC:5783]                                                   | IG V gene      | 0.90                                     |                | 4.00                         | 24.62                           | 0.00    | 0.00 |                  |
| ENSG00000183087 | GAS6              | growth arrest specific 6 [Source:HGNC Symbol;Acc:HGNC:4168]                                                             | protein coding | 0.90                                     |                | 3.67                         | 12.04                           | 0.00    | 0.01 |                  |
| ENSG00000244038 | DDOST             | dolichyl-diphosphooligosaccharide-protein glycosyl-transferase non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:2728] | protein coding | 0.90                                     |                | 7.95                         | 28.08                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                     | Gene Type      | Log <sub>2</sub> Change<br>6 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|----------------------------------------------------------------------------------------------|----------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000278857 | IGKV1D-12         | immunoglobulin kappa variable 1D-12 [Source:HGNC Symbol;Acc:HGNC:5746]                       | IG V gene      | 0.89                                           |                      | 2.63                               | 7.82                                     | 0.01    | 0.05 |                           |
| ENSG00000115677 | HDLBP             | high density lipoprotein binding protein [Source:HGNC Symbol;Acc:HGNC:4857]                  | protein coding | 0.89                                           |                      | 8.63                               | 23.22                                    | 0.00    | 0.00 |                           |
| ENSG00000128590 | DNAJB9            | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]          | protein coding | 0.89                                           |                      | 5.26                               | 32.18                                    | 0.00    | 0.00 |                           |
| ENSG00000198856 | OSTC              | oligosaccharyltransferase complex non-catalytic sub-unit [Source:HGNC Symbol;Acc:HGNC:24448] | protein coding | 0.89                                           |                      | 6.21                               | 33.17                                    | 0.00    | 0.00 |                           |
| ENSG00000176658 | MYO1D             | myosin ID [Source:HGNC Symbol;Acc:HGNC:7598]                                                 | protein coding | 0.89                                           |                      | 6.04                               | 17.53                                    | 0.00    | 0.00 |                           |
| ENSG00000101294 | HM13              | histocompatibility minor 13 [Source:HGNC Symbol;Acc:HGNC:16435]                              | protein coding | 0.89                                           |                      | 7.10                               | 21.48                                    | 0.00    | 0.00 |                           |
| ENSG00000115902 | SLC1A4            | solute carrier family 1 member 4 [Source:HGNC Symbol;Acc:HGNC:10942]                         | protein coding | 0.89                                           |                      | 6.16                               | 21.52                                    | 0.00    | 0.00 |                           |
| ENSG00000139193 | CD27              | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                            | protein coding | 0.89                                           |                      | 6.01                               | 17.00                                    | 0.00    | 0.00 |                           |
| ENSG00000203760 | CENPW             | centromere protein W [Source:HGNC Symbol;Acc:HGNC:21488]                                     | protein coding | 0.89                                           |                      | 1.66                               | 7.78                                     | 0.01    | 0.05 |                           |
| ENSG00000185480 | PARPBP            | PARP1 binding protein [Source:HGNC Symbol;Acc:HGNC:26074]                                    | protein coding | 0.89                                           |                      | 2.30                               | 10.37                                    | 0.00    | 0.02 |                           |
| ENSG00000198826 | ARHGAP11A         | Rho GTPase activating protein 11A [Source:HGNC Symbol;Acc:HGNC:15783]                        | protein coding | 0.89                                           |                      | 4.01                               | 25.37                                    | 0.00    | 0.00 |                           |
| ENSG00000076382 | SPAG5             | sperm associated antigen 5 [Source:HGNC Symbol;Acc:HGNC:13452]                               | protein coding | 0.88                                           |                      | 3.81                               | 14.89                                    | 0.00    | 0.00 |                           |
| ENSG00000122862 | SRGN              | serglycin [Source:HGNC Symbol;Acc:HGNC:9361]                                                 | protein coding | 0.88                                           |                      | 7.26                               | 30.49                                    | 0.00    | 0.00 |                           |
| ENSG00000133328 | HRASLS2           | HRAS like suppressor 2 [Source:HGNC Symbol;Acc:HGNC:17824]                                   | protein coding | 0.88                                           |                      | 3.14                               | 9.55                                     | 0.00    | 0.03 |                           |
| ENSG00000235162 | C12orf75          | chromosome 12 open reading frame 75 [Source:HGNC Symbol;Acc:HGNC:35164]                      | protein coding | 0.87                                           |                      | 4.74                               | 26.30                                    | 0.00    | 0.00 |                           |
| ENSG00000249096 |                   |                                                                                              | lincRNA        | 0.87                                           |                      | 2.71                               | 8.14                                     | 0.00    | 0.04 |                           |
| ENSG00000105011 | ASF1B             | anti-silencing function 1B histone chaperone [Source:HGNC Symbol;Acc:HGNC:20996]             | protein coding | 0.87                                           |                      | 3.11                               | 12.56                                    | 0.00    | 0.01 |                           |
| ENSG00000182054 | IDH2              | isocitrate dehydrogenase (NADP(+)) 2, mitochondrial [Source:HGNC Symbol;Acc:HGNC:5383]       | protein coding | 0.87                                           |                      | 6.79                               | 19.19                                    | 0.00    | 0.00 |                           |
| ENSG00000117411 | B4GALT2           | beta-1,4-galactosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:925]                           | protein coding | 0.87                                           |                      | 3.44                               | 13.63                                    | 0.00    | 0.00 |                           |
| ENSG00000164109 | MAD2L1            | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]              | protein coding | 0.87                                           |                      | 3.28                               | 18.20                                    | 0.00    | 0.00 |                           |
| ENSG00000077152 | UBE2T             | ubiquitin conjugating enzyme E2 T [Source:HGNC Symbol;Acc:HGNC:25009]                        | protein coding | 0.87                                           |                      | 2.14                               | 8.25                                     | 0.00    | 0.04 |                           |
| ENSG00000083444 | PLOD1             | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]         | protein coding | 0.86                                           |                      | 4.47                               | 15.74                                    | 0.00    | 0.00 |                           |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                        | IG V gene      | 0.86                                           |                      | 7.59                               | 15.37                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                                | Gene Type            | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000101003 | GIN51             | GIN5 complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28980]                                                                              | protein coding       | 0.86                                     |                | 2.43                         | 10.38                           | 0.00    | 0.02 |                  |
| ENSG00000136240 | KDEL2             | KDEL endoplasmic reticulum protein retention receptor 2 [Source:HGNC Symbol;Acc:HGNC:6305]                                              | protein coding       | 0.86                                     |                | 6.27                         | 30.35                           | 0.00    | 0.00 |                  |
| ENSG00000123080 | CDKN2C            | cyclin dependent kinase inhibitor 2C [Source:HGNC Symbol;Acc:HGNC:1789]                                                                 | protein coding       | 0.86                                     |                | 2.81                         | 15.13                           | 0.00    | 0.00 |                  |
| ENSG00000175984 | DENND2C           | DENN domain containing 2C [Source:HGNC Symbol;Acc:HGNC:24748]                                                                           | protein coding       | 0.85                                     |                | 2.06                         | 7.86                            | 0.01    | 0.05 |                  |
| ENSG00000242371 | IGKV1-39          | immunoglobulin kappa variable 1-39 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5740]                                                 | IG V gene            | 0.85                                     |                | 4.34                         | 12.02                           | 0.00    | 0.01 |                  |
| ENSG00000168209 | DDIT4             | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                                                                   | protein coding       | -0.85                                    |                | 4.57                         | 34.62                           | 0.00    | 0.00 |                  |
| ENSG00000228589 | SPCS2P4           | signal peptidase complex subunit 2 homolog (S. cerevisiae) pseudogene 4 [Source:HGNC Symbol;Acc:HGNC:45237]                             | processed pseudogene | 0.84                                     |                | 2.23                         | 8.69                            | 0.00    | 0.04 |                  |
| ENSG00000211976 | IGHV3-73          | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                                                                   | IG V gene            | 0.84                                     |                | 4.70                         | 11.89                           | 0.00    | 0.01 |                  |
| ENSG00000198937 | CCDC167           | coiled-coil domain containing 167 [Source:HGNC Symbol;Acc:HGNC:21239]                                                                   | protein coding       | 0.84                                     |                | 3.78                         | 22.96                           | 0.00    | 0.00 |                  |
| ENSG00000004866 | ST7               | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                                                                     | protein coding       | 0.84                                     |                | 2.91                         | 12.46                           | 0.00    | 0.01 |                  |
| ENSG00000173540 | GMPPB             | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                                                                     | protein coding       | 0.84                                     |                | 5.46                         | 25.55                           | 0.00    | 0.00 |                  |
| ENSG00000135476 | ESPL1             | extra spindle pole bodies like 1, separase [Source:HGNC Symbol;Acc:HGNC:16856]                                                          | protein coding       | 0.84                                     |                | 2.83                         | 9.83                            | 0.00    | 0.02 |                  |
| ENSG00000102595 | UGGT2             | UDP-glucose glycoprotein glucosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:15664]                                                      | protein coding       | 0.83                                     |                | 2.74                         | 10.32                           | 0.00    | 0.02 |                  |
| ENSG00000112312 | GMNN              | geminin, DNA replication inhibitor [Source:HGNC Symbol;Acc:HGNC:17493]                                                                  | protein coding       | 0.83                                     |                | 3.06                         | 12.57                           | 0.00    | 0.01 |                  |
| ENSG00000065911 | MTHFD2            | methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methenyltetrahydrofolate cyclohydrolase [Source:HGNC Symbol;Acc:HGNC:7434] | protein coding       | 0.83                                     |                | 5.34                         | 20.74                           | 0.00    | 0.00 |                  |
| ENSG00000168496 | FEN1              | flap structure-specific endonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3650]                                                               | protein coding       | 0.83                                     |                | 4.36                         | 16.89                           | 0.00    | 0.00 |                  |
| ENSG00000211935 | IGHV1-3           | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                                                                    | IG V gene            | 0.83                                     |                | 6.30                         | 10.35                           | 0.00    | 0.02 |                  |
| ENSG00000163170 | BOLA3             | bolA family member 3 [Source:HGNC Symbol;Acc:HGNC:24415]                                                                                | protein coding       | 0.83                                     |                | 2.23                         | 10.00                           | 0.00    | 0.02 |                  |
| ENSG00000103512 | NOMO1             | NODAL modulator 1 [Source:HGNC Symbol;Acc:HGNC:30060]                                                                                   | protein coding       | 0.83                                     |                | 5.39                         | 13.57                           | 0.00    | 0.00 |                  |
| ENSG00000163808 | KIF15             | kinesin family member 15 [Source:HGNC Symbol;Acc:HGNC:17273]                                                                            | protein coding       | 0.83                                     |                | 2.75                         | 10.53                           | 0.00    | 0.02 |                  |
| ENSG00000211679 | IGLC3             | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]                                                   | IG C gene            | 0.83                                     |                | 9.33                         | 10.91                           | 0.00    | 0.01 |                  |
| ENSG00000136868 | SLC31A1           | solute carrier family 31 member 1 [Source:HGNC Symbol;Acc:HGNC:11016]                                                                   | protein coding       | 0.83                                     |                | 3.96                         | 17.84                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type      | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre-) | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|----------------|---------------------------------------------|-----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000109501 | WFS1              | wolframin ER transmembrane glycoprotein [Source:HGNC Symbol;Acc:HGNC:12762]               | protein coding | 0.82                                        |                 | 4.09                         | 17.93                           | 0.00    | 0.00 |                  |
| ENSG00000121073 | SLC35B1           | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                    | protein coding | 0.82                                        |                 | 5.38                         | 22.89                           | 0.00    | 0.00 |                  |
| ENSG00000198018 | ENTPD7            | ectonucleoside triphosphate diphosphohydrolase 7 [Source:HGNC Symbol;Acc:HGNC:19745]      | protein coding | 0.82                                        |                 | 3.33                         | 14.85                           | 0.00    | 0.00 |                  |
| ENSG00000120725 | SIL1              | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                       | protein coding | 0.82                                        |                 | 4.33                         | 13.15                           | 0.00    | 0.01 |                  |
| ENSG00000100228 | RAB36             | RAB36, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:9775]                      | protein coding | 0.82                                        |                 | 2.44                         | 8.02                            | 0.00    | 0.05 |                  |
| ENSG00000102096 | PIM2              | Pim-2 proto-oncogene, serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:8987]          | protein coding | 0.82                                        |                 | 7.96                         | 23.94                           | 0.00    | 0.00 |                  |
| ENSG00000068489 | PRR11             | proline rich 11 [Source:HGNC Symbol;Acc:HGNC:25619]                                       | protein coding | 0.82                                        |                 | 3.68                         | 18.68                           | 0.00    | 0.00 |                  |
| ENSG00000058262 | SEC61A1           | Sec61 translocon alpha 1 subunit [Source:HGNC Symbol;Acc:HGNC:18276]                      | protein coding | 0.82                                        |                 | 8.38                         | 21.73                           | 0.00    | 0.00 |                  |
| ENSG00000168701 | TMEM208           | transmembrane protein 208 [Source:HGNC Symbol;Acc:HGNC:25015]                             | protein coding | 0.82                                        |                 | 4.09                         | 18.12                           | 0.00    | 0.00 |                  |
| ENSG00000101412 | E2F1              | E2F transcription factor 1 [Source:HGNC Symbol;Acc:HGNC:3113]                             | protein coding | 0.82                                        |                 | 2.70                         | 8.92                            | 0.00    | 0.03 |                  |
| ENSG00000134825 | TMEM258           | transmembrane protein 258 [Source:HGNC Symbol;Acc:HGNC:1164]                              | protein coding | 0.81                                        |                 | 5.75                         | 25.73                           | 0.00    | 0.00 |                  |
| ENSG00000211685 | IGLC7             | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                       | IG C gene      | 0.81                                        |                 | 4.89                         | 13.95                           | 0.00    | 0.00 |                  |
| ENSG00000006638 | TBXA2R            | thromboxane A2 receptor [Source:HGNC Symbol;Acc:HGNC:11608]                               | protein coding | -0.81                                       |                 | 2.88                         | 14.51                           | 0.00    | 0.00 |                  |
| ENSG00000136161 | RCBTB2            | RCC1 and BTB domain containing protein 2 [Source:HGNC Symbol;Acc:HGNC:1914]               | protein coding | 0.81                                        |                 | 4.34                         | 10.75                           | 0.00    | 0.02 |                  |
| ENSG00000155380 | SLC16A1           | solute carrier family 16 member 1 [Source:HGNC Symbol;Acc:HGNC:10922]                     | protein coding | 0.81                                        |                 | 4.29                         | 19.65                           | 0.00    | 0.00 |                  |
| ENSG00000099337 | KCNK6             | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281] | protein coding | 0.81                                        |                 | 5.23                         | 23.33                           | 0.00    | 0.00 |                  |
| ENSG00000184164 | CRELD2            | cysteine rich with EGF like domains 2 [Source:HGNC Symbol;Acc:HGNC:28150]                 | protein coding | 0.79                                        |                 | 5.95                         | 23.19                           | 0.00    | 0.00 |                  |
| ENSG00000274576 | IGHV2-70          | immunoglobulin heavy variable 2-70 [Source:HGNC Symbol;Acc:HGNC:5577]                     | IG V gene      | 0.79                                        |                 | 3.98                         | 12.88                           | 0.00    | 0.01 |                  |
| ENSG00000136810 | TXN               | thioredoxin [Source:HGNC Symbol;Acc:HGNC:12435]                                           | protein coding | 0.79                                        |                 | 5.12                         | 16.59                           | 0.00    | 0.00 |                  |
| ENSG00000211933 | IGHV6-1           | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                      | IG V gene      | 0.79                                        |                 | 6.14                         | 37.11                           | 0.00    | 0.00 |                  |
| ENSG00000136052 | SLC41A2           | solute carrier family 41 member 2 [Source:HGNC Symbol;Acc:HGNC:31045]                     | protein coding | 0.79                                        |                 | 2.36                         | 8.68                            | 0.00    | 0.04 |                  |
| ENSG00000011478 | QPCTL             | glutaminyl-peptide cyclotransferase like [Source:HGNC Symbol;Acc:HGNC:25952]              | protein coding | 0.79                                        |                 | 4.35                         | 13.30                           | 0.00    | 0.01 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                      | Gene Type             | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000213430 | HSPD1P1           | heat shock protein family D (Hsp60) member 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:35133] | processed pseudo-gene | 0.79                                        |                | 2.21                         | 10.19                           | 0.00    | 0.02 |                  |
| ENSG00000224041 | IGKV3D-15         | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824]      | IG V gene             | 0.78                                        |                | 4.58                         | 14.20                           | 0.00    | 0.00 |                  |
| ENSG00000179218 | CALR              | calreticulin [Source:HGNC Symbol;Acc:HGNC:1455]                                               | protein coding        | 0.78                                        |                | 9.29                         | 24.44                           | 0.00    | 0.00 |                  |
| ENSG00000204386 | NEU1              | neuraminidase 1 [Source:HGNC Symbol;Acc:HGNC:7758]                                            | protein coding        | 0.78                                        |                | 5.02                         | 26.67                           | 0.00    | 0.00 |                  |
| ENSG00000211592 | IGKC              | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                              | IG C gene             | 0.77                                        |                | 13.09                        | 11.80                           | 0.00    | 0.01 |                  |
| ENSG00000279873 | LINC01126         | long intergenic non-protein coding RNA 1126 [Source:HGNC Symbol;Acc:HGNC:49275]               | lincRNA               | -0.77                                       |                | 2.66                         | 10.15                           | 0.00    | 0.02 |                  |
| ENSG00000123975 | CKS2              | CDC28 protein kinase regulatory subunit 2 [Source:HGNC Symbol;Acc:HGNC:2000]                  | protein coding        | 0.77                                        |                | 3.23                         | 14.97                           | 0.00    | 0.00 |                  |
| ENSG00000211625 | IGKV3D-20         | immunoglobulin kappa variable 3D-20 [Source:HGNC Symbol;Acc:HGNC:5825]                        | IG V gene             | 0.77                                        |                | 5.49                         | 12.45                           | 0.00    | 0.01 |                  |
| ENSG00000103226 | NOMO3             | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                         | protein coding        | 0.77                                        |                | 3.09                         | 14.85                           | 0.00    | 0.00 |                  |
| ENSG00000232216 | IGHV3-43          | immunoglobulin heavy variable 3-43 [Source:HGNC Symbol;Acc:HGNC:5604]                         | IG V gene             | 0.76                                        |                | 5.19                         | 13.08                           | 0.00    | 0.01 |                  |
| ENSG00000172548 | NIPAL4            | NIPA like domain containing 4 [Source:HGNC Symbol;Acc:HGNC:28018]                             | protein coding        | -0.76                                       |                | 3.06                         | 18.32                           | 0.00    | 0.00 |                  |
| ENSG00000211666 | IGLV2-14          | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                        | IG V gene             | 0.76                                        |                | 7.56                         | 12.17                           | 0.00    | 0.01 |                  |
| ENSG00000140105 | WARS              | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                              | protein coding        | 0.76                                        |                | 7.83                         | 20.19                           | 0.00    | 0.00 |                  |
| ENSG00000184840 | TMED9             | transmembrane p24 trafficking protein 9 [Source:HGNC Symbol;Acc:HGNC:24878]                   | protein coding        | 0.76                                        |                | 6.94                         | 22.68                           | 0.00    | 0.00 |                  |
| ENSG00000182481 | KPNA2             | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                                | protein coding        | 0.76                                        |                | 5.06                         | 27.50                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]       | IG V gene             | 0.76                                        |                | 4.34                         | 11.80                           | 0.00    | 0.01 |                  |
| ENSG00000112473 | SLC39A7           | solute carrier family 39 member 7 [Source:HGNC Symbol;Acc:HGNC:4927]                          | protein coding        | 0.76                                        |                | 6.40                         | 28.32                           | 0.00    | 0.00 |                  |
| ENSG00000113387 | SUB1              | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]                   | protein coding        | 0.76                                        |                | 8.28                         | 23.81                           | 0.00    | 0.00 |                  |
| ENSG00000120697 | ALG5              | ALG5, dolichyl-phosphate beta-glucosyltransferase [Source:HGNC Symbol;Acc:HGNC:20266]         | protein coding        | 0.76                                        |                | 4.92                         | 23.37                           | 0.00    | 0.00 |                  |
| ENSG00000104738 | MCM4              | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947]             | protein coding        | 0.75                                        |                | 5.30                         | 20.58                           | 0.00    | 0.00 |                  |
| ENSG00000169223 | LMAN2             | lectin, mannose binding 2 [Source:HGNC Symbol;Acc:HGNC:16986]                                 | protein coding        | 0.75                                        |                | 7.02                         | 21.88                           | 0.00    | 0.00 |                  |
| ENSG00000124783 | SSR1              | signal sequence receptor subunit 1 [Source:HGNC Symbol;Acc:HGNC:11323]                        | protein coding        | 0.75                                        |                | 8.00                         | 29.92                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID  | Ensembl Gene Name | Ensembl Gene Description                                                         | Gene Type      | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|------------------|-------------------|----------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000185477  | GPRIN3            | GPRIN family member 3 [Source:HGNC Symbol;Acc:HGNC:27733]                        | protein coding | 0.75                                        |                | 4.97                         | 14.35                           | 0.00    | 0.00 |                  |
| ENSG00000239672  | NME1              | NME/NM23 nucleoside diphosphate kinase 1 [Source:HGNC Symbol;Acc:HGNC:7849]      | protein coding | 0.74                                        |                | 3.07                         | 16.13                           | 0.00    | 0.00 |                  |
| ENSG00000144867  | SRPRB             | SRP receptor beta subunit [Source:HGNC Symbol;Acc:HGNC:24085]                    | protein coding | 0.74                                        |                | 5.75                         | 23.07                           | 0.00    | 0.00 |                  |
| ENSG00000123473  | STIL              | SCL/TAL1 interrupting locus [Source:HGNC Symbol;Acc:HGNC:10879]                  | protein coding | 0.74                                        |                | 3.13                         | 9.74                            | 0.00    | 0.02 |                  |
| ENSG00000232613  |                   |                                                                                  | antisense      | 0.74                                        |                | 2.20                         | 7.85                            | 0.01    | 0.05 |                  |
| ENSG00000146733  | PSPH              | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                     | protein coding | 0.74                                        |                | 2.38                         | 8.77                            | 0.00    | 0.03 |                  |
| ENSG00000110917  | MLEC              | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                     | protein coding | 0.74                                        |                | 7.02                         | 28.25                           | 0.00    | 0.00 |                  |
| ENSG00000100883  | SRP54             | signal recognition particle 54 [Source:HGNC Symbol;Acc:HGNC:11301]               | protein coding | 0.73                                        |                | 6.23                         | 26.54                           | 0.00    | 0.00 |                  |
| ENSG00000134153  | EMC7              | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]        | protein coding | 0.73                                        |                | 5.11                         | 22.01                           | 0.00    | 0.00 |                  |
| ENSG00000187922  | LCN10             | lipocalin 10 [Source:HGNC Symbol;Acc:HGNC:20892]                                 | protein coding | -0.73                                       |                | 2.63                         | 8.13                            | 0.00    | 0.04 |                  |
| ENSG00000107833  | NPM3              | nucleophosmin/nucleoplasmin 3 [Source:HGNC Symbol;Acc:HGNC:7931]                 | protein coding | 0.73                                        |                | 2.84                         | 11.07                           | 0.00    | 0.01 |                  |
| ENSG00000168374  | ARF4              | ADP ribosylation factor 4 [Source:HGNC Symbol;Acc:HGNC:655]                      | protein coding | 0.73                                        |                | 6.55                         | 30.22                           | 0.00    | 0.00 |                  |
| ENSG00000111640  | GAPDH             | glyceraldehyde-3-phosphate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:4141]      | protein coding | 0.73                                        |                | 8.93                         | 20.76                           | 0.00    | 0.00 |                  |
| ENSG00000144724  | PTPRG             | protein tyrosine phosphatase, receptor type G [Source:HGNC Symbol;Acc:HGNC:9671] | protein coding | 0.72                                        |                | 2.67                         | 8.08                            | 0.00    | 0.04 |                  |
| ENSG00000002549  | LAP3              | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                     | protein coding | 0.72                                        |                | 5.80                         | 27.19                           | 0.00    | 0.00 |                  |
| ENSG00000114902  | SPCS1             | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]           | protein coding | 0.72                                        |                | 6.74                         | 32.13                           | 0.00    | 0.00 |                  |
| ENSG00000198833  | UBE2J1            | ubiquitin conjugating enzyme E2 J1 [Source:HGNC Symbol;Acc:HGNC:17598]           | protein coding | 0.72                                        |                | 9.70                         | 16.21                           | 0.00    | 0.00 |                  |
| ENSG00000102158  | MAGT1             | magnesium transporter 1 [Source:HGNC Symbol;Acc:HGNC:28880]                      | protein coding | 0.72                                        |                | 6.83                         | 36.24                           | 0.00    | 0.00 |                  |
| ENSG00000140525  | FANCI             | Fanconi anemia complementation group I [Source:HGNC Symbol;Acc:HGNC:25568]       | protein coding | 0.72                                        |                | 4.55                         | 25.27                           | 0.00    | 0.00 |                  |
| ENSG00000198792  | TMEM184B          | transmembrane protein 184B [Source:HGNC Symbol;Acc:HGNC:1310]                    | protein coding | 0.72                                        |                | 4.95                         | 10.93                           | 0.00    | 0.01 |                  |
| ENSG000000007968 | E2F2              | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                    | protein coding | 0.72                                        |                | 4.92                         | 13.78                           | 0.00    | 0.00 |                  |
| ENSG00000240382  | IGKV1-17          | immunoglobulin kappa variable 1-17 [Source:HGNC Symbol;Acc:HGNC:5733]            | IG V gene      | 0.71                                        |                | 5.38                         | 12.86                           | 0.00    | 0.01 |                  |
| ENSG00000138709  | LARP1B            | La ribonucleoprotein domain family member 1B [Source:HGNC Symbol;Acc:HGNC:24704] | protein coding | 0.71                                        |                | 4.79                         | 18.20                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                              | Gene Type                           | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold<br>(Day pre- | Average<br>Log <sub>2</sub> CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR<br>Adjusted<br>P-<br>Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------|-------------------|---------------------------------|------------------------------------------|---------|--------------------------------|
| ENSG00000164305 | CASP3             | caspase 3 [Source:HGNC Symbol;Acc:HGNC:1504]                                                          | protein coding                      | 0.71                                        |                   | 6.05                            | 18.84                                    | 0.00    | 0.00                           |
| ENSG00000122188 | LAX1              | lymphocyte transmembrane adaptor 1 [Source:HGNC Symbol;Acc:HGNC:26005]                                | protein coding                      | 0.71                                        |                   | 6.08                            | 14.35                                    | 0.00    | 0.00                           |
| ENSG00000012048 | BRCA1             | BRCA1, DNA repair associated [Source:HGNC Symbol;Acc:HGNC:1100]                                       | protein coding                      | 0.71                                        |                   | 4.10                            | 17.93                                    | 0.00    | 0.00                           |
| ENSG00000163527 | STT3B             | STT3B, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:30611] | protein coding                      | 0.71                                        |                   | 8.27                            | 19.59                                    | 0.00    | 0.00                           |
| ENSG00000213047 | DENND1B           | DENN domain containing 1B [Source:HGNC Symbol;Acc:HGNC:28404]                                         | protein coding                      | 0.71                                        |                   | 5.87                            | 17.65                                    | 0.00    | 0.00                           |
| ENSG00000110063 | DCPS              | decapping enzyme, scavenger [Source:HGNC Symbol;Acc:HGNC:29812]                                       | protein coding                      | 0.71                                        |                   | 4.95                            | 12.28                                    | 0.00    | 0.01                           |
| ENSG00000119912 | IDE               | insulin degrading enzyme [Source:HGNC Symbol;Acc:HGNC:5381]                                           | protein coding                      | 0.70                                        |                   | 5.83                            | 24.61                                    | 0.00    | 0.00                           |
| ENSG00000113811 | SELENOK           | selenoprotein K [Source:HGNC Symbol;Acc:HGNC:30394]                                                   | protein coding                      | 0.70                                        |                   | 5.19                            | 24.83                                    | 0.00    | 0.00                           |
| ENSG00000166851 | PLK1              | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                                                 | protein coding                      | 0.70                                        |                   | 3.47                            | 9.07                                     | 0.00    | 0.03                           |
| ENSG00000118363 | SPCS2             | signal peptidase complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:28962]                                | protein coding                      | 0.70                                        |                   | 5.87                            | 18.38                                    | 0.00    | 0.00                           |
| ENSG00000230006 | ANKRD36BP2        | ankyrin repeat domain 36B pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:33607]                            | transcribed unprocessed pseudo-gene | 0.70                                        |                   | 5.15                            | 9.03                                     | 0.00    | 0.03                           |
| ENSG00000037241 | RPL26L1           | ribosomal protein L26 like 1 [Source:HGNC Symbol;Acc:HGNC:17050]                                      | protein coding                      | 0.70                                        |                   | 2.75                            | 11.66                                    | 0.00    | 0.01                           |
| ENSG00000184432 | COPB2             | coatamer protein complex subunit beta 2 [Source:HGNC Symbol;Acc:HGNC:2232]                            | protein coding                      | 0.70                                        |                   | 7.32                            | 26.70                                    | 0.00    | 0.00                           |
| ENSG00000127022 | CANX              | calnexin [Source:HGNC Symbol;Acc:HGNC:1473]                                                           | protein coding                      | 0.69                                        |                   | 9.13                            | 24.72                                    | 0.00    | 0.00                           |
| ENSG00000095380 | NANS              | N-acetylneuraminate synthase [Source:HGNC Symbol;Acc:HGNC:19237]                                      | protein coding                      | 0.69                                        |                   | 4.46                            | 12.90                                    | 0.00    | 0.01                           |
| ENSG00000067167 | TRAM1             | translocation associated membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:20568]                       | protein coding                      | 0.69                                        |                   | 8.46                            | 19.79                                    | 0.00    | 0.00                           |
| ENSG00000086598 | TMED2             | transmembrane p24 trafficking protein 2 [Source:HGNC Symbol;Acc:HGNC:16996]                           | protein coding                      | 0.69                                        |                   | 7.60                            | 24.17                                    | 0.00    | 0.00                           |
| ENSG00000129128 | SPCS3             | signal peptidase complex subunit 3 [Source:HGNC Symbol;Acc:HGNC:26212]                                | protein coding                      | 0.69                                        |                   | 8.25                            | 19.91                                    | 0.00    | 0.00                           |
| ENSG00000198380 | GFPT1             | glutamine-fructose-6-phosphate transaminase 1 [Source:HGNC Symbol;Acc:HGNC:4241]                      | protein coding                      | 0.69                                        |                   | 5.97                            | 20.34                                    | 0.00    | 0.00                           |
| ENSG00000049656 | CLPTM1L           | CLPTM1 like [Source:HGNC Symbol;Acc:HGNC:24308]                                                       | protein coding                      | 0.69                                        |                   | 7.62                            | 16.21                                    | 0.00    | 0.00                           |
| ENSG00000211950 | IGHV1-24          | immunoglobulin heavy variable 1-24 [Source:HGNC Symbol;Acc:HGNC:5551]                                 | IG V gene                           | 0.68                                        |                   | 4.87                            | 21.22                                    | 0.00    | 0.00                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                       | Gene Type      | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000113621 | TXNDC15           | thioredoxin domain containing 15 [Source:HGNC Symbol;Acc:HGNC:20652]                           | protein coding | 0.68                                     |                | 5.55                         | 21.24                           | 0.00    | 0.00 |                  |
| ENSG00000264522 | OTUD7B            | OTU deubiquitinase 7B [Source:HGNC Symbol;Acc:HGNC:16683]                                      | protein coding | 0.68                                     |                | 2.87                         | 9.29                            | 0.00    | 0.03 |                  |
| ENSG00000086062 | B4GALT1           | beta-1,4-galactosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:924]                             | protein coding | 0.68                                     |                | 8.59                         | 21.69                           | 0.00    | 0.00 |                  |
| ENSG00000180879 | SSR4              | signal sequence receptor subunit 4 [Source:HGNC Symbol;Acc:HGNC:11326]                         | protein coding | 0.68                                     |                | 7.44                         | 15.91                           | 0.00    | 0.00 |                  |
| ENSG00000211962 | IGHV1-46          | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                          | IG V gene      | 0.67                                     |                | 6.18                         | 8.36                            | 0.00    | 0.04 |                  |
| ENSG00000040933 | INPP4A            | inositol polyphosphate-4-phosphatase type I A [Source:HGNC Symbol;Acc:HGNC:6074]               | protein coding | 0.67                                     |                | 6.54                         | 15.19                           | 0.00    | 0.00 |                  |
| ENSG00000211945 | IGHV1-18          | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                          | IG V gene      | 0.67                                     |                | 6.51                         | 16.04                           | 0.00    | 0.00 |                  |
| ENSG00000137812 | KNL1              | kinetochore scaffold 1 [Source:HGNC Symbol;Acc:HGNC:24054]                                     | protein coding | 0.67                                     |                | 4.33                         | 15.75                           | 0.00    | 0.00 |                  |
| ENSG00000259772 |                   |                                                                                                | lincRNA        | 0.67                                     |                | 4.06                         | 9.98                            | 0.00    | 0.02 |                  |
| ENSG00000085063 | CD59              | CD59 molecule [Source:HGNC Symbol;Acc:HGNC:1689]                                               | protein coding | 0.67                                     |                | 5.70                         | 13.49                           | 0.00    | 0.00 |                  |
| ENSG00000211649 | IGLV7-46          | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930]       | IG V gene      | 0.67                                     |                | 5.23                         | 17.47                           | 0.00    | 0.00 |                  |
| ENSG00000129636 | ITFG1             | integrin alpha FG-GAP repeat containing 1 [Source:HGNC Symbol;Acc:HGNC:30697]                  | protein coding | 0.66                                     |                | 4.97                         | 22.10                           | 0.00    | 0.00 |                  |
| ENSG00000076003 | MCM6              | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949]              | protein coding | 0.66                                     |                | 5.13                         | 14.62                           | 0.00    | 0.00 |                  |
| ENSG00000170348 | TMED10            | transmembrane p24 trafficking protein 10 [Source:HGNC Symbol;Acc:HGNC:16998]                   | protein coding | 0.66                                     |                | 8.09                         | 23.53                           | 0.00    | 0.00 |                  |
| ENSG00000147649 | MTDH              | metadherin [Source:HGNC Symbol;Acc:HGNC:29608]                                                 | protein coding | 0.66                                     |                | 8.52                         | 27.32                           | 0.00    | 0.00 |                  |
| ENSG00000242534 | IGKV2D-28         | immunoglobulin kappa variable 2D-28 [Source:HGNC Symbol;Acc:HGNC:5799]                         | IG V gene      | 0.66                                     |                | 4.07                         | 11.57                           | 0.00    | 0.01 |                  |
| ENSG00000196839 | ADA               | adenosine deaminase [Source:HGNC Symbol;Acc:HGNC:186]                                          | protein coding | 0.66                                     |                | 4.12                         | 8.12                            | 0.00    | 0.04 |                  |
| ENSG00000185745 | IFIT1             | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407] | protein coding | 0.66                                     |                | 3.31                         | 11.15                           | 0.00    | 0.01 |                  |
| ENSG00000211967 | IGHV3-53          | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                          | IG V gene      | 0.66                                     |                | 5.84                         | 19.12                           | 0.00    | 0.00 |                  |
| ENSG00000101310 | SEC23B            | Sec23 homolog B, coat complex II component [Source:HGNC Symbol;Acc:HGNC:10702]                 | protein coding | 0.65                                     |                | 6.45                         | 21.60                           | 0.00    | 0.00 |                  |
| ENSG00000211668 | IGLV2-11          | immunoglobulin lambda variable 2-11 [Source:HGNC Symbol;Acc:HGNC:5887]                         | IG V gene      | 0.65                                     |                | 7.19                         | 11.28                           | 0.00    | 0.01 |                  |
| ENSG00000154511 | FAM69A            | family with sequence similarity 69 member A [Source:HGNC Symbol;Acc:HGNC:32213]                | protein coding | 0.65                                     |                | 5.29                         | 20.44                           | 0.00    | 0.00 |                  |
| ENSG00000231475 | IGHV4-31          | immunoglobulin heavy variable 4-31 [Source:HGNC Symbol;Acc:HGNC:5649]                          | IG V gene      | 0.65                                     |                | 4.75                         | 18.89                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                           | Gene Type             | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre-) | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------|-----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000138760 | SCARB2            | scavenger receptor class B member 2 [Source:HGNC Symbol;Acc:HGNC:1665]                                             | protein coding        | 0.65                                        |                 | 5.92                         | 16.50                           | 0.00    | 0.00 |                  |
| ENSG00000142731 | PLK4              | polo like kinase 4 [Source:HGNC Symbol;Acc:HGNC:11397]                                                             | protein coding        | 0.65                                        |                 | 2.96                         | 9.38                            | 0.00    | 0.03 |                  |
| ENSG00000154723 | ATP5J             | ATP synthase, H <sup>+</sup> transporting, mitochondrial Fo complex subunit F6 [Source:HGNC Symbol;Acc:HGNC:847]   | protein coding        | 0.65                                        |                 | 5.19                         | 22.87                           | 0.00    | 0.00 |                  |
| ENSG00000279278 |                   |                                                                                                                    | lincRNA               | -0.65                                       |                 | 3.58                         | 11.79                           | 0.00    | 0.01 |                  |
| ENSG00000165672 | PRDX3             | peroxiredoxin 3 [Source:HGNC Symbol;Acc:HGNC:9354]                                                                 | protein coding        | 0.65                                        |                 | 6.01                         | 26.83                           | 0.00    | 0.00 |                  |
| ENSG00000220008 | LINGO3            | leucine rich repeat and Ig domain containing 3 [Source:HGNC Symbol;Acc:HGNC:21206]                                 | protein coding        | -0.64                                       |                 | 4.59                         | 20.06                           | 0.00    | 0.00 |                  |
| ENSG00000167325 | RRM1              | ribonucleotide reductase catalytic subunit M1 [Source:HGNC Symbol;Acc:HGNC:10451]                                  | protein coding        | 0.64                                        |                 | 5.23                         | 22.88                           | 0.00    | 0.00 |                  |
| ENSG00000108953 | YWHAE             | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein epsilon [Source:HGNC Symbol;Acc:HGNC:12851] | protein coding        | 0.64                                        |                 | 6.77                         | 24.40                           | 0.00    | 0.00 |                  |
| ENSG00000112893 | MAN2A1            | mannosidase alpha class 2A member 1 [Source:HGNC Symbol;Acc:HGNC:6824]                                             | protein coding        | 0.64                                        |                 | 7.49                         | 23.15                           | 0.00    | 0.00 |                  |
| ENSG00000182197 | EXT1              | exostosin glycosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:3512]                                                 | protein coding        | 0.64                                        |                 | 3.13                         | 10.87                           | 0.00    | 0.01 |                  |
| ENSG00000087502 | ERGIC2            | ERGIC and golgi 2 [Source:HGNC Symbol;Acc:HGNC:30208]                                                              | protein coding        | 0.64                                        |                 | 5.05                         | 16.41                           | 0.00    | 0.00 |                  |
| ENSG00000138768 | USO1              | USO1 vesicle transport factor [Source:HGNC Symbol;Acc:HGNC:30904]                                                  | protein coding        | 0.64                                        |                 | 7.19                         | 21.66                           | 0.00    | 0.00 |                  |
| ENSG00000235587 | GAPDHP65          | glyceraldehyde 3 phosphate dehydrogenase pseudo-gene 65 [Source:HGNC Symbol;Acc:HGNC:4143]                         | processed pseudo-gene | 0.64                                        |                 | 2.83                         | 7.83                            | 0.01    | 0.05 |                  |
| ENSG00000105438 | KDELRL1           | KDEL endoplasmic reticulum protein retention receptor 1 [Source:HGNC Symbol;Acc:HGNC:6304]                         | protein coding        | 0.64                                        |                 | 6.02                         | 17.55                           | 0.00    | 0.00 |                  |
| ENSG00000129562 | DAD1              | defender against cell death 1 [Source:HGNC Symbol;Acc:HGNC:2664]                                                   | protein coding        | 0.64                                        |                 | 6.22                         | 25.90                           | 0.00    | 0.00 |                  |
| ENSG00000197780 | TAF13             | TATA-box binding protein associated factor 13 [Source:HGNC Symbol;Acc:HGNC:11546]                                  | protein coding        | 0.63                                        |                 | 3.11                         | 11.38                           | 0.00    | 0.01 |                  |
| ENSG00000116649 | SRM               | spermidine synthase [Source:HGNC Symbol;Acc:HGNC:11296]                                                            | protein coding        | 0.63                                        |                 | 5.90                         | 18.87                           | 0.00    | 0.00 |                  |
| ENSG00000069956 | MAPK6             | mitogen-activated protein kinase 6 [Source:HGNC Symbol;Acc:HGNC:6879]                                              | protein coding        | 0.63                                        |                 | 5.19                         | 25.57                           | 0.00    | 0.00 |                  |
| ENSG00000187837 | HIST1H1C          | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                                            | protein coding        | 0.63                                        |                 | 3.70                         | 10.75                           | 0.00    | 0.02 |                  |
| ENSG00000182934 | SRPRA             | SRP receptor alpha subunit [Source:HGNC Symbol;Acc:HGNC:11307]                                                     | protein coding        | 0.63                                        |                 | 8.06                         | 18.47                           | 0.00    | 0.00 |                  |
| ENSG00000080546 | SESN1             | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                                                      | protein coding        | -0.63                                       |                 | 6.64                         | 41.99                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                | Gene Type                                    | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000228903 | RASA4CP           | RAS p21 protein activator 4C, pseudogene [Source:HGNC Symbol;Acc:HGNC:44185]                                            | transcribed unpro-<br>cessed pseudo-<br>gene | -0.63                                       |                | 3.34                         | 11.21                           | 0.00    | 0.01 |                  |
| ENSG00000106080 | FKBP14            | FK506 binding protein 14 [Source:HGNC Sym-<br>bol;Acc:HGNC:18625]                                                       | protein coding                               | 0.62                                        |                | 3.83                         | 7.88                            | 0.01    | 0.05 |                  |
| ENSG00000138073 | PREB              | prolactin regulatory element binding [Source:HGNC<br>Symbol;Acc:HGNC:9356]                                              | protein coding                               | 0.62                                        |                | 6.58                         | 16.13                           | 0.00    | 0.00 |                  |
| ENSG00000104635 | SLC39A14          | solute carrier family 39 member 14 [Source:HGNC<br>Symbol;Acc:HGNC:20858]                                               | protein coding                               | 0.62                                        |                | 4.46                         | 14.83                           | 0.00    | 0.00 |                  |
| ENSG00000172339 | ALG14             | ALG14, UDP-N-acetylglucosaminyltransferase sub-<br>unit [Source:HGNC Symbol;Acc:HGNC:28287]                             | protein coding                               | 0.62                                        |                | 3.14                         | 9.69                            | 0.00    | 0.02 |                  |
| ENSG00000143641 | GALNT2            | polypeptide N-acetylgalactosaminyltransferase 2<br>[Source:HGNC Symbol;Acc:HGNC:4124]                                   | protein coding                               | 0.62                                        |                | 6.04                         | 23.63                           | 0.00    | 0.00 |                  |
| ENSG00000228327 |                   |                                                                                                                         | transcribed unpro-<br>cessed pseudo-<br>gene | -0.62                                       |                | 2.58                         | 7.84                            | 0.01    | 0.05 |                  |
| ENSG00000141753 | IGFBP4            | insulin like growth factor binding protein 4<br>[Source:HGNC Symbol;Acc:HGNC:5473]                                      | protein coding                               | -0.62                                       |                | 3.41                         | 11.36                           | 0.00    | 0.01 |                  |
| ENSG00000104290 | FZD3              | frizzled class receptor 3 [Source:HGNC Sym-<br>bol;Acc:HGNC:4041]                                                       | protein coding                               | 0.62                                        |                | 3.15                         | 9.43                            | 0.00    | 0.03 |                  |
| ENSG00000170027 | YWHAG             | tyrosine 3-monooxygenase/tryptophan 5-<br>monooxygenase activation protein gamma<br>[Source:HGNC Symbol;Acc:HGNC:12852] | protein coding                               | 0.62                                        |                | 6.80                         | 15.53                           | 0.00    | 0.00 |                  |
| ENSG00000069849 | ATP1B3            | ATPase Na <sup>+</sup> /K <sup>+</sup> transporting subunit beta 3<br>[Source:HGNC Symbol;Acc:HGNC:806]                 | protein coding                               | 0.62                                        |                | 5.52                         | 21.64                           | 0.00    | 0.00 |                  |
| ENSG00000145354 | CISD2             | CDGSH iron sulfur domain 2 [Source:HGNC Sym-<br>bol;Acc:HGNC:24212]                                                     | protein coding                               | 0.61                                        |                | 3.53                         | 9.31                            | 0.00    | 0.03 |                  |
| ENSG00000140743 | CDR2              | cerebellar degeneration related protein 2<br>[Source:HGNC Symbol;Acc:HGNC:1799]                                         | protein coding                               | 0.61                                        |                | 4.39                         | 9.20                            | 0.00    | 0.03 |                  |
| ENSG00000255026 |                   |                                                                                                                         | antisense                                    | -0.61                                       |                | 2.72                         | 8.91                            | 0.00    | 0.03 |                  |
| ENSG00000157020 | SEC13             | SEC13 homolog, nuclear pore and COPII<br>coat complex component [Source:HGNC Sym-<br>bol;Acc:HGNC:10697]                | protein coding                               | 0.61                                        |                | 6.35                         | 17.17                           | 0.00    | 0.00 |                  |
| ENSG00000198130 | HIBCH             | 3-hydroxyisobutyryl-CoA hydrolase [Source:HGNC<br>Symbol;Acc:HGNC:4908]                                                 | protein coding                               | 0.61                                        |                | 5.20                         | 22.01                           | 0.00    | 0.00 |                  |
| ENSG00000113273 | ARSB              | arylsulfatase B [Source:HGNC Sym-<br>bol;Acc:HGNC:714]                                                                  | protein coding                               | 0.61                                        |                | 4.25                         | 18.58                           | 0.00    | 0.00 |                  |
| ENSG00000163754 | GYG1              | glycogenin 1 [Source:HGNC Sym-<br>bol;Acc:HGNC:4699]                                                                    | protein coding                               | 0.61                                        |                | 5.15                         | 18.95                           | 0.00    | 0.00 |                  |
| ENSG00000108578 | BLMH              | bleomycin hydrolase [Source:HGNC Sym-<br>bol;Acc:HGNC:1059]                                                             | protein coding                               | 0.61                                        |                | 4.98                         | 22.91                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                     | Gene Type            | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|----------------------------------------------------------------------------------------------|----------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000146376 | ARHGAP18          | Rho GTPase activating protein 18 [Source:HGNC Symbol;Acc:HGNC:21035]                         | protein coding       | 0.61                                        |                | 3.96                         | 16.81                           | 0.00    | 0.00 |                  |
| ENSG00000172115 | CYCS              | cytochrome c, somatic [Source:HGNC Symbol;Acc:HGNC:19986]                                    | protein coding       | 0.61                                        |                | 6.05                         | 31.13                           | 0.00    | 0.00 |                  |
| ENSG00000167004 | PDIA3             | protein disulfide isomerase family A member 3 [Source:HGNC Symbol;Acc:HGNC:4606]             | protein coding       | 0.61                                        |                | 7.92                         | 27.04                           | 0.00    | 0.00 |                  |
| ENSG00000154719 | MRPL39            | mitochondrial ribosomal protein L39 [Source:HGNC Symbol;Acc:HGNC:14027]                      | protein coding       | 0.61                                        |                | 4.21                         | 21.36                           | 0.00    | 0.00 |                  |
| ENSG00000106105 | GARS              | glycyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:4162]                                    | protein coding       | 0.61                                        |                | 6.50                         | 26.88                           | 0.00    | 0.00 |                  |
| ENSG00000185522 | LMNTD2            | lamin tail domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28561]                           | protein coding       | -0.61                                       |                | 3.09                         | 11.91                           | 0.00    | 0.01 |                  |
| ENSG00000255733 | IFNG-AS1          | IFNG antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:43910]                                     | antisense            | 0.60                                        |                | 4.49                         | 12.08                           | 0.00    | 0.01 |                  |
| ENSG00000100804 | PSMB5             | proteasome subunit beta 5 [Source:HGNC Symbol;Acc:HGNC:9542]                                 | protein coding       | 0.60                                        |                | 4.11                         | 13.08                           | 0.00    | 0.01 |                  |
| ENSG00000145817 | YIPF5             | Yip1 domain family member 5 [Source:HGNC Symbol;Acc:HGNC:24877]                              | protein coding       | 0.60                                        |                | 5.19                         | 28.67                           | 0.00    | 0.00 |                  |
| ENSG00000112237 | CCNC              | cyclin C [Source:HGNC Symbol;Acc:HGNC:1581]                                                  | protein coding       | 0.60                                        |                | 6.31                         | 18.68                           | 0.00    | 0.00 |                  |
| ENSG00000119523 | ALG2              | ALG2, alpha-1,3/1,6-mannosyltransferase [Source:HGNC Symbol;Acc:HGNC:23159]                  | protein coding       | 0.60                                        |                | 5.10                         | 15.47                           | 0.00    | 0.00 |                  |
| ENSG00000106462 | EZH2              | enhancer of zeste 2 polycomb repressive complex 2 subunit [Source:HGNC Symbol;Acc:HGNC:3527] | protein coding       | 0.60                                        |                | 4.68                         | 13.18                           | 0.00    | 0.01 |                  |
| ENSG00000179222 | MAGED1            | MAGE family member D1 [Source:HGNC Symbol;Acc:HGNC:6813]                                     | protein coding       | 0.60                                        |                | 6.26                         | 16.37                           | 0.00    | 0.00 |                  |
| ENSG00000108984 | MAP2K6            | mitogen-activated protein kinase kinase 6 [Source:HGNC Symbol;Acc:HGNC:6846]                 | protein coding       | 0.60                                        |                | 3.53                         | 11.46                           | 0.00    | 0.01 |                  |
| ENSG00000168653 | NDUFS5            | NADH:ubiquinone oxidoreductase subunit S5 [Source:HGNC Symbol;Acc:HGNC:7712]                 | protein coding       | 0.60                                        |                | 5.12                         | 17.41                           | 0.00    | 0.00 |                  |
| ENSG00000145703 | IQGAP2            | IQ motif containing GTPase activating protein 2 [Source:HGNC Symbol;Acc:HGNC:6111]           | protein coding       | 0.60                                        |                | 6.35                         | 21.25                           | 0.00    | 0.00 |                  |
| ENSG00000117632 | STMN1             | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                                | protein coding       | 0.59                                        |                | 5.74                         | 23.69                           | 0.00    | 0.00 |                  |
| ENSG00000280063 |                   |                                                                                              | TEC                  | -0.59                                       |                | 3.21                         | 9.21                            | 0.00    | 0.03 |                  |
| ENSG00000274272 |                   |                                                                                              | processed transcript | -0.59                                       |                | 3.99                         | 15.02                           | 0.00    | 0.00 |                  |
| ENSG00000182022 | CHST15            | carbohydrate sulfotransferase 15 [Source:HGNC Symbol;Acc:HGNC:18137]                         | protein coding       | 0.59                                        |                | 6.55                         | 15.40                           | 0.00    | 0.00 |                  |
| ENSG00000137806 | NDUFAF1           | NADH:ubiquinone oxidoreductase complex assembly factor 1 [Source:HGNC Symbol;Acc:HGNC:18828] | protein coding       | 0.59                                        |                | 4.03                         | 13.32                           | 0.00    | 0.01 |                  |
| ENSG00000198900 | TOP1              | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]                                    | protein coding       | 0.59                                        |                | 6.87                         | 29.64                           | 0.00    | 0.00 |                  |
| ENSG00000163507 | KIAA1524          | KIAA1524 [Source:HGNC Symbol;Acc:HGNC:29302]                                                 | protein coding       | 0.59                                        |                | 3.70                         | 14.06                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                      | Gene Type      | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000198879 | SFMBT2            | Scm-like with four mbt domains 2 [Source:HGNC Symbol;Acc:HGNC:20256]                          | protein coding | 0.59                                     |                | 5.00                         | 14.75                           | 0.00    | 0.00 |                  |
| ENSG00000166548 | TK2               | thymidine kinase 2, mitochondrial [Source:HGNC Symbol;Acc:HGNC:11831]                         | protein coding | 0.59                                     |                | 3.09                         | 8.10                            | 0.00    | 0.04 |                  |
| ENSG00000165895 | ARHGAP42          | Rho GTPase activating protein 42 [Source:HGNC Symbol;Acc:HGNC:26545]                          | protein coding | 0.59                                     |                | 3.93                         | 10.66                           | 0.00    | 0.02 |                  |
| ENSG00000049860 | HEXB              | hexosaminidase subunit beta [Source:HGNC Symbol;Acc:HGNC:4879]                                | protein coding | 0.59                                     |                | 5.51                         | 13.49                           | 0.00    | 0.00 |                  |
| ENSG00000108826 | MRPL27            | mitochondrial ribosomal protein L27 [Source:HGNC Symbol;Acc:HGNC:14483]                       | protein coding | 0.59                                     |                | 3.93                         | 13.89                           | 0.00    | 0.00 |                  |
| ENSG00000197157 | SND1              | staphylococcal nuclease and tudor domain containing 1 [Source:HGNC Symbol;Acc:HGNC:30646]     | protein coding | 0.59                                     |                | 7.99                         | 18.86                           | 0.00    | 0.00 |                  |
| ENSG00000088298 | EDEM2             | ER degradation enhancing alpha-mannosidase like protein 2 [Source:HGNC Symbol;Acc:HGNC:15877] | protein coding | 0.58                                     |                | 5.88                         | 16.64                           | 0.00    | 0.00 |                  |

**Table 12:** Genes differentially expressed at Day 6 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 6 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type                      | Log <sub>2</sub> Change 7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|--------------------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000259997 | IGHV1OR16-4       | immunoglobulin heavy variable 1/OR16-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5573]  | IG V pseudogene                | 3.52                                     |                | 0.83                         | 20.05                           | 0.00    | 0.00 |                  |
| ENSG00000254174 | IGHV1-12          | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]      | IG V pseudogene                | 2.56                                     |                | 1.00                         | 25.25                           | 0.00    | 0.00 |                  |
| ENSG00000148468 | FAM171A1          | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]       | protein coding                 | 2.35                                     |                | 0.71                         | 22.10                           | 0.00    | 0.00 |                  |
| ENSG00000261834 | IGHV3OR16-15      | immunoglobulin heavy variable 3/OR16-15 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5639] | IG V pseudogene                | 2.14                                     |                | 1.20                         | 10.89                           | 0.00    | 0.02 |                  |
| ENSG00000088340 | FER1L4            | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]              | transcribed unitary pseudogene | 2.07                                     |                | 2.48                         | 55.27                           | 0.00    | 0.00 |                  |
| ENSG00000154277 | UCHL1             | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                   | protein coding                 | 2.04                                     |                | 1.68                         | 29.62                           | 0.00    | 0.00 |                  |
| ENSG00000153093 | ACOXL             | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                               | protein coding                 | 1.99                                     |                | 1.07                         | 15.82                           | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]   | IG C gene                      | 1.94                                     |                | 12.36                        | 69.68                           | 0.00    | 0.00 |                  |
| ENSG00000113140 | SPARC             | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]           | protein coding                 | 1.94                                     |                | 1.63                         | 16.67                           | 0.00    | 0.00 |                  |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                  | IG V gene                      | 1.93                                     |                | 9.48                         | 17.32                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type             | Log <sub>2</sub> Change 7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000111186 | WNT5B             | Wnt family member 5B [Source:HGNC Symbol;Acc:HGNC:16265]                                   | protein coding        | 1.93                                     |                | 0.93                         | 19.60                           | 0.00    | 0.00 |                  |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                             | protein coding        | 1.92                                     |                | 4.23                         | 97.96                           | 0.00    | 0.00 |                  |
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                       | IG V gene             | 1.92                                     |                | 8.78                         | 34.31                           | 0.00    | 0.00 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                     | IG V gene             | 1.84                                     |                | 8.79                         | 19.26                           | 0.00    | 0.00 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]  | IG C pseudogene       | 1.75                                     |                | 7.32                         | 56.38                           | 0.00    | 0.00 |                  |
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                              | protein coding        | 1.74                                     |                | 4.02                         | 54.58                           | 0.00    | 0.00 |                  |
| ENSG00000168078 | PBK               | PDZ binding kinase [Source:HGNC Symbol;Acc:HGNC:18282]                                     | protein coding        | 1.51                                     |                | 1.22                         | 13.15                           | 0.00    | 0.01 |                  |
| ENSG00000211651 | IGLV1-44          | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                     | IG V gene             | 1.47                                     |                | 6.67                         | 17.03                           | 0.00    | 0.00 |                  |
| ENSG00000197476 |                   |                                                                                            | processed pseudo-gene | 1.46                                     |                | 3.59                         | 21.58                           | 0.00    | 0.00 |                  |
| ENSG00000162676 | GFI1              | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]   | protein coding        | 1.45                                     |                | 2.61                         | 20.43                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5918]   | IG V gene             | 1.39                                     |                | 5.54                         | 12.05                           | 0.00    | 0.01 |                  |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                        | IG C gene             | 1.39                                     |                | 10.76                        | 22.22                           | 0.00    | 0.00 |                  |
| ENSG00000248571 |                   |                                                                                            | antisense             | 1.36                                     |                | 1.97                         | 25.72                           | 0.00    | 0.00 |                  |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                        | protein coding        | 1.36                                     |                | 5.15                         | 32.86                           | 0.00    | 0.00 |                  |
| ENSG00000203914 | HSP90B3P          | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100] | processed pseudo-gene | 1.33                                     |                | 3.00                         | 41.97                           | 0.00    | 0.00 |                  |
| ENSG00000163053 | SLC16A14          | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                     | protein coding        | 1.33                                     |                | 2.31                         | 18.99                           | 0.00    | 0.00 |                  |
| ENSG00000138166 | DUSP5             | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                          | protein coding        | 1.32                                     |                | 4.78                         | 40.42                           | 0.00    | 0.00 |                  |
| ENSG00000184661 | CDCA2             | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                       | protein coding        | 1.32                                     |                | 1.98                         | 18.69                           | 0.00    | 0.00 |                  |
| ENSG00000165304 | MELK              | maternal embryonic leucine zipper kinase [Source:HGNC Symbol;Acc:HGNC:16870]               | protein coding        | 1.31                                     |                | 1.79                         | 16.07                           | 0.00    | 0.00 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                      | IG V gene             | 1.31                                     |                | 8.34                         | 28.10                           | 0.00    | 0.00 |                  |
| ENSG00000074842 | MYDGF             | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                          | protein coding        | 1.31                                     |                | 6.70                         | 51.97                           | 0.00    | 0.00 |                  |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                          | protein coding        | 1.28                                     |                | 5.75                         | 113.13                          | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type                           | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre-) | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------|-----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                      | IG V gene                           | 1.26                                        |                 | 6.63                         | 110.60                          | 0.00    | 0.00 |                  |
| ENSG00000136010 | ALDH1L2           | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]              | protein coding                      | 1.26                                        |                 | 3.98                         | 10.09                           | 0.00    | 0.03 |                  |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                   | protein coding                      | 1.25                                        |                 | 5.15                         | 45.43                           | 0.00    | 0.00 |                  |
| ENSG00000100219 | XBP1              | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                | protein coding                      | 1.25                                        |                 | 8.51                         | 57.90                           | 0.00    | 0.00 |                  |
| ENSG00000198722 | UNC13B            | unc-13 homolog B [Source:HGNC Symbol;Acc:HGNC:12566]                                       | protein coding                      | 1.25                                        |                 | 2.40                         | 17.08                           | 0.00    | 0.00 |                  |
| ENSG00000270472 | IGHV3OR16-9       | immunoglobulin heavy variable 3/OR16-9 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5644] | IG V gene                           | 1.25                                        |                 | 4.07                         | 9.28                            | 0.00    | 0.04 |                  |
| ENSG00000088826 | SMOX              | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                       | protein coding                      | 1.24                                        |                 | 1.84                         | 15.89                           | 0.00    | 0.00 |                  |
| ENSG00000239975 | IGKV1D-33         | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                     | IG V gene                           | 1.24                                        |                 | 4.11                         | 14.05                           | 0.00    | 0.01 |                  |
| ENSG00000075420 | FNDC3B            | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]              | protein coding                      | 1.22                                        |                 | 5.48                         | 37.77                           | 0.00    | 0.00 |                  |
| ENSG00000167476 | JSRP1             | junctional sarcoplasmic reticulum protein 1 [Source:HGNC Symbol;Acc:HGNC:24963]            | protein coding                      | 1.21                                        |                 | 2.90                         | 22.10                           | 0.00    | 0.00 |                  |
| ENSG00000183010 | PYCR1             | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]                     | protein coding                      | 1.19                                        |                 | 2.81                         | 26.71                           | 0.00    | 0.00 |                  |
| ENSG00000123485 | HJURP             | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]                  | protein coding                      | 1.18                                        |                 | 2.40                         | 11.64                           | 0.00    | 0.01 |                  |
| ENSG00000166598 | HSP90B1           | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]             | protein coding                      | 1.18                                        |                 | 10.71                        | 49.00                           | 0.00    | 0.00 |                  |
| ENSG00000090104 | RGS1              | regulator of G-protein signaling 1 [Source:HGNC Symbol;Acc:HGNC:9991]                      | protein coding                      | 1.18                                        |                 | 3.08                         | 9.65                            | 0.00    | 0.03 |                  |
| ENSG00000165409 | TSHR              | thyroid stimulating hormone receptor [Source:HGNC Symbol;Acc:HGNC:12373]                   | protein coding                      | 1.17                                        |                 | 2.52                         | 16.42                           | 0.00    | 0.00 |                  |
| ENSG00000216775 |                   |                                                                                            | transcribed unprocessed pseudo-gene | 1.16                                        |                 | 1.53                         | 10.83                           | 0.00    | 0.02 |                  |
| ENSG00000239571 | IGKV2D-30         | immunoglobulin kappa variable 2D-30 [Source:HGNC Symbol;Acc:HGNC:5801]                     | IG V gene                           | 1.15                                        |                 | 3.68                         | 11.53                           | 0.00    | 0.02 |                  |
| ENSG00000186810 | CXCR3             | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                        | protein coding                      | 1.15                                        |                 | 4.13                         | 33.67                           | 0.00    | 0.00 |                  |
| ENSG00000065485 | PDIA5             | protein disulfide isomerase family A member 5 [Source:HGNC Symbol;Acc:HGNC:24811]          | protein coding                      | 1.15                                        |                 | 4.42                         | 28.61                           | 0.00    | 0.00 |                  |
| ENSG00000211973 | IGHV1-69          | immunoglobulin heavy variable 1-69 [Source:HGNC Symbol;Acc:HGNC:5558]                      | IG V gene                           | 1.14                                        |                 | 4.04                         | 30.14                           | 0.00    | 0.00 |                  |
| ENSG00000164045 | CDC25A            | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                                 | protein coding                      | 1.14                                        |                 | 1.85                         | 10.27                           | 0.00    | 0.03 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type            | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|----------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000155660 | PDIA4             | protein disulfide isomerase family A member 4 [Source:HGNC Symbol;Acc:HGNC:30167]          | protein coding       | 1.14                                        |                | 8.74                         | 38.08                           | 0.00    | 0.00 |                  |
| ENSG00000211648 | IGLV1-47          | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                     | IG V gene            | 1.13                                        |                | 7.13                         | 9.04                            | 0.00    | 0.04 |                  |
| ENSG00000259706 | HSP90B2P          | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099] | processed pseudogene | 1.13                                        |                | 5.08                         | 44.41                           | 0.00    | 0.00 |                  |
| ENSG00000186594 | MIR22HG           | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                                        | lincRNA              | 1.12                                        |                | 3.18                         | 34.69                           | 0.00    | 0.00 |                  |
| ENSG00000107104 | KANK1             | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                  | protein coding       | 1.12                                        |                | 3.11                         | 27.33                           | 0.00    | 0.00 |                  |
| ENSG00000280411 | IGHV1-69-2        | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                    | IG V gene            | 1.10                                        |                | 5.46                         | 18.73                           | 0.00    | 0.00 |                  |
| ENSG00000137563 | GGH               | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                                | protein coding       | 1.10                                        |                | 3.75                         | 30.15                           | 0.00    | 0.00 |                  |
| ENSG00000026751 | SLAMF7            | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                                   | protein coding       | 1.09                                        |                | 7.60                         | 38.74                           | 0.00    | 0.00 |                  |
| ENSG00000128228 | SDF2L1            | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                   | protein coding       | 1.09                                        |                | 5.15                         | 33.53                           | 0.00    | 0.00 |                  |
| ENSG00000118985 | ELL2              | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]              | protein coding       | 1.09                                        |                | 7.22                         | 51.62                           | 0.00    | 0.00 |                  |
| ENSG00000025039 | RRAGD             | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                              | protein coding       | 1.08                                        |                | 2.92                         | 25.65                           | 0.00    | 0.00 |                  |
| ENSG00000143333 | RGS16             | regulator of G-protein signaling 16 [Source:HGNC Symbol;Acc:HGNC:9997]                     | protein coding       | 1.08                                        |                | 2.27                         | 13.74                           | 0.00    | 0.01 |                  |
| ENSG00000171444 | MCC               | mutated in colorectal cancers [Source:HGNC Symbol;Acc:HGNC:6935]                           | protein coding       | 1.08                                        |                | 2.21                         | 13.94                           | 0.00    | 0.01 |                  |
| ENSG00000004468 | CD38              | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                           | protein coding       | 1.08                                        |                | 7.71                         | 54.90                           | 0.00    | 0.00 |                  |
| ENSG00000118515 | SGK1              | serum/glucocorticoid regulated kinase 1 [Source:HGNC Symbol;Acc:HGNC:10810]                | protein coding       | 1.08                                        |                | 4.48                         | 75.17                           | 0.00    | 0.00 |                  |
| ENSG00000135916 | ITM2C             | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                            | protein coding       | 1.07                                        |                | 8.80                         | 38.84                           | 0.00    | 0.00 |                  |
| ENSG00000180535 | BHLHA15           | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]               | protein coding       | 1.07                                        |                | 3.45                         | 19.57                           | 0.00    | 0.00 |                  |
| ENSG00000171848 | RRM2              | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]         | protein coding       | 1.07                                        |                | 5.35                         | 26.67                           | 0.00    | 0.00 |                  |
| ENSG00000101439 | CST3              | cystatin C [Source:HGNC Symbol;Acc:HGNC:2475]                                              | protein coding       | -1.06                                       |                | 3.42                         | 23.82                           | 0.00    | 0.00 |                  |
| ENSG00000239264 | TXNDC5            | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                        | protein coding       | 1.06                                        |                | 6.02                         | 21.42                           | 0.00    | 0.00 |                  |
| ENSG00000242766 | IGKV1D-17         | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                     | IG V gene            | 1.05                                        |                | 3.30                         | 25.34                           | 0.00    | 0.00 |                  |
| ENSG00000176890 | TYMS              | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                                 | protein coding       | 1.05                                        |                | 3.07                         | 19.75                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type       | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|-----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000184232 | OAF               | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                | protein coding  | 1.04                                        |                | 2.50                         | 12.83                           | 0.00    | 0.01 |                  |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                  | protein coding  | 1.04                                        |                | 6.48                         | 48.75                           | 0.00    | 0.00 |                  |
| ENSG00000145050 | MANF              | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461] | protein coding  | 1.04                                        |                | 6.46                         | 44.33                           | 0.00    | 0.00 |                  |
| ENSG00000123131 | PRDX4             | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                     | protein coding  | 1.03                                        |                | 5.30                         | 27.07                           | 0.00    | 0.00 |                  |
| ENSG00000153162 | BMP6              | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                         | protein coding  | 1.03                                        |                | 2.57                         | 12.60                           | 0.00    | 0.01 |                  |
| ENSG00000102471 | NDFIP2            | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                  | protein coding  | 1.03                                        |                | 2.09                         | 13.72                           | 0.00    | 0.01 |                  |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]              | protein coding  | 1.02                                        |                | 11.65                        | 42.02                           | 0.00    | 0.00 |                  |
| ENSG00000108641 | B9D1              | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                              | protein coding  | 1.02                                        |                | 2.11                         | 10.72                           | 0.00    | 0.02 |                  |
| ENSG00000093009 | CDC45             | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]                               | protein coding  | 1.02                                        |                | 1.85                         | 10.37                           | 0.00    | 0.02 |                  |
| ENSG00000102760 | RGCC              | regulator of cell cycle [Source:HGNC Symbol;Acc:HGNC:20369]                             | protein coding  | 1.02                                        |                | 2.50                         | 18.10                           | 0.00    | 0.00 |                  |
| ENSG00000171241 | SHCBP1            | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                | protein coding  | 1.01                                        |                | 4.43                         | 23.14                           | 0.00    | 0.00 |                  |
| ENSG00000282600 |                   |                                                                                         | IG V pseudogene | 1.01                                        |                | 2.20                         | 13.26                           | 0.00    | 0.01 |                  |
| ENSG00000198794 | SCAMP5            | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                | protein coding  | 1.00                                        |                | 3.50                         | 34.11                           | 0.00    | 0.00 |                  |
| ENSG00000243238 | IGKV2-30          | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                   | IG V gene       | 0.99                                        |                | 5.43                         | 12.25                           | 0.00    | 0.01 |                  |
| ENSG00000085840 | ORC1              | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                 | protein coding  | 0.99                                        |                | 2.43                         | 12.68                           | 0.00    | 0.01 |                  |
| ENSG00000242076 | IGKV1-33          | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                   | IG V gene       | 0.99                                        |                | 4.57                         | 27.16                           | 0.00    | 0.00 |                  |
| ENSG00000166794 | PPIB              | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                           | protein coding  | 0.98                                        |                | 7.68                         | 35.77                           | 0.00    | 0.00 |                  |
| ENSG00000079931 | MOXD1             | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                            | protein coding  | 0.98                                        |                | 3.83                         | 39.35                           | 0.00    | 0.00 |                  |
| ENSG00000109805 | NCAPG             | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]               | protein coding  | 0.98                                        |                | 3.06                         | 19.31                           | 0.00    | 0.00 |                  |
| ENSG00000070081 | NUCB2             | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                       | protein coding  | 0.98                                        |                | 5.65                         | 33.46                           | 0.00    | 0.00 |                  |
| ENSG00000143476 | DTL               | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288]    | protein coding  | 0.98                                        |                | 2.88                         | 15.70                           | 0.00    | 0.00 |                  |
| ENSG00000044574 | HSPA5             | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]         | protein coding  | 0.97                                        |                | 9.22                         | 35.86                           | 0.00    | 0.00 |                  |
| ENSG00000103257 | SLC7A5            | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                    | protein coding  | 0.97                                        |                | 5.44                         | 28.25                           | 0.00    | 0.00 |                  |

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|-----------------|-------------------|---------------------------------------------------------------------------------------|-----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000168268 | NT5DC2            | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]               | protein coding  | 0.97                                        |                | 5.59                         | 25.99                           | 0.00    | 0.00 |                  |
| ENSG00000211659 | IGLV3-25          | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                | IG V gene       | 0.96                                        |                | 7.26                         | 18.32                           | 0.00    | 0.00 |                  |
| ENSG00000122952 | ZWINT             | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]              | protein coding  | 0.96                                        |                | 3.27                         | 14.55                           | 0.00    | 0.00 |                  |
| ENSG00000167861 | HID1              | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                            | protein coding  | 0.96                                        |                | 4.25                         | 17.94                           | 0.00    | 0.00 |                  |
| ENSG00000174132 | FAM174A           | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]      | protein coding  | 0.95                                        |                | 1.89                         | 13.90                           | 0.00    | 0.01 |                  |
| ENSG00000111424 | VDR               | vitamin D (1,25- dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]    | protein coding  | 0.95                                        |                | 3.57                         | 25.07                           | 0.00    | 0.00 |                  |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]      | protein coding  | 0.95                                        |                | 8.50                         | 30.34                           | 0.00    | 0.00 |                  |
| ENSG00000185164 | NOMO2             | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                 | protein coding  | 0.95                                        |                | 4.34                         | 17.56                           | 0.00    | 0.00 |                  |
| ENSG00000111885 | MAN1A1            | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                | protein coding  | 0.94                                        |                | 8.04                         | 33.68                           | 0.00    | 0.00 |                  |
| ENSG00000134285 | FKBP11            | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                          | protein coding  | 0.94                                        |                | 6.33                         | 25.23                           | 0.00    | 0.00 |                  |
| ENSG00000119326 | CTNNAL1           | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                               | protein coding  | 0.93                                        |                | 2.32                         | 16.37                           | 0.00    | 0.00 |                  |
| ENSG00000173334 | TRIB1             | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                           | protein coding  | 0.93                                        |                | 5.93                         | 30.73                           | 0.00    | 0.00 |                  |
| ENSG00000166562 | SEC11C            | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400] | protein coding  | 0.93                                        |                | 7.37                         | 31.49                           | 0.00    | 0.00 |                  |
| ENSG00000172965 | MIR4435-2HG       | MIR4435-2 host gene [Source:HGNC Symbol;Acc:HGNC:35163]                               | lincRNA         | 0.93                                        |                | 2.53                         | 14.47                           | 0.00    | 0.00 |                  |
| ENSG00000166803 | KIAA0101          | KIAA0101 [Source:HGNC Symbol;Acc:HGNC:28961]                                          | protein coding  | 0.93                                        |                | 1.53                         | 8.88                            | 0.00    | 0.04 |                  |
| ENSG00000254395 | IGHV4-55          | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]    | IG V pseudogene | 0.92                                        |                | 4.12                         | 17.39                           | 0.00    | 0.00 |                  |
| ENSG00000094804 | CDC6              | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                              | protein coding  | 0.92                                        |                | 3.24                         | 18.72                           | 0.00    | 0.00 |                  |
| ENSG00000169679 | BUB1              | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]    | protein coding  | 0.92                                        |                | 4.49                         | 18.39                           | 0.00    | 0.00 |                  |
| ENSG00000175063 | UBE2C             | ubiquitin conjugating enzyme E2 C [Source:HGNC Symbol;Acc:HGNC:15937]                 | protein coding  | 0.91                                        |                | 2.20                         | 9.06                            | 0.00    | 0.04 |                  |
| ENSG00000077152 | UBE2T             | ubiquitin conjugating enzyme E2 T [Source:HGNC Symbol;Acc:HGNC:25009]                 | protein coding  | 0.91                                        |                | 2.15                         | 10.82                           | 0.00    | 0.02 |                  |
| ENSG00000103226 | NOMO3             | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                 | protein coding  | 0.91                                        |                | 3.27                         | 21.79                           | 0.00    | 0.00 |                  |
| ENSG00000113615 | SEC24A            | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]     | protein coding  | 0.91                                        |                | 6.60                         | 34.02                           | 0.00    | 0.00 |                  |
| ENSG00000068912 | ERLEC1            | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                    | protein coding  | 0.90                                        |                | 6.64                         | 40.00                           | 0.00    | 0.00 |                  |

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|-----------------|-------------------|-----------------------------------------------------------------------------------------------|-----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000137807 | KIF23             | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                                   | protein coding  | 0.90                                        |                | 2.22                         | 9.39                            | 0.00    | 0.04 |                  |
| ENSG00000258572 |                   |                                                                                               | lincRNA         | 0.90                                        |                | 2.61                         | 14.82                           | 0.00    | 0.00 |                  |
| ENSG00000253691 | IGKV2OR22-4       | immunoglobulin kappa variable 2/OR22-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5813]        | IG V pseudogene | 0.90                                        |                | 3.56                         | 11.91                           | 0.00    | 0.01 |                  |
| ENSG00000196189 | SEMA4A            | semaphorin 4A [Source:HGNC Symbol;Acc:HGNC:10729]                                             | protein coding  | 0.90                                        |                | 6.70                         | 33.39                           | 0.00    | 0.00 |                  |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                  | protein coding  | 0.90                                        |                | 5.96                         | 29.80                           | 0.00    | 0.00 |                  |
| ENSG00000211946 | IGHV3-20          | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                         | IG V gene       | 0.90                                        |                | 4.18                         | 23.95                           | 0.00    | 0.00 |                  |
| ENSG00000070214 | SLC44A1           | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                         | protein coding  | 0.90                                        |                | 7.13                         | 36.03                           | 0.00    | 0.00 |                  |
| ENSG00000147459 | DOCK5             | dedicator of cytokinesis 5 [Source:HGNC Symbol;Acc:HGNC:23476]                                | protein coding  | -0.89                                       |                | 3.71                         | 15.93                           | 0.00    | 0.00 |                  |
| ENSG00000136770 | DNAJC1            | DnaJ heat shock protein family (Hsp40) member C1 [Source:HGNC Symbol;Acc:HGNC:20090]          | protein coding  | 0.89                                        |                | 4.91                         | 36.86                           | 0.00    | 0.00 |                  |
| ENSG00000128590 | DNAJB9            | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]           | protein coding  | 0.89                                        |                | 5.28                         | 27.73                           | 0.00    | 0.00 |                  |
| ENSG00000131871 | SELENOS           | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                           | protein coding  | 0.89                                        |                | 5.56                         | 42.42                           | 0.00    | 0.00 |                  |
| ENSG00000171155 | C1GALT1C1         | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                              | protein coding  | 0.88                                        |                | 4.07                         | 30.36                           | 0.00    | 0.00 |                  |
| ENSG00000253818 | IGLV1-41          | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]           | IG V pseudogene | 0.88                                        |                | 3.91                         | 15.30                           | 0.00    | 0.00 |                  |
| ENSG00000071539 | TRIP13            | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]                    | protein coding  | 0.87                                        |                | 2.56                         | 16.14                           | 0.00    | 0.00 |                  |
| ENSG00000118705 | RPN2              | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                             | protein coding  | 0.87                                        |                | 8.34                         | 39.93                           | 0.00    | 0.00 |                  |
| ENSG00000010310 | GIPR              | gastric inhibitory polypeptide receptor [Source:HGNC Symbol;Acc:HGNC:4271]                    | protein coding  | 0.87                                        |                | 2.28                         | 10.01                           | 0.00    | 0.03 |                  |
| ENSG00000173848 | NET1              | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                       | protein coding  | 0.87                                        |                | 4.27                         | 28.05                           | 0.00    | 0.00 |                  |
| ENSG00000146670 | CDCA5             | cell division cycle associated 5 [Source:HGNC Symbol;Acc:HGNC:14626]                          | protein coding  | 0.87                                        |                | 2.72                         | 13.29                           | 0.00    | 0.01 |                  |
| ENSG00000211897 | IGHG3             | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]         | IG C gene       | 0.86                                        |                | 9.09                         | 20.28                           | 0.00    | 0.00 |                  |
| ENSG00000136026 | CKAP4             | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                         | protein coding  | 0.86                                        |                | 6.65                         | 38.36                           | 0.00    | 0.00 |                  |
| ENSG00000179750 | APOBEC3B          | apolipoprotein B mRNA editing enzyme catalytic subunit 3B [Source:HGNC Symbol;Acc:HGNC:17352] | protein coding  | 0.86                                        |                | 2.89                         | 13.05                           | 0.00    | 0.01 |                  |
| ENSG00000153066 | TXNDC11           | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                          | protein coding  | 0.86                                        |                | 7.71                         | 28.79                           | 0.00    | 0.00 |                  |
| ENSG00000139193 | CD27              | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                             | protein coding  | 0.86                                        |                | 5.98                         | 28.90                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type      | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000178999 | AURKB             | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                         | protein coding | 0.85                                        |                | 2.35                         | 13.12                           | 0.00    | 0.01 |                  |
| ENSG00000074695 | LMAN1             | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                                | protein coding | 0.85                                        |                | 7.89                         | 28.71                           | 0.00    | 0.00 |                  |
| ENSG00000211967 | IGHV3-53          | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                       | IG V gene      | 0.84                                        |                | 5.97                         | 12.80                           | 0.00    | 0.01 |                  |
| ENSG00000075218 | GTSE1             | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                              | protein coding | 0.84                                        |                | 2.41                         | 12.94                           | 0.00    | 0.01 |                  |
| ENSG00000111291 | GPRC5D            | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310]     | protein coding | 0.84                                        |                | 3.92                         | 18.27                           | 0.00    | 0.00 |                  |
| ENSG00000078900 | TP73              | tumor protein p73 [Source:HGNC Symbol;Acc:HGNC:12003]                                       | protein coding | 0.83                                        |                | 1.97                         | 10.11                           | 0.00    | 0.03 |                  |
| ENSG00000092621 | PHGDH             | phosphoglycerate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:8923]                           | protein coding | 0.83                                        |                | 3.90                         | 10.87                           | 0.00    | 0.02 |                  |
| ENSG00000271178 | IGHV3OR16-13      | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | IG V gene      | 0.83                                        |                | 3.66                         | 11.43                           | 0.00    | 0.02 |                  |
| ENSG00000183508 | FAM46C            | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]             | protein coding | 0.83                                        |                | 8.49                         | 31.35                           | 0.00    | 0.00 |                  |
| ENSG00000087586 | AURKA             | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                         | protein coding | 0.83                                        |                | 2.40                         | 9.45                            | 0.00    | 0.03 |                  |
| ENSG00000089685 | BIRC5             | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                       | protein coding | 0.83                                        |                | 2.97                         | 13.22                           | 0.00    | 0.01 |                  |
| ENSG00000106803 | SEC61B            | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                           | protein coding | 0.82                                        |                | 6.11                         | 44.26                           | 0.00    | 0.00 |                  |
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                       | IG V gene      | 0.82                                        |                | 7.39                         | 22.69                           | 0.00    | 0.00 |                  |
| ENSG00000163694 | RBM47             | RNA binding motif protein 47 [Source:HGNC Symbol;Acc:HGNC:30358]                            | protein coding | 0.82                                        |                | 4.83                         | 31.02                           | 0.00    | 0.00 |                  |
| ENSG00000100629 | CEP128            | centrosomal protein 128 [Source:HGNC Symbol;Acc:HGNC:20359]                                 | protein coding | 0.81                                        |                | 4.29                         | 18.83                           | 0.00    | 0.00 |                  |
| ENSG00000198855 | FICD              | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                                   | protein coding | 0.81                                        |                | 3.28                         | 12.32                           | 0.00    | 0.01 |                  |
| ENSG00000138180 | CEP55             | centrosomal protein 55 [Source:HGNC Symbol;Acc:HGNC:1161]                                   | protein coding | 0.81                                        |                | 2.47                         | 9.11                            | 0.00    | 0.04 |                  |
| ENSG00000150967 | ABCB9             | ATP binding cassette subfamily B member 9 [Source:HGNC Symbol;Acc:HGNC:50]                  | protein coding | 0.80                                        |                | 4.02                         | 15.47                           | 0.00    | 0.00 |                  |
| ENSG00000074416 | MGLL              | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                    | protein coding | 0.80                                        |                | 3.72                         | 24.90                           | 0.00    | 0.00 |                  |
| ENSG00000125844 | RRBP1             | ribosome binding protein 1 [Source:HGNC Symbol;Acc:HGNC:10448]                              | protein coding | 0.80                                        |                | 7.11                         | 43.20                           | 0.00    | 0.00 |                  |
| ENSG00000083444 | PLOD1             | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]        | protein coding | 0.80                                        |                | 4.46                         | 21.59                           | 0.00    | 0.00 |                  |
| ENSG00000155304 | HSPA13            | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]           | protein coding | 0.80                                        |                | 6.17                         | 27.91                           | 0.00    | 0.00 |                  |
| ENSG00000117399 | CDC20             | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                                   | protein coding | 0.79                                        |                | 3.40                         | 14.69                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                             | Gene Type             | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre-CPM | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------|-------------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000204634 | TBC1D8            | TBC1 domain family member 8 [Source:HGNC Symbol;Acc:HGNC:17791]                                      | protein coding        | -0.79                                       |                   | 2.98                         | 12.76                           | 0.00    | 0.01 |                  |
| ENSG00000150961 | SEC24D            | SEC24 homolog D, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10706]                    | protein coding        | 0.79                                        |                   | 6.48                         | 30.83                           | 0.00    | 0.00 |                  |
| ENSG00000065308 | TRAM2             | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]                      | protein coding        | 0.79                                        |                   | 7.05                         | 34.02                           | 0.00    | 0.00 |                  |
| ENSG00000165948 | IFI27L1           | interferon alpha inducible protein 27 like 1 [Source:HGNC Symbol;Acc:HGNC:19754]                     | protein coding        | 0.79                                        |                   | 2.50                         | 14.06                           | 0.00    | 0.01 |                  |
| ENSG00000134910 | STT3A             | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172] | protein coding        | 0.79                                        |                   | 7.28                         | 35.63                           | 0.00    | 0.00 |                  |
| ENSG00000017483 | SLC38A5           | solute carrier family 38 member 5 [Source:HGNC Symbol;Acc:HGNC:18070]                                | protein coding        | 0.79                                        |                   | 5.08                         | 21.45                           | 0.00    | 0.00 |                  |
| ENSG00000072571 | HMMR              | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]                             | protein coding        | 0.79                                        |                   | 2.77                         | 10.76                           | 0.00    | 0.02 |                  |
| ENSG00000132432 | SEC61G            | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                                   | protein coding        | 0.78                                        |                   | 5.28                         | 30.24                           | 0.00    | 0.00 |                  |
| ENSG00000227203 | SUB1P1            | SUB1 homolog, transcriptional regulator pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:32300]             | processed pseudo-gene | 0.78                                        |                   | 2.08                         | 10.65                           | 0.00    | 0.02 |                  |
| ENSG00000182054 | IDH2              | isocitrate dehydrogenase (NADP(+)) 2, mitochondrial [Source:HGNC Symbol;Acc:HGNC:5383]               | protein coding        | 0.78                                        |                   | 6.71                         | 25.88                           | 0.00    | 0.00 |                  |
| ENSG00000106415 | GLCCI1            | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                                         | protein coding        | 0.78                                        |                   | 6.60                         | 31.84                           | 0.00    | 0.00 |                  |
| ENSG00000224041 | IGKV3D-15         | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824]             | IG V gene             | 0.78                                        |                   | 4.67                         | 39.34                           | 0.00    | 0.00 |                  |
| ENSG00000111665 | CDCA3             | cell division cycle associated 3 [Source:HGNC Symbol;Acc:HGNC:14624]                                 | protein coding        | 0.78                                        |                   | 2.12                         | 9.27                            | 0.00    | 0.04 |                  |
| ENSG00000124788 | ATXN1             | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                                         | protein coding        | 0.77                                        |                   | 4.94                         | 28.09                           | 0.00    | 0.00 |                  |
| ENSG00000185155 | MIXL1             | Mix paired-like homeobox [Source:HGNC Symbol;Acc:HGNC:13363]                                         | protein coding        | 0.77                                        |                   | 2.81                         | 12.27                           | 0.00    | 0.01 |                  |
| ENSG00000241755 | IGKV1-9           | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                                 | IG V gene             | 0.77                                        |                   | 6.00                         | 8.95                            | 0.00    | 0.04 |                  |
| ENSG00000029153 | ARNTL2            | aryl hydrocarbon receptor nuclear translocator like 2 [Source:HGNC Symbol;Acc:HGNC:18984]            | protein coding        | 0.77                                        |                   | 2.75                         | 11.49                           | 0.00    | 0.02 |                  |
| ENSG00000004866 | ST7               | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                                  | protein coding        | 0.77                                        |                   | 2.90                         | 17.04                           | 0.00    | 0.00 |                  |
| ENSG00000112378 | PERP              | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                                    | protein coding        | 0.77                                        |                   | 3.82                         | 15.45                           | 0.00    | 0.00 |                  |
| ENSG00000120725 | SIL1              | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                                  | protein coding        | 0.77                                        |                   | 4.32                         | 19.83                           | 0.00    | 0.00 |                  |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]                | IG C gene             | 0.77                                        |                   | 7.21                         | 22.77                           | 0.00    | 0.00 |                  |
| ENSG00000164611 | PTTG1             | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                                    | protein coding        | 0.77                                        |                   | 3.37                         | 18.35                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                 | Gene Type      | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000185624 | P4HB              | prolyl 4-hydroxylase subunit beta [Source:HGNC Symbol;Acc:HGNC:8548]                                                     | protein coding | 0.76                                        |                | 8.34                         | 24.83                           | 0.00    | 0.00 |                  |
| ENSG00000211943 | IGHV3-15          | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                                                    | IG V gene      | 0.76                                        |                | 6.81                         | 10.81                           | 0.00    | 0.02 |                  |
| ENSG00000163902 | RPN1              | ribophorin I [Source:HGNC Symbol;Acc:HGNC:10381]                                                                         | protein coding | 0.76                                        |                | 7.90                         | 36.02                           | 0.00    | 0.00 |                  |
| ENSG00000138778 | CENPE             | centromere protein E [Source:HGNC Symbol;Acc:HGNC:1856]                                                                  | protein coding | 0.76                                        |                | 3.46                         | 11.76                           | 0.00    | 0.01 |                  |
| ENSG00000244038 | DDOST             | dolichyl-diphosphooligosaccharide--protein glycosyl-transferase non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:2728] | protein coding | 0.75                                        |                | 7.88                         | 24.40                           | 0.00    | 0.00 |                  |
| ENSG00000168701 | TMEM208           | transmembrane protein 208 [Source:HGNC Symbol;Acc:HGNC:25015]                                                            | protein coding | 0.75                                        |                | 4.09                         | 21.16                           | 0.00    | 0.00 |                  |
| ENSG00000148773 | MKI67             | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                                                         | protein coding | 0.75                                        |                | 6.17                         | 14.54                           | 0.00    | 0.00 |                  |
| ENSG00000100342 | APOL1             | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                                                      | protein coding | 0.75                                        |                | 4.70                         | 26.31                           | 0.00    | 0.00 |                  |
| ENSG00000211679 | IGLC3             | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]                                    | IG C gene      | 0.75                                        |                | 9.17                         | 14.18                           | 0.00    | 0.01 |                  |
| ENSG00000011478 | QPCTL             | glutaminyl-peptide cyclotransferase like [Source:HGNC Symbol;Acc:HGNC:25952]                                             | protein coding | 0.74                                        |                | 4.32                         | 24.49                           | 0.00    | 0.00 |                  |
| ENSG00000198937 | CCDC167           | coiled-coil domain containing 167 [Source:HGNC Symbol;Acc:HGNC:21239]                                                    | protein coding | 0.74                                        |                | 3.77                         | 17.76                           | 0.00    | 0.00 |                  |
| ENSG00000128595 | CALU              | calumenin [Source:HGNC Symbol;Acc:HGNC:1458]                                                                             | protein coding | 0.74                                        |                | 6.14                         | 29.74                           | 0.00    | 0.00 |                  |
| ENSG00000114850 | SSR3              | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                                                   | protein coding | 0.74                                        |                | 7.74                         | 26.81                           | 0.00    | 0.00 |                  |
| ENSG00000172469 | MANEA             | mannosidase endo-alpha [Source:HGNC Symbol;Acc:HGNC:21072]                                                               | protein coding | 0.74                                        |                | 5.85                         | 18.64                           | 0.00    | 0.00 |                  |
| ENSG00000189233 | NUGGC             | nuclear GTPase, germinal center associated [Source:HGNC Symbol;Acc:HGNC:33550]                                           | protein coding | 0.74                                        |                | 4.82                         | 21.03                           | 0.00    | 0.00 |                  |
| ENSG00000143870 | PDIA6             | protein disulfide isomerase family A member 6 [Source:HGNC Symbol;Acc:HGNC:30168]                                        | protein coding | 0.74                                        |                | 7.61                         | 29.56                           | 0.00    | 0.00 |                  |
| ENSG00000135069 | PSAT1             | phosphoserine aminotransferase 1 [Source:HGNC Symbol;Acc:HGNC:19129]                                                     | protein coding | 0.74                                        |                | 3.74                         | 10.49                           | 0.00    | 0.02 |                  |
| ENSG00000184164 | CRELD2            | cysteine rich with EGF like domains 2 [Source:HGNC Symbol;Acc:HGNC:28150]                                                | protein coding | 0.74                                        |                | 5.99                         | 18.80                           | 0.00    | 0.00 |                  |
| ENSG00000109501 | WFS1              | wolframin ER transmembrane glycoprotein [Source:HGNC Symbol;Acc:HGNC:12762]                                              | protein coding | 0.74                                        |                | 4.11                         | 13.41                           | 0.00    | 0.01 |                  |
| ENSG00000101294 | HM13              | histocompatibility minor 13 [Source:HGNC Symbol;Acc:HGNC:16435]                                                          | protein coding | 0.73                                        |                | 7.02                         | 20.56                           | 0.00    | 0.00 |                  |
| ENSG00000274422 |                   |                                                                                                                          | lincRNA        | -0.73                                       |                | 2.94                         | 9.61                            | 0.00    | 0.03 |                  |
| ENSG00000211644 | IGLV1-51          | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                                                   | IG V gene      | 0.72                                        |                | 6.00                         | 15.96                           | 0.00    | 0.00 |                  |
| ENSG00000123352 | SPATS2            | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]                                             | protein coding | 0.72                                        |                | 5.57                         | 24.13                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type      | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000002549 | LAP3              | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                                | protein coding | 0.71                                        |                | 5.86                         | 21.75                           | 0.00    | 0.00 |                  |
| ENSG00000102096 | PIM2              | Pim-2 proto-oncogene, serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:8987]            | protein coding | 0.71                                        |                | 7.88                         | 32.56                           | 0.00    | 0.00 |                  |
| ENSG00000211649 | IGLV7-46          | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930]    | IG V gene      | 0.71                                        |                | 5.22                         | 14.31                           | 0.00    | 0.00 |                  |
| ENSG00000149428 | HYOU1             | hypoxia up-regulated 1 [Source:HGNC Symbol;Acc:HGNC:16931]                                  | protein coding | 0.71                                        |                | 7.68                         | 20.85                           | 0.00    | 0.00 |                  |
| ENSG00000198876 | DCAF12            | DDB1 and CUL4 associated factor 12 [Source:HGNC Symbol;Acc:HGNC:19911]                      | protein coding | 0.71                                        |                | 4.45                         | 16.87                           | 0.00    | 0.00 |                  |
| ENSG00000111206 | FOXM1             | forkhead box M1 [Source:HGNC Symbol;Acc:HGNC:3818]                                          | protein coding | 0.71                                        |                | 3.19                         | 18.25                           | 0.00    | 0.00 |                  |
| ENSG00000102580 | DNAJC3            | DnaJ heat shock protein family (Hsp40) member C3 [Source:HGNC Symbol;Acc:HGNC:9439]         | protein coding | 0.71                                        |                | 6.71                         | 28.06                           | 0.00    | 0.00 |                  |
| ENSG00000103512 | NOMO1             | NODAL modulator 1 [Source:HGNC Symbol;Acc:HGNC:30060]                                       | protein coding | 0.71                                        |                | 5.32                         | 17.01                           | 0.00    | 0.00 |                  |
| ENSG00000108829 | LRRC59            | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                       | protein coding | 0.70                                        |                | 6.50                         | 23.64                           | 0.00    | 0.00 |                  |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                       | IG V gene      | 0.70                                        |                | 7.41                         | 28.67                           | 0.00    | 0.00 |                  |
| ENSG00000134825 | TMEM258           | transmembrane protein 258 [Source:HGNC Symbol;Acc:HGNC:1164]                                | protein coding | 0.70                                        |                | 5.70                         | 32.65                           | 0.00    | 0.00 |                  |
| ENSG00000198856 | OSTC              | oligosaccharyltransferase complex non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:24448] | protein coding | 0.70                                        |                | 6.11                         | 33.85                           | 0.00    | 0.00 |                  |
| ENSG00000051341 | POLQ              | DNA polymerase theta [Source:HGNC Symbol;Acc:HGNC:9186]                                     | protein coding | 0.70                                        |                | 2.87                         | 13.44                           | 0.00    | 0.01 |                  |
| ENSG00000120708 | TGFB1             | transforming growth factor beta induced [Source:HGNC Symbol;Acc:HGNC:11771]                 | protein coding | -0.70                                       |                | 3.44                         | 8.52                            | 0.00    | 0.05 |                  |
| ENSG00000165272 | AQP3              | aquaporin 3 (Gill blood group) [Source:HGNC Symbol;Acc:HGNC:636]                            | protein coding | 0.70                                        |                | 6.08                         | 24.62                           | 0.00    | 0.00 |                  |
| ENSG00000134057 | CCNB1             | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                                | protein coding | 0.70                                        |                | 3.37                         | 16.04                           | 0.00    | 0.00 |                  |
| ENSG00000197714 | ZNF460            | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                                 | protein coding | -0.69                                       |                | 3.07                         | 13.51                           | 0.00    | 0.01 |                  |
| ENSG00000144724 | PTPRG             | protein tyrosine phosphatase, receptor type G [Source:HGNC Symbol;Acc:HGNC:9671]            | protein coding | 0.69                                        |                | 2.70                         | 12.21                           | 0.00    | 0.01 |                  |
| ENSG00000117143 | UAP1              | UDP-N-acetylglucosamine pyrophosphorylase 1 [Source:HGNC Symbol;Acc:HGNC:12457]             | protein coding | 0.69                                        |                | 5.59                         | 35.74                           | 0.00    | 0.00 |                  |
| ENSG00000184840 | TMED9             | transmembrane p24 trafficking protein 9 [Source:HGNC Symbol;Acc:HGNC:24878]                 | protein coding | 0.69                                        |                | 6.90                         | 31.51                           | 0.00    | 0.00 |                  |
| ENSG00000160883 | HK3               | hexokinase 3 [Source:HGNC Symbol;Acc:HGNC:4925]                                             | protein coding | -0.69                                       |                | 4.71                         | 14.55                           | 0.00    | 0.00 |                  |
| ENSG00000169223 | LMAN2             | lectin, mannose binding 2 [Source:HGNC Symbol;Acc:HGNC:16986]                               | protein coding | 0.68                                        |                | 7.00                         | 23.39                           | 0.00    | 0.00 |                  |
| ENSG00000114902 | SPCS1             | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]                      | protein coding | 0.68                                        |                | 6.73                         | 39.09                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type            | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre-CPM | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|----------------------|---------------------------------------------|-------------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000090520 | DNAJB11           | DnaJ heat shock protein family (Hsp40) member B11 [Source:HGNC Symbol;Acc:HGNC:14889]      | protein coding       | 0.68                                        |                   | 6.03                         | 23.10                           | 0.00    | 0.00 |                  |
| ENSG00000115677 | HDLBP             | high density lipoprotein binding protein [Source:HGNC Symbol;Acc:HGNC:4857]                | protein coding       | 0.68                                        |                   | 8.52                         | 16.85                           | 0.00    | 0.00 |                  |
| ENSG00000260948 |                   |                                                                                            | sense overlapping    | -0.68                                       |                   | 2.26                         | 8.85                            | 0.00    | 0.04 |                  |
| ENSG00000136240 | KDEL2             | KDEL endoplasmic reticulum protein retention receptor 2 [Source:HGNC Symbol;Acc:HGNC:6305] | protein coding       | 0.68                                        |                   | 6.21                         | 21.19                           | 0.00    | 0.00 |                  |
| ENSG00000121073 | SLC35B1           | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                     | protein coding       | 0.67                                        |                   | 5.33                         | 19.29                           | 0.00    | 0.00 |                  |
| ENSG00000142675 | CNKS1             | connector enhancer of kinase suppressor of Ras 1 [Source:HGNC Symbol;Acc:HGNC:19700]       | protein coding       | 0.67                                        |                   | 3.82                         | 14.90                           | 0.00    | 0.00 |                  |
| ENSG00000117411 | B4GALT2           | beta-1,4-galactosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:925]                         | protein coding       | 0.67                                        |                   | 3.39                         | 10.29                           | 0.00    | 0.03 |                  |
| ENSG00000176658 | MYO1D             | myosin ID [Source:HGNC Symbol;Acc:HGNC:7598]                                               | protein coding       | 0.67                                        |                   | 5.94                         | 25.17                           | 0.00    | 0.00 |                  |
| ENSG00000143942 | CHAC2             | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]              | protein coding       | 0.66                                        |                   | 3.01                         | 16.94                           | 0.00    | 0.00 |                  |
| ENSG00000172339 | ALG14             | ALG14, UDP-N-acetylglucosaminyltransferase subunit [Source:HGNC Symbol;Acc:HGNC:28287]     | protein coding       | 0.66                                        |                   | 3.21                         | 12.37                           | 0.00    | 0.01 |                  |
| ENSG00000173540 | GMPPB             | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                        | protein coding       | 0.66                                        |                   | 5.40                         | 23.17                           | 0.00    | 0.00 |                  |
| ENSG00000224699 | LAMTOR5-AS1       | LAMTOR5 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:40823]                                | processed transcript | -0.66                                       |                   | 2.43                         | 9.51                            | 0.00    | 0.03 |                  |
| ENSG00000070540 | WIPI1             | WD repeat domain, phosphoinositide interacting 1 [Source:HGNC Symbol;Acc:HGNC:25471]       | protein coding       | 0.66                                        |                   | 4.19                         | 14.01                           | 0.00    | 0.01 |                  |
| ENSG00000088325 | TPX2              | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                     | protein coding       | 0.66                                        |                   | 3.62                         | 12.38                           | 0.00    | 0.01 |                  |
| ENSG00000133328 | HRASLS2           | HRAS like suppressor 2 [Source:HGNC Symbol;Acc:HGNC:17824]                                 | protein coding       | 0.66                                        |                   | 3.11                         | 12.31                           | 0.00    | 0.01 |                  |
| ENSG00000115902 | SLC1A4            | solute carrier family 1 member 4 [Source:HGNC Symbol;Acc:HGNC:10942]                       | protein coding       | 0.66                                        |                   | 6.07                         | 19.46                           | 0.00    | 0.00 |                  |
| ENSG00000110063 | DCPS              | decapping enzyme, scavenger [Source:HGNC Symbol;Acc:HGNC:29812]                            | protein coding       | 0.65                                        |                   | 4.93                         | 27.22                           | 0.00    | 0.00 |                  |
| ENSG00000157456 | CCNB2             | cyclin B2 [Source:HGNC Symbol;Acc:HGNC:1580]                                               | protein coding       | 0.65                                        |                   | 2.94                         | 11.61                           | 0.00    | 0.01 |                  |
| ENSG00000167900 | TK1               | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                     | protein coding       | 0.65                                        |                   | 3.74                         | 24.47                           | 0.00    | 0.00 |                  |
| ENSG00000129235 | TXNDC17           | thioredoxin domain containing 17 [Source:HGNC Symbol;Acc:HGNC:28218]                       | protein coding       | 0.65                                        |                   | 3.45                         | 14.35                           | 0.00    | 0.00 |                  |
| ENSG00000211632 | IGKV3D-11         | immunoglobulin kappa variable 3D-11 [Source:HGNC Symbol;Acc:HGNC:5823]                     | IG V gene            | 0.65                                        |                   | 4.11                         | 12.93                           | 0.00    | 0.01 |                  |
| ENSG00000211952 | IGHV4-28          | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                      | IG V gene            | 0.65                                        |                   | 3.53                         | 10.19                           | 0.00    | 0.03 |                  |
| ENSG00000204386 | NEU1              | neuraminidase 1 [Source:HGNC Symbol;Acc:HGNC:7758]                                         | protein coding       | 0.64                                        |                   | 4.98                         | 17.45                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                      | Gene Type      | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre-) | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------|----------------|---------------------------------------------|-----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000057657 | PRDM1             | PR/SET domain 1 [Source:HGNC Symbol;Acc:HGNC:9346]                                            | protein coding | 0.64                                        |                 | 6.14                         | 30.36                           | 0.00    | 0.00 |                  |
| ENSG00000146733 | PSPH              | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                                  | protein coding | 0.64                                        |                 | 2.35                         | 8.97                            | 0.00    | 0.04 |                  |
| ENSG00000279192 | PWAR5             | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                        | TEC            | -0.64                                       |                 | 3.24                         | 10.37                           | 0.00    | 0.02 |                  |
| ENSG00000140105 | WARS              | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                              | protein coding | 0.64                                        |                 | 7.78                         | 13.81                           | 0.00    | 0.01 |                  |
| ENSG00000180879 | SSR4              | signal sequence receptor subunit 4 [Source:HGNC Symbol;Acc:HGNC:11326]                        | protein coding | 0.64                                        |                 | 7.43                         | 24.99                           | 0.00    | 0.00 |                  |
| ENSG00000107719 | PALD1             | phosphatase domain containing, paladin 1 [Source:HGNC Symbol;Acc:HGNC:23530]                  | protein coding | 0.64                                        |                 | 2.77                         | 10.80                           | 0.00    | 0.02 |                  |
| ENSG00000140451 | PIF1              | PIF1 5'-to-3' DNA helicase [Source:HGNC Symbol;Acc:HGNC:26220]                                | protein coding | 0.63                                        |                 | 2.80                         | 11.02                           | 0.00    | 0.02 |                  |
| ENSG00000122862 | SRGN              | serglycin [Source:HGNC Symbol;Acc:HGNC:9361]                                                  | protein coding | 0.63                                        |                 | 7.13                         | 22.51                           | 0.00    | 0.00 |                  |
| ENSG00000071537 | SEL1L             | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]                      | protein coding | 0.63                                        |                 | 7.49                         | 23.73                           | 0.00    | 0.00 |                  |
| ENSG00000136840 | ST6GALNAC4        | ST6 N-acetylgalactosaminide alpha-2,6-sialyltransferase 4 [Source:HGNC Symbol;Acc:HGNC:17846] | protein coding | 0.63                                        |                 | 5.46                         | 22.48                           | 0.00    | 0.00 |                  |
| ENSG00000187837 | HIST1H1C          | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                       | protein coding | 0.63                                        |                 | 3.73                         | 12.05                           | 0.00    | 0.01 |                  |
| ENSG00000211933 | IGHV6-1           | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                          | IG V gene      | 0.62                                        |                 | 6.10                         | 15.55                           | 0.00    | 0.00 |                  |
| ENSG00000182985 | CADM1             | cell adhesion molecule 1 [Source:HGNC Symbol;Acc:HGNC:5951]                                   | protein coding | 0.62                                        |                 | 3.24                         | 11.53                           | 0.00    | 0.02 |                  |
| ENSG00000183087 | GAS6              | growth arrest specific 6 [Source:HGNC Symbol;Acc:HGNC:4168]                                   | protein coding | 0.62                                        |                 | 3.58                         | 8.89                            | 0.00    | 0.04 |                  |
| ENSG00000058262 | SEC61A1           | Sec61 translocon alpha 1 subunit [Source:HGNC Symbol;Acc:HGNC:18276]                          | protein coding | 0.62                                        |                 | 8.26                         | 21.98                           | 0.00    | 0.00 |                  |
| ENSG00000086062 | B4GALT1           | beta-1,4-galactosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:924]                            | protein coding | 0.62                                        |                 | 8.55                         | 20.78                           | 0.00    | 0.00 |                  |
| ENSG00000278897 | TXNDC15           | thioredoxin domain containing 15 [Source:HGNC Symbol;Acc:HGNC:20652]                          | TEC            | -0.62                                       |                 | 3.53                         | 15.27                           | 0.00    | 0.00 |                  |
| ENSG00000113621 | TXN               | thioredoxin [Source:HGNC Symbol;Acc:HGNC:12435]                                               | protein coding | 0.61                                        |                 | 5.05                         | 26.75                           | 0.00    | 0.00 |                  |
| ENSG00000182481 | KPNA2             | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                                | protein coding | 0.61                                        |                 | 4.98                         | 30.75                           | 0.00    | 0.00 |                  |
| ENSG00000186818 | LILRB4            | leukocyte immunoglobulin like receptor B4 [Source:HGNC Symbol;Acc:HGNC:6608]                  | protein coding | 0.61                                        |                 | 3.51                         | 15.57                           | 0.00    | 0.00 |                  |
| ENSG00000160712 | IL6R              | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                                     | protein coding | 0.61                                        |                 | 6.44                         | 12.94                           | 0.00    | 0.01 |                  |
| ENSG00000134153 | EMC7              | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]                     | protein coding | 0.61                                        |                 | 5.04                         | 26.53                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                                | Gene Type                           | Log <sub>2</sub> Change 7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000168374 | ARF4              | ADP ribosylation factor 4 [Source:HGNC Symbol;Acc:HGNC:655]                                                                             | protein coding                      | 0.61                                     |                | 6.51                         | 28.29                           | 0.00    | 0.00 |                  |
| ENSG00000065911 | MTHFD2            | methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methenyltetrahydrofolate cyclohydrolase [Source:HGNC Symbol;Acc:HGNC:7434] | protein coding                      | 0.61                                     |                | 5.29                         | 13.05                           | 0.00    | 0.01 |                  |
| ENSG00000099337 | KCNK6             | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281]                                               | protein coding                      | 0.60                                     |                | 5.17                         | 13.91                           | 0.00    | 0.01 |                  |
| ENSG00000233806 | LINC01237         | long intergenic non-protein coding RNA 1237 [Source:HGNC Symbol;Acc:HGNC:49793]                                                         | processed transcript                | -0.60                                    |                | 3.53                         | 14.07                           | 0.00    | 0.01 |                  |
| ENSG00000173486 | FKBP2             | FK506 binding protein 2 [Source:HGNC Symbol;Acc:HGNC:3718]                                                                              | protein coding                      | 0.60                                     |                | 4.96                         | 16.20                           | 0.00    | 0.00 |                  |
| ENSG00000113811 | SELENOK           | selenoprotein K [Source:HGNC Symbol;Acc:HGNC:30394]                                                                                     | protein coding                      | 0.60                                     |                | 5.15                         | 23.44                           | 0.00    | 0.00 |                  |
| ENSG00000173218 | VANGL1            | VANGL planar cell polarity protein 1 [Source:HGNC Symbol;Acc:HGNC:15512]                                                                | protein coding                      | 0.60                                     |                | 2.79                         | 9.79                            | 0.00    | 0.03 |                  |
| ENSG00000179218 | CALR              | calreticulin [Source:HGNC Symbol;Acc:HGNC:1455]                                                                                         | protein coding                      | 0.60                                     |                | 9.21                         | 18.63                           | 0.00    | 0.00 |                  |
| ENSG00000198018 | ENTPD7            | ectonucleoside triphosphate diphosphohydrolase 7 [Source:HGNC Symbol;Acc:HGNC:19745]                                                    | protein coding                      | 0.60                                     |                | 3.24                         | 8.45                            | 0.00    | 0.05 |                  |
| ENSG00000154723 | ATP5J             | ATP synthase, H+ transporting, mitochondrial Fo complex subunit F6 [Source:HGNC Symbol;Acc:HGNC:847]                                    | protein coding                      | 0.60                                     |                | 5.17                         | 33.59                           | 0.00    | 0.00 |                  |
| ENSG00000164109 | MAD2L1            | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]                                                         | protein coding                      | 0.60                                     |                | 3.16                         | 14.36                           | 0.00    | 0.00 |                  |
| ENSG00000120697 | ALG5              | ALG5, dolichyl-phosphate beta-glucosyltransferase [Source:HGNC Symbol;Acc:HGNC:20266]                                                   | protein coding                      | 0.60                                     |                | 4.84                         | 22.58                           | 0.00    | 0.00 |                  |
| ENSG00000180747 | SMG1P3            | SMG1P3, nonsense mediated mRNA decay associated PI3K related kinase pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:49860]                    | transcribed unprocessed pseudo-gene | -0.59                                    |                | 3.28                         | 10.78                           | 0.00    | 0.02 |                  |
| ENSG00000080986 | NDC80             | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                                                                | protein coding                      | 0.59                                     |                | 3.04                         | 9.05                            | 0.00    | 0.04 |                  |
| ENSG00000116741 | RGS2              | regulator of G-protein signaling 2 [Source:HGNC Symbol;Acc:HGNC:9998]                                                                   | protein coding                      | 0.59                                     |                | 5.80                         | 9.60                            | 0.00    | 0.03 |                  |
| ENSG00000116649 | SRM               | spermidine synthase [Source:HGNC Symbol;Acc:HGNC:11296]                                                                                 | protein coding                      | 0.59                                     |                | 5.91                         | 23.28                           | 0.00    | 0.00 |                  |
| ENSG00000095380 | NANS              | N-acetylneuraminate synthase [Source:HGNC Symbol;Acc:HGNC:19237]                                                                        | protein coding                      | 0.59                                     |                | 4.43                         | 16.83                           | 0.00    | 0.00 |                  |
| ENSG00000259772 |                   |                                                                                                                                         | lincRNA                             | 0.59                                     |                | 3.99                         | 11.27                           | 0.00    | 0.02 |                  |
| ENSG00000198792 | TMEM184B          | transmembrane protein 184B [Source:HGNC Symbol;Acc:HGNC:1310]                                                                           | protein coding                      | 0.59                                     |                | 4.85                         | 21.21                           | 0.00    | 0.00 |                  |
| ENSG00000113387 | SUB1              | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]                                                             | protein coding                      | 0.59                                     |                | 8.19                         | 26.38                           | 0.00    | 0.00 |                  |
| ENSG00000166825 | ANPEP             | alanyl aminopeptidase, membrane [Source:HGNC Symbol;Acc:HGNC:500]                                                                       | protein coding                      | -0.59                                    |                | 3.37                         | 10.89                           | 0.00    | 0.02 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                      | Gene Type      | <i>Log<sub>2</sub></i> Change 7 vs. treatment) | Fold (Day pre- | Average <i>Log<sub>2</sub></i> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------|----------------|------------------------------------------------|----------------|------------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000144867 | SRPRB             | SRP receptor beta subunit [Source:HGNC Symbol;Acc:HGNC:24085] | protein coding | 0.58                                           |                | 5.69                               | 18.60                           | 0.00    | 0.00 |                  |

**Table 13:** Genes differentially expressed at Day 7 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 7 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type                      | <i>Log<sub>2</sub></i> Change 8 vs. treatment) | Fold (Day pre- | Average <i>Log<sub>2</sub></i> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------|----------------|------------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000254176 | IGHV3-75          | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]        | IG V pseudogene                | 6.80                                           |                | 0.23                               | 23.47                           | 0.00    | 0.00 |                  |
| ENSG00000253822 | IGLV3-24          | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]       | IG V pseudogene                | 2.55                                           |                | 2.44                               | 11.39                           | 0.00    | 0.04 |                  |
| ENSG00000254174 | IGHV1-12          | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]        | IG V pseudogene                | 2.29                                           |                | 1.09                               | 16.81                           | 0.00    | 0.01 |                  |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    | IG V gene                      | 1.99                                           |                | 9.68                               | 11.78                           | 0.00    | 0.03 |                  |
| ENSG00000148468 | FAM171A1          | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]         | protein coding                 | 1.95                                           |                | 0.48                               | 11.46                           | 0.00    | 0.04 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | IG V gene                      | 1.74                                           |                | 8.24                               | 21.63                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]   | IG V gene                      | 1.73                                           |                | 6.23                               | 15.45                           | 0.00    | 0.01 |                  |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | protein coding                 | 1.69                                           |                | 4.06                               | 57.81                           | 0.00    | 0.00 |                  |
| ENSG00000088340 | FER1L4            | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]                | transcribed unitary pseudogene | 1.68                                           |                | 2.13                               | 27.53                           | 0.00    | 0.00 |                  |
| ENSG00000154277 | UCHL1             | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                     | protein coding                 | 1.67                                           |                | 1.37                               | 16.22                           | 0.00    | 0.01 |                  |
| ENSG00000113140 | SPARC             | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]             | protein coding                 | 1.67                                           |                | 1.28                               | 17.84                           | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | IG C gene                      | 1.65                                           |                | 12.17                              | 34.24                           | 0.00    | 0.00 |                  |
| ENSG00000211645 | IGLV1-50          | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]   | IG V gene                      | 1.61                                           |                | 1.40                               | 11.58                           | 0.00    | 0.04 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudogene                | 1.49                                           |                | 7.19                               | 31.44                           | 0.00    | 0.00 |                  |
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                             | protein coding                 | 1.48                                           |                | 3.85                               | 32.78                           | 0.00    | 0.00 |                  |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | IG C gene                      | 1.31                                           |                | 10.64                              | 18.10                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                   | Gene Type            | Log <sub>2</sub> Change<br>8 vs. treatment) | Fold (Day pre-CPM | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------|----------------------|---------------------------------------------|-------------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                       | IG V gene            | 1.31                                        |                   | 8.14                         | 24.24                           | 0.00    | 0.00 |                  |
| ENSG00000282600 |                   |                                                                                            | IG V pseudogene      | 1.29                                        |                   | 2.30                         | 18.76                           | 0.00    | 0.00 |                  |
| ENSG00000162676 | GFI1              | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]   | protein coding       | 1.27                                        |                   | 2.42                         | 13.59                           | 0.00    | 0.02 |                  |
| ENSG00000163053 | SLC16A14          | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                     | protein coding       | 1.23                                        |                   | 2.18                         | 15.44                           | 0.00    | 0.01 |                  |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                      | IG V gene            | 1.23                                        |                   | 6.63                         | 55.25                           | 0.00    | 0.00 |                  |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                          | protein coding       | 1.20                                        |                   | 5.72                         | 82.34                           | 0.00    | 0.00 |                  |
| ENSG00000186810 | CXCR3             | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                        | protein coding       | 1.17                                        |                   | 4.10                         | 37.80                           | 0.00    | 0.00 |                  |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                        | protein coding       | 1.14                                        |                   | 4.95                         | 22.08                           | 0.00    | 0.00 |                  |
| ENSG00000248571 |                   |                                                                                            | antisense            | 1.11                                        |                   | 1.78                         | 14.60                           | 0.00    | 0.01 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                      | IG V gene            | 1.08                                        |                   | 8.22                         | 17.78                           | 0.00    | 0.00 |                  |
| ENSG00000075420 | FNDC3B            | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]              | protein coding       | 1.04                                        |                   | 5.34                         | 27.28                           | 0.00    | 0.00 |                  |
| ENSG00000183010 | PYCR1             | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]                     | protein coding       | 1.03                                        |                   | 2.69                         | 16.57                           | 0.00    | 0.01 |                  |
| ENSG00000100219 | XBP1              | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                | protein coding       | 1.01                                        |                   | 8.34                         | 34.37                           | 0.00    | 0.00 |                  |
| ENSG00000184232 | OAF               | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                   | protein coding       | 1.00                                        |                   | 2.35                         | 14.21                           | 0.00    | 0.01 |                  |
| ENSG00000180535 | BHLHA15           | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]               | protein coding       | 0.97                                        |                   | 3.30                         | 19.44                           | 0.00    | 0.00 |                  |
| ENSG00000173578 | XCR1              | X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1625]                          | protein coding       | 0.96                                        |                   | 2.51                         | 11.64                           | 0.00    | 0.04 |                  |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                   | protein coding       | 0.96                                        |                   | 4.90                         | 23.14                           | 0.00    | 0.00 |                  |
| ENSG00000211972 | IGHV3-66          | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                      | IG V gene            | 0.96                                        |                   | 4.62                         | 13.04                           | 0.00    | 0.02 |                  |
| ENSG00000203914 | HSP90B3P          | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100] | processed pseudogene | 0.96                                        |                   | 2.68                         | 18.22                           | 0.00    | 0.00 |                  |
| ENSG00000074842 | MYDGF             | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                          | protein coding       | 0.95                                        |                   | 6.42                         | 23.39                           | 0.00    | 0.00 |                  |
| ENSG00000198794 | SCAMP5            | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                   | protein coding       | 0.94                                        |                   | 3.46                         | 25.25                           | 0.00    | 0.00 |                  |
| ENSG00000065485 | PDIA5             | protein disulfide isomerase family A member 5 [Source:HGNC Symbol;Acc:HGNC:24811]          | protein coding       | 0.94                                        |                   | 4.20                         | 19.14                           | 0.00    | 0.00 |                  |
| ENSG00000102471 | NDFIP2            | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                     | protein coding       | 0.93                                        |                   | 1.98                         | 10.92                           | 0.00    | 0.04 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type             | Log <sub>2</sub> Change 8 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000143603 | KCNN3             | potassium calcium-activated channel subfamily N member 3 [Source:HGNC Symbol;Acc:HGNC:6292] | protein coding        | 0.92                                     |                | 2.96                         | 12.47                           | 0.00    | 0.03 |                  |
| ENSG00000211952 | IGHV4-28          | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                       | IG V gene             | 0.91                                     |                | 3.69                         | 14.50                           | 0.00    | 0.01 |                  |
| ENSG00000167861 | HID1              | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                                  | protein coding        | 0.91                                     |                | 4.16                         | 15.72                           | 0.00    | 0.01 |                  |
| ENSG00000259706 | HSP90B2P          | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099]  | processed pseudo-gene | 0.91                                     |                | 4.91                         | 27.79                           | 0.00    | 0.00 |                  |
| ENSG00000123131 | PRDX4             | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                         | protein coding        | 0.90                                     |                | 5.15                         | 22.31                           | 0.00    | 0.00 |                  |
| ENSG00000026751 | SLAMF7            | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                                    | protein coding        | 0.89                                     |                | 7.45                         | 24.93                           | 0.00    | 0.00 |                  |
| ENSG00000025039 | RRAGD             | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                               | protein coding        | 0.89                                     |                | 2.75                         | 13.46                           | 0.00    | 0.02 |                  |
| ENSG00000178127 | NDUFV2            | NADH:ubiquinone oxidoreductase core subunit V2 [Source:HGNC Symbol;Acc:HGNC:7717]           | protein coding        | -0.87                                    |                | 2.42                         | 15.87                           | 0.00    | 0.01 |                  |
| ENSG00000168209 | DDIT4             | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                       | protein coding        | -0.86                                    |                | 4.56                         | 32.30                           | 0.00    | 0.00 |                  |
| ENSG00000166598 | HSP90B1           | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]              | protein coding        | 0.86                                     |                | 10.49                        | 20.53                           | 0.00    | 0.00 |                  |
| ENSG00000242766 | IGKV1D-17         | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                      | IG V gene             | 0.85                                     |                | 3.19                         | 11.15                           | 0.00    | 0.04 |                  |
| ENSG00000107104 | KANK1             | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                   | protein coding        | 0.85                                     |                | 2.80                         | 17.62                           | 0.00    | 0.00 |                  |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                  | protein coding        | 0.83                                     |                | 11.54                        | 18.33                           | 0.00    | 0.00 |                  |
| ENSG00000135916 | ITM2C             | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                             | protein coding        | 0.83                                     |                | 8.62                         | 20.73                           | 0.00    | 0.00 |                  |
| ENSG00000232176 |                   |                                                                                             | processed pseudo-gene | -0.82                                    |                | 3.77                         | 26.63                           | 0.00    | 0.00 |                  |
| ENSG00000155660 | PDIA4             | protein disulfide isomerase family A member 4 [Source:HGNC Symbol;Acc:HGNC:30167]           | protein coding        | 0.82                                     |                | 8.50                         | 18.69                           | 0.00    | 0.00 |                  |
| ENSG00000118985 | ELL2              | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]               | protein coding        | 0.81                                     |                | 7.02                         | 23.00                           | 0.00    | 0.00 |                  |
| ENSG00000070081 | NUCB2             | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                           | protein coding        | 0.81                                     |                | 5.51                         | 22.32                           | 0.00    | 0.00 |                  |
| ENSG00000185164 | NOMO2             | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                       | protein coding        | 0.80                                     |                | 4.19                         | 15.42                           | 0.00    | 0.01 |                  |
| ENSG00000254395 | IGHV4-55          | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]          | IG V pseudo-gene      | 0.80                                     |                | 4.02                         | 11.02                           | 0.00    | 0.04 |                  |
| ENSG00000181800 | CELF2-AS1         | CELF2 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:23515]                                   | antisense             | -0.80                                    |                | 3.06                         | 12.21                           | 0.00    | 0.03 |                  |
| ENSG00000004468 | CD38              | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                            | protein coding        | 0.78                                     |                | 7.50                         | 27.02                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type      | Log <sub>2</sub> Change<br>8 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000137563 | GGH               | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                             | protein coding | 0.77                                        |                | 3.50                         | 13.77                           | 0.00    | 0.02 |                  |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]        | protein coding | 0.77                                        |                | 8.34                         | 20.64                           | 0.00    | 0.00 |                  |
| ENSG00000103257 | SLC7A5            | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                    | protein coding | 0.77                                        |                | 5.30                         | 14.15                           | 0.00    | 0.01 |                  |
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                   | IG V gene      | 0.77                                        |                | 7.33                         | 17.24                           | 0.00    | 0.00 |                  |
| ENSG00000118515 | SGK1              | serum/glucocorticoid regulated kinase 1 [Source:HGNC Symbol;Acc:HGNC:10810]             | protein coding | 0.76                                        |                | 4.30                         | 26.58                           | 0.00    | 0.00 |                  |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                  | protein coding | 0.76                                        |                | 6.28                         | 26.80                           | 0.00    | 0.00 |                  |
| ENSG00000168268 | NT5DC2            | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]                 | protein coding | 0.76                                        |                | 5.42                         | 16.47                           | 0.00    | 0.01 |                  |
| ENSG00000111291 | GPRC5D            | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310] | protein coding | 0.75                                        |                | 3.85                         | 15.54                           | 0.00    | 0.01 |                  |
| ENSG00000145050 | MANF              | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461] | protein coding | 0.74                                        |                | 6.23                         | 23.17                           | 0.00    | 0.00 |                  |
| ENSG00000131871 | SELENOS           | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                     | protein coding | 0.73                                        |                | 5.44                         | 26.75                           | 0.00    | 0.00 |                  |
| ENSG00000134285 | FKBP11            | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                            | protein coding | 0.73                                        |                | 6.15                         | 14.98                           | 0.00    | 0.01 |                  |
| ENSG00000241666 |                   |                                                                                         | antisense      | -0.73                                       |                | 2.96                         | 21.00                           | 0.00    | 0.00 |                  |
| ENSG00000173334 | TRIB1             | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                             | protein coding | 0.73                                        |                | 5.80                         | 14.47                           | 0.00    | 0.01 |                  |
| ENSG00000079931 | MOXD1             | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                            | protein coding | 0.72                                        |                | 3.65                         | 22.15                           | 0.00    | 0.00 |                  |
| ENSG00000068912 | ERLEC1            | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                      | protein coding | 0.72                                        |                | 6.51                         | 21.62                           | 0.00    | 0.00 |                  |
| ENSG00000198855 | FICD              | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                               | protein coding | 0.71                                        |                | 3.18                         | 13.12                           | 0.00    | 0.02 |                  |
| ENSG00000173848 | NET1              | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                 | protein coding | 0.71                                        |                | 4.15                         | 18.99                           | 0.00    | 0.00 |                  |
| ENSG00000143942 | CHAC2             | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]           | protein coding | 0.71                                        |                | 3.05                         | 14.45                           | 0.00    | 0.01 |                  |
| ENSG00000128228 | SDF2L1            | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                | protein coding | 0.70                                        |                | 4.82                         | 14.31                           | 0.00    | 0.01 |                  |
| ENSG00000128590 | DNAJB9            | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]     | protein coding | 0.70                                        |                | 5.18                         | 13.44                           | 0.00    | 0.02 |                  |
| ENSG00000111885 | MAN1A1            | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                  | protein coding | 0.70                                        |                | 7.89                         | 15.59                           | 0.00    | 0.01 |                  |
| ENSG00000074695 | LMAN1             | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                            | protein coding | 0.69                                        |                | 7.77                         | 19.17                           | 0.00    | 0.00 |                  |
| ENSG00000196189 | SEMA4A            | semaphorin 4A [Source:HGNC Symbol;Acc:HGNC:10729]                                       | protein coding | 0.69                                        |                | 6.55                         | 16.71                           | 0.00    | 0.01 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change<br>8 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000136026 | CKAP4             | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                 | protein coding | 0.69                                           |                      | 6.51                               | 30.28                                    | 0.00    | 0.00 |                           |
| ENSG00000239264 | TXNDC5            | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                   | protein coding | 0.69                                           |                      | 5.56                               | 14.99                                    | 0.00    | 0.01 |                           |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                 | IG V gene      | 0.68                                           |                      | 7.38                               | 43.83                                    | 0.00    | 0.00 |                           |
| ENSG00000044574 | HSPA5             | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]       | protein coding | 0.68                                           |                      | 9.00                               | 16.14                                    | 0.00    | 0.01 |                           |
| ENSG00000111424 | VDR               | vitamin D (1,25- dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]    | protein coding | 0.68                                           |                      | 3.39                               | 11.34                                    | 0.00    | 0.04 |                           |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528] | IG C gene      | 0.68                                           |                      | 7.19                               | 21.94                                    | 0.00    | 0.00 |                           |
| ENSG00000211599 | IGKV5-2           | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835]                  | IG V gene      | 0.67                                           |                      | 4.23                               | 17.41                                    | 0.00    | 0.00 |                           |
| ENSG00000166794 | PPIB              | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                         | protein coding | 0.67                                           |                      | 7.46                               | 16.42                                    | 0.00    | 0.01 |                           |
| ENSG00000113615 | SEC24A            | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]     | protein coding | 0.67                                           |                      | 6.46                               | 14.62                                    | 0.00    | 0.01 |                           |
| ENSG00000196263 | ZNF471            | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]                           | protein coding | -0.66                                          |                      | 2.76                               | 13.17                                    | 0.00    | 0.02 |                           |
| ENSG00000169962 | TAS1R3            | taste 1 receptor member 3 [Source:HGNC Symbol;Acc:HGNC:15661]                         | protein coding | 0.66                                           |                      | 3.80                               | 14.00                                    | 0.00    | 0.01 |                           |
| ENSG00000183508 | FAM46C            | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]       | protein coding | 0.66                                           |                      | 8.38                               | 18.92                                    | 0.00    | 0.00 |                           |
| ENSG00000166562 | SEC11C            | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400] | protein coding | 0.65                                           |                      | 7.17                               | 14.11                                    | 0.00    | 0.01 |                           |
| ENSG00000139193 | CD27              | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                     | protein coding | 0.65                                           |                      | 5.83                               | 17.35                                    | 0.00    | 0.00 |                           |
| ENSG00000125844 | RRBP1             | ribosome binding protein 1 [Source:HGNC Symbol;Acc:HGNC:10448]                        | protein coding | 0.64                                           |                      | 6.98                               | 21.28                                    | 0.00    | 0.00 |                           |
| ENSG00000150961 | SEC24D            | SEC24 homolog D, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10706]     | protein coding | 0.64                                           |                      | 6.35                               | 20.99                                    | 0.00    | 0.00 |                           |
| ENSG00000118705 | RPN2              | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                     | protein coding | 0.64                                           |                      | 8.18                               | 20.74                                    | 0.00    | 0.00 |                           |
| ENSG00000155304 | HSPA13            | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]     | protein coding | 0.63                                           |                      | 6.06                               | 17.82                                    | 0.00    | 0.00 |                           |
| ENSG00000074416 | MGLL              | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                              | protein coding | 0.63                                           |                      | 3.62                               | 11.47                                    | 0.00    | 0.04 |                           |
| ENSG00000120725 | SIL1              | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                   | protein coding | 0.62                                           |                      | 4.22                               | 12.17                                    | 0.00    | 0.03 |                           |
| ENSG00000070214 | SLC44A1           | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                 | protein coding | 0.62                                           |                      | 6.94                               | 18.48                                    | 0.00    | 0.00 |                           |
| ENSG00000153066 | TXNDC11           | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                  | protein coding | 0.61                                           |                      | 7.51                               | 15.94                                    | 0.00    | 0.01 |                           |
| ENSG00000065308 | TRAM2             | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]       | protein coding | 0.61                                           |                      | 6.92                               | 18.48                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                             | Gene Type      | Log <sub>2</sub> Change<br>8 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000108829 | LRRC59            | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                                | protein coding | 0.61                                            |                | 6.41                         | 20.70                           | 0.00    | 0.00 |                  |
| ENSG00000103226 | NOMO3             | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                                | protein coding | 0.60                                            |                | 3.02                         | 11.34                           | 0.00    | 0.04 |                  |
| ENSG00000123352 | SPATS2            | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]                         | protein coding | 0.60                                            |                | 5.47                         | 21.06                           | 0.00    | 0.00 |                  |
| ENSG00000083444 | PLOD1             | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]                 | protein coding | 0.60                                            |                | 4.30                         | 14.09                           | 0.00    | 0.01 |                  |
| ENSG00000106803 | SEC61B            | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                    | protein coding | 0.60                                            |                | 5.97                         | 17.94                           | 0.00    | 0.00 |                  |
| ENSG00000279192 | PWAR5             | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                               | TEC            | -0.60                                           |                | 3.27                         | 10.73                           | 0.00    | 0.05 |                  |
| ENSG00000100154 | TTC28             | tetratricopeptide repeat domain 28 [Source:HGNC Symbol;Acc:HGNC:29179]                               | protein coding | -0.59                                           |                | 3.05                         | 10.81                           | 0.00    | 0.04 |                  |
| ENSG00000134910 | STT3A             | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172] | protein coding | 0.59                                            |                | 7.13                         | 21.84                           | 0.00    | 0.00 |                  |
| ENSG00000099337 | KCNK6             | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281]            | protein coding | 0.59                                            |                | 5.11                         | 16.97                           | 0.00    | 0.01 |                  |
| ENSG00000181722 | ZBTB20            | zinc finger and BTB domain containing 20 [Source:HGNC Symbol;Acc:HGNC:13503]                         | protein coding | -0.59                                           |                | 5.00                         | 18.69                           | 0.00    | 0.00 |                  |
| ENSG00000113621 | TXNDC15           | thioredoxin domain containing 15 [Source:HGNC Symbol;Acc:HGNC:20652]                                 | protein coding | 0.59                                            |                | 5.49                         | 25.95                           | 0.00    | 0.00 |                  |
| ENSG00000080546 | SESN1             | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                                        | protein coding | -0.59                                           |                | 6.66                         | 43.86                           | 0.00    | 0.00 |                  |
| ENSG00000100342 | APOL1             | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                                  | protein coding | 0.59                                            |                | 4.58                         | 20.57                           | 0.00    | 0.00 |                  |
| ENSG00000017483 | SLC38A5           | solute carrier family 38 member 5 [Source:HGNC Symbol;Acc:HGNC:18070]                                | protein coding | 0.59                                            |                | 4.91                         | 13.22                           | 0.00    | 0.02 |                  |

**Table 14:** Genes differentially expressed at Day 8 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 8 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type       | Log <sub>2</sub> Change<br>9 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|-----------------|-------------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000254176 | IGHV3-75          | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]      | IG V pseudogene | 6.51                                            |                | -0.25                        | 18.08                           | 0.00    | 0.02 |                  |
| ENSG00000158578 | ALAS2             | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                         | protein coding  | 2.22                                            |                | 2.43                         | 56.22                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918] | IG V gene       | 1.57                                            |                | 5.49                         | 17.24                           | 0.00    | 0.02 |                  |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                              | protein coding  | 1.55                                            |                | 9.71                         | 51.73                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                               | Gene Type      | Log <sub>2</sub> Change 9 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000206172 | HBA1              | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]          | protein coding | 1.43                                     |                | 4.95                         | 35.36                           | 0.00    | 0.00                 |
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]          | protein coding | 1.42                                     |                | 6.22                         | 46.68                           | 0.00    | 0.00                 |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877] | IG V gene      | 1.39                                     |                | 7.83                         | 15.61                           | 0.00    | 0.05                 |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                         | protein coding | 1.38                                     |                | 3.72                         | 26.24                           | 0.00    | 0.00                 |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]  | IG V gene      | 0.97                                     |                | 6.44                         | 24.41                           | 0.00    | 0.00                 |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]      | protein coding | 0.83                                     |                | 5.43                         | 43.92                           | 0.00    | 0.00                 |
| ENSG00000186810 | CXCR3             | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]    | protein coding | 0.79                                     |                | 3.82                         | 20.45                           | 0.00    | 0.01                 |
| ENSG00000211599 | IGKV5-2           | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835]   | IG V gene      | 0.78                                     |                | 4.42                         | 21.46                           | 0.00    | 0.00                 |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]  | IG V gene      | 0.71                                     |                | 7.79                         | 18.28                           | 0.00    | 0.02                 |
| ENSG00000079931 | MOXD1             | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]           | protein coding | 0.60                                     |                | 3.55                         | 16.91                           | 0.00    | 0.03                 |

**Table 15:** Genes differentially expressed at Day 9 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute  $\log_2$  fold change (Day 9 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type      | Log <sub>2</sub> Change 10 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|----------------|-------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5918] | IG V gene      | 1.55                                      |                | 5.12                         | 27.34                           | 0.00    | 0.00                 |
| ENSG00000101439 | CST3              | cystatin C [Source:HGNC Symbol;Acc:HGNC:2475]                                            | protein coding | -0.87                                     |                | 3.47                         | 20.32                           | 0.00    | 0.02                 |
| ENSG00000211599 | IGKV5-2           | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835]                     | IG V gene      | 0.84                                      |                | 4.55                         | 22.26                           | 0.00    | 0.01                 |

**Table 16:** Genes differentially expressed at Day 10 compared to pre-treatment (B Cells, Trivalent Influenza Vaccine). Sorted by descending absolute  $\log_2$  fold change (Day 10 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                              | Gene Type      | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000100336 | APOL4             | apolipoprotein L4 [Source:HGNC Symbol;Acc:HGNC:14867] | protein coding | 2.57                                     |                | 1.62                         | 43.61                           | 0.00    | 0.00                 |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type                           | Log <sub>2</sub> Change<br>1 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000149131 | SERPING1          | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                              | protein coding                      | 1.83                                           |                      | 3.81                               | 51.22                                    | 0.00    | 0.00 |                           |
| ENSG00000152766 | ANKRD22           | ankyrin repeat domain 22 [Source:HGNC Symbol;Acc:HGNC:28321]                             | protein coding                      | 1.79                                           |                      | 2.54                               | 30.20                                    | 0.00    | 0.00 |                           |
| ENSG00000123689 | G0S2              | G0/G1 switch 2 [Source:HGNC Symbol;Acc:HGNC:30229]                                       | protein coding                      | -1.61                                          |                      | 1.10                               | 13.51                                    | 0.00    | 0.01 |                           |
| ENSG00000166278 | C2                | complement C2 [Source:HGNC Symbol;Acc:HGNC:1248]                                         | protein coding                      | 1.57                                           |                      | 1.53                               | 26.20                                    | 0.00    | 0.00 |                           |
| ENSG00000198019 | FCGR1B            | Fc fragment of IgG receptor 1b [Source:HGNC Symbol;Acc:HGNC:3614]                        | protein coding                      | 1.54                                           |                      | 1.88                               | 31.19                                    | 0.00    | 0.00 |                           |
| ENSG00000168062 | BATF2             | basic leucine zipper ATF-like transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:25163] | protein coding                      | 1.40                                           |                      | 2.13                               | 26.84                                    | 0.00    | 0.00 |                           |
| ENSG00000183762 | KREMEN1           | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]           | protein coding                      | 1.39                                           |                      | 2.19                               | 27.23                                    | 0.00    | 0.00 |                           |
| ENSG00000150337 | FCGR1A            | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                        | protein coding                      | 1.35                                           |                      | 2.99                               | 41.24                                    | 0.00    | 0.00 |                           |
| ENSG00000169245 | CXCL10            | C-X-C motif chemokine ligand 10 [Source:HGNC Symbol;Acc:HGNC:10637]                      | protein coding                      | 1.33                                           |                      | 2.72                               | 15.25                                    | 0.00    | 0.00 |                           |
| ENSG00000272821 |                   |                                                                                          | antisense                           | 1.21                                           |                      | 3.76                               | 58.04                                    | 0.00    | 0.00 |                           |
| ENSG00000174705 | SH3PXD2B          | SH3 and PX domains 2B [Source:HGNC Symbol;Acc:HGNC:29242]                                | protein coding                      | 1.20                                           |                      | 2.02                               | 12.73                                    | 0.00    | 0.01 |                           |
| ENSG00000225492 | GBP1P1            | guanylate binding protein 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39561]             | transcribed unprocessed pseudo-gene | 1.19                                           |                      | 1.74                               | 8.77                                     | 0.00    | 0.05 |                           |
| ENSG00000205846 | CLEC6A            | C-type lectin domain family 6 member A [Source:HGNC Symbol;Acc:HGNC:14556]               | protein coding                      | 1.18                                           |                      | 1.88                               | 9.60                                     | 0.00    | 0.04 |                           |
| ENSG00000177989 | ODF3B             | outer dense fiber of sperm tails 3B [Source:HGNC Symbol;Acc:HGNC:34388]                  | protein coding                      | 1.16                                           |                      | 5.52                               | 37.02                                    | 0.00    | 0.00 |                           |
| ENSG00000130489 | SCO2              | SCO2, cytochrome c oxidase assembly protein [Source:HGNC Symbol;Acc:HGNC:10604]          | protein coding                      | 1.04                                           |                      | 4.48                               | 53.67                                    | 0.00    | 0.00 |                           |
| ENSG00000123700 | KCNJ2             | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]  | protein coding                      | 1.04                                           |                      | 3.82                               | 19.34                                    | 0.00    | 0.00 |                           |
| ENSG00000025708 | TYMP              | thymidine phosphorylase [Source:HGNC Symbol;Acc:HGNC:3148]                               | protein coding                      | 1.01                                           |                      | 7.97                               | 44.15                                    | 0.00    | 0.00 |                           |
| ENSG00000234389 |                   |                                                                                          | sense                               | -0.97                                          |                      | 2.31                               | 23.22                                    | 0.00    | 0.00 |                           |
| ENSG00000162512 | SDC3              | syndecan 3 [Source:HGNC Symbol;Acc:HGNC:10660]                                           | intronic protein coding             | 0.97                                           |                      | 2.92                               | 21.90                                    | 0.00    | 0.00 |                           |
| ENSG00000125538 | IL1B              | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                    | protein coding                      | 0.96                                           |                      | 3.79                               | 19.58                                    | 0.00    | 0.00 |                           |
| ENSG00000111181 | SLC6A12           | solute carrier family 6 member 12 [Source:HGNC Symbol;Acc:HGNC:11045]                    | protein coding                      | 0.95                                           |                      | 2.79                               | 23.06                                    | 0.00    | 0.00 |                           |
| ENSG00000115415 | STAT1             | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]   | protein coding                      | 0.95                                           |                      | 9.11                               | 43.00                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                       | Gene Type                           | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|-----|------------------|
| ENSG00000185339 | TCN2              | transcobalamin 2 [Source:HGNC Symbol;Acc:HGNC:11653]                                           | Sym-protein coding                  | 0.94                                     |                | 3.79                         | 26.51                           | 0.00    |     | 0.00             |
| ENSG00000141574 | SECTM1            | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                               | Sym-protein coding                  | 0.94                                     |                | 6.60                         | 40.06                           | 0.00    |     | 0.00             |
| ENSG00000117228 | GBP1              | guanylate binding protein 1 [Source:HGNC Symbol;Acc:HGNC:4182]                                 | Sym-protein coding                  | 0.91                                     |                | 7.12                         | 21.74                           | 0.00    |     | 0.00             |
| ENSG00000002549 | LAP3              | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                                   | Sym-protein coding                  | 0.90                                     |                | 6.81                         | 32.78                           | 0.00    |     | 0.00             |
| ENSG00000119922 | IFIT2             | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | Sym-protein coding                  | 0.90                                     |                | 5.98                         | 27.36                           | 0.00    |     | 0.00             |
| ENSG00000149798 | CDC42EP2          | CDC42 effector protein 2 [Source:HGNC Symbol;Acc:HGNC:16263]                                   | Sym-protein coding                  | 0.87                                     |                | 3.64                         | 32.94                           | 0.00    |     | 0.00             |
| ENSG00000149557 | FEZ1              | fasciculation and elongation protein zeta 1 [Source:HGNC Symbol;Acc:HGNC:3659]                 | Sym-protein coding                  | -0.87                                    |                | 2.70                         | 18.47                           | 0.00    |     | 0.00             |
| ENSG00000182487 | NCF1B             | neutrophil cytosolic factor 1B pseudogene [Source:HGNC Symbol;Acc:HGNC:32522]                  | transcribed unprocessed pseudo-gene | 0.86                                     |                | 4.24                         | 43.16                           | 0.00    |     | 0.00             |
| ENSG00000250138 |                   |                                                                                                | unprocessed pseudo-gene             | 0.85                                     |                | 2.63                         | 18.44                           | 0.00    |     | 0.00             |
| ENSG00000140105 | WARS              | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                               | Sym-protein coding                  | 0.85                                     |                | 8.50                         | 35.54                           | 0.00    |     | 0.00             |
| ENSG00000260401 |                   |                                                                                                | sense overlapping                   | 0.83                                     |                | 2.86                         | 18.70                           | 0.00    |     | 0.00             |
| ENSG00000119917 | IFIT3             | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411] | Sym-protein coding                  | 0.82                                     |                | 5.74                         | 18.55                           | 0.00    |     | 0.00             |
| ENSG00000179331 | RAB39A            | RAB39A, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:16521]                         | Sym-protein coding                  | 0.82                                     |                | 2.34                         | 16.97                           | 0.00    |     | 0.00             |
| ENSG00000158714 | SLAMF8            | SLAM family member 8 [Source:HGNC Symbol;Acc:HGNC:21391]                                       | Sym-protein coding                  | 0.82                                     |                | 3.40                         | 12.21                           | 0.00    |     | 0.01             |
| ENSG00000135636 | DYSF              | dysferlin [Source:HGNC Symbol;Acc:HGNC:3097]                                                   | Sym-protein coding                  | 0.81                                     |                | 6.79                         | 23.39                           | 0.00    |     | 0.00             |
| ENSG00000088827 | SIGLEC1           | sialic acid binding Ig like lectin 1 [Source:HGNC Symbol;Acc:HGNC:11127]                       | Sym-protein coding                  | 0.81                                     |                | 5.24                         | 29.90                           | 0.00    |     | 0.00             |
| ENSG00000020577 | SAMD4A            | sterile alpha motif domain containing 4A [Source:HGNC Symbol;Acc:HGNC:23023]                   | Sym-protein coding                  | 0.81                                     |                | 3.55                         | 16.26                           | 0.00    |     | 0.00             |
| ENSG00000113494 | PRLR              | prolactin receptor [Source:HGNC Symbol;Acc:HGNC:9446]                                          | Sym-protein coding                  | 0.79                                     |                | 2.15                         | 13.26                           | 0.00    |     | 0.01             |
| ENSG00000165178 | NCF1C             | neutrophil cytosolic factor 1C pseudogene [Source:HGNC Symbol;Acc:HGNC:32523]                  | unprocessed pseudo-gene             | 0.79                                     |                | 5.03                         | 46.78                           | 0.00    |     | 0.00             |
| ENSG00000232810 | TNF               | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                      | Sym-protein coding                  | 0.78                                     |                | 2.72                         | 21.52                           | 0.00    |     | 0.00             |

| Ensembl Gene ID  | Ensembl Gene Name | Ensembl Gene Description                                                                      | Gene Type                           | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|------------------|-------------------|-----------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000019169  | MARCO             | macrophage receptor with collagenous structure [Source:HGNC Symbol;Acc:HGNC:6895]             | protein coding                      | 0.78                                     |                | 4.17                         | 25.58                           | 0.00    | 0.00 |                  |
| ENSG000000158517 | NCF1              | neutrophil cytosolic factor 1 [Source:HGNC Symbol;Acc:HGNC:7660]                              | protein coding                      | 0.78                                     |                | 5.71                         | 30.84                           | 0.00    | 0.00 |                  |
| ENSG000000171049 | FPR2              | formyl peptide receptor 2 [Source:HGNC Symbol;Acc:HGNC:3827]                                  | protein coding                      | 0.77                                     |                | 5.80                         | 18.94                           | 0.00    | 0.00 |                  |
| ENSG000000125148 | MT2A              | metallothionein 2A [Source:HGNC Symbol;Acc:HGNC:7406]                                         | protein coding                      | 0.76                                     |                | 3.80                         | 20.08                           | 0.00    | 0.00 |                  |
| ENSG000000134755 | DSC2              | desmocollin 2 [Source:HGNC Symbol;Acc:HGNC:3036]                                              | protein coding                      | 0.76                                     |                | 4.12                         | 30.41                           | 0.00    | 0.00 |                  |
| ENSG000000135604 | STX11             | syntaxin 11 [Source:HGNC Symbol;Acc:HGNC:11429]                                               | protein coding                      | 0.76                                     |                | 6.17                         | 38.29                           | 0.00    | 0.00 |                  |
| ENSG000000162614 | NEXN              | nexilin F-actin binding protein [Source:HGNC Symbol;Acc:HGNC:29557]                           | protein coding                      | 0.76                                     |                | 2.94                         | 14.37                           | 0.00    | 0.01 |                  |
| ENSG000000168389 | MFSD2A            | major facilitator superfamily domain containing 2A [Source:HGNC Symbol;Acc:HGNC:25897]        | protein coding                      | 0.75                                     |                | 2.89                         | 15.86                           | 0.00    | 0.00 |                  |
| ENSG000000169136 | ATF5              | activating transcription factor 5 [Source:HGNC Symbol;Acc:HGNC:790]                           | protein coding                      | 0.74                                     |                | 4.31                         | 20.23                           | 0.00    | 0.00 |                  |
| ENSG000000171451 | DSEL              | dermatan sulfate epimerase-like [Source:HGNC Symbol;Acc:HGNC:18144]                           | protein coding                      | -0.74                                    |                | 2.17                         | 9.15                            | 0.00    | 0.04 |                  |
| ENSG000000170962 | PDGFD             | platelet derived growth factor D [Source:HGNC Symbol;Acc:HGNC:30620]                          | protein coding                      | -0.74                                    |                | 3.78                         | 23.66                           | 0.00    | 0.00 |                  |
| ENSG000000186049 | KRT73             | keratin 73 [Source:HGNC Symbol;Acc:HGNC:28928]                                                | protein coding                      | -0.73                                    |                | 2.29                         | 9.08                            | 0.00    | 0.04 |                  |
| ENSG000000139832 | RAB20             | RAB20, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:18260]                         | protein coding                      | 0.72                                     |                | 3.45                         | 15.78                           | 0.00    | 0.00 |                  |
| ENSG000000276070 | CCL4L2            | C-C motif chemokine ligand 4 like 2 [Source:HGNC Symbol;Acc:HGNC:24066]                       | protein coding                      | -0.71                                    |                | 1.99                         | 9.35                            | 0.00    | 0.04 |                  |
| ENSG000000157227 | MMP14             | matrix metalloproteinase 14 [Source:HGNC Symbol;Acc:HGNC:7160]                                | protein coding                      | 0.71                                     |                | 2.72                         | 13.28                           | 0.00    | 0.01 |                  |
| ENSG000000181631 | P2RY13            | purinergic receptor P2Y13 [Source:HGNC Symbol;Acc:HGNC:4537]                                  | protein coding                      | 0.71                                     |                | 6.90                         | 21.58                           | 0.00    | 0.00 |                  |
| ENSG000000101335 | MYL9              | myosin light chain 9 [Source:HGNC Symbol;Acc:HGNC:15754]                                      | protein coding                      | 0.71                                     |                | 3.67                         | 15.75                           | 0.00    | 0.00 |                  |
| ENSG000000268849 | SIGLEC22P         | sialic acid binding lg like lectin 22, pseudogene [Source:HGNC Symbol;Acc:HGNC:15611]         | transcribed unprocessed pseudo-gene | 0.71                                     |                | 2.61                         | 9.99                            | 0.00    | 0.03 |                  |
| ENSG000000128383 | APOBEC3A          | apolipoprotein B mRNA editing enzyme catalytic subunit 3A [Source:HGNC Symbol;Acc:HGNC:17343] | protein coding                      | 0.71                                     |                | 5.78                         | 22.90                           | 0.00    | 0.00 |                  |
| ENSG000000173110 | HSPA6             | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]               | protein coding                      | 0.70                                     |                | 4.28                         | 19.73                           | 0.00    | 0.00 |                  |
| ENSG000000255819 | KLRC4-KLRK1       | KLRC4-KLRK1 readthrough [Source:HGNC Symbol;Acc:HGNC:48357]                                   | protein coding                      | -0.70                                    |                | 2.09                         | 8.91                            | 0.00    | 0.05 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                     | Gene Type      | Log <sub>2</sub> Change<br>1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|----------------------------------------------------------------------------------------------|----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000271109 |                   |                                                                                              | lincRNA        | -0.70                                       |                | 2.64                         | 15.63                           | 0.00    | 0.00 |                  |
| ENSG00000125347 | IRF1              | interferon regulatory factor 1 [Source:HGNC Symbol;Acc:HGNC:6116]                            | protein coding | 0.70                                        |                | 8.00                         | 36.06                           | 0.00    | 0.00 |                  |
| ENSG00000156587 | UBE2L6            | ubiquitin conjugating enzyme E2 L6 [Source:HGNC Symbol;Acc:HGNC:12490]                       | protein coding | 0.69                                        |                | 6.89                         | 29.46                           | 0.00    | 0.00 |                  |
| ENSG00000187608 | ISG15             | ISG15 ubiquitin-like modifier [Source:HGNC Symbol;Acc:HGNC:4053]                             | protein coding | 0.69                                        |                | 4.39                         | 23.80                           | 0.00    | 0.00 |                  |
| ENSG00000127951 | FGL2              | fibrinogen like 2 [Source:HGNC Symbol;Acc:HGNC:3696]                                         | protein coding | 0.69                                        |                | 10.13                        | 22.91                           | 0.00    | 0.00 |                  |
| ENSG00000004809 | SLC22A16          | solute carrier family 22 member 16 [Source:HGNC Symbol;Acc:HGNC:20302]                       | protein coding | 0.69                                        |                | 2.11                         | 9.88                            | 0.00    | 0.03 |                  |
| ENSG00000213694 | S1PR3             | sphingosine-1-phosphate receptor 3 [Source:HGNC Symbol;Acc:HGNC:3167]                        | protein coding | 0.68                                        |                | 4.71                         | 17.86                           | 0.00    | 0.00 |                  |
| ENSG00000103196 | CRISPLD2          | cysteine rich secretory protein LCCL domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25248] | protein coding | 0.68                                        |                | 6.22                         | 20.96                           | 0.00    | 0.00 |                  |
| ENSG00000146070 | PLA2G7            | phospholipase A2 group VII [Source:HGNC Symbol;Acc:HGNC:9040]                                | protein coding | 0.68                                        |                | 4.39                         | 13.11                           | 0.00    | 0.01 |                  |
| ENSG00000121858 | TNFSF10           | tumor necrosis factor superfamily member 10 [Source:HGNC Symbol;Acc:HGNC:11925]              | protein coding | 0.67                                        |                | 7.71                         | 23.30                           | 0.00    | 0.00 |                  |
| ENSG00000235568 | NFAM1             | NFAT activating protein with ITAM motif 1 [Source:HGNC Symbol;Acc:HGNC:29872]                | protein coding | 0.67                                        |                | 7.91                         | 31.36                           | 0.00    | 0.00 |                  |
| ENSG00000197122 | SRC               | SRC proto-oncogene, non-receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:11283]         | protein coding | 0.67                                        |                | 5.43                         | 27.22                           | 0.00    | 0.00 |                  |
| ENSG00000198814 | GK                | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                           | protein coding | 0.67                                        |                | 4.39                         | 18.14                           | 0.00    | 0.00 |                  |
| ENSG00000134326 | CMPK2             | cytidine/uridine monophosphate kinase 2 [Source:HGNC Symbol;Acc:HGNC:27015]                  | protein coding | 0.67                                        |                | 4.51                         | 14.58                           | 0.00    | 0.01 |                  |
| ENSG00000116711 | PLA2G4A           | phospholipase A2 group IVA [Source:HGNC Symbol;Acc:HGNC:9035]                                | protein coding | 0.66                                        |                | 3.08                         | 15.55                           | 0.00    | 0.00 |                  |
| ENSG00000188906 | LRRK2             | leucine rich repeat kinase 2 [Source:HGNC Symbol;Acc:HGNC:18618]                             | protein coding | 0.66                                        |                | 8.22                         | 19.62                           | 0.00    | 0.00 |                  |
| ENSG00000138496 | PARP9             | poly(ADP-ribose) polymerase family member 9 [Source:HGNC Symbol;Acc:HGNC:24118]              | protein coding | 0.66                                        |                | 7.25                         | 31.80                           | 0.00    | 0.00 |                  |
| ENSG00000165092 | ALDH1A1           | aldehyde dehydrogenase 1 family member A1 [Source:HGNC Symbol;Acc:HGNC:402]                  | protein coding | 0.66                                        |                | 5.68                         | 15.97                           | 0.00    | 0.00 |                  |
| ENSG00000204388 | HSPA1B            | heat shock protein family A (Hsp70) member 1B [Source:HGNC Symbol;Acc:HGNC:5233]             | protein coding | 0.66                                        |                | 2.84                         | 10.70                           | 0.00    | 0.02 |                  |
| ENSG00000145685 | LHFPL2            | lipoma HMGIC fusion partner-like 2 [Source:HGNC Symbol;Acc:HGNC:6588]                        | protein coding | 0.65                                        |                | 4.87                         | 15.20                           | 0.00    | 0.00 |                  |
| ENSG00000137441 | FGFBP2            | fibroblast growth factor binding protein 2 [Source:HGNC Symbol;Acc:HGNC:29451]               | protein coding | -0.65                                       |                | 6.37                         | 19.40                           | 0.00    | 0.00 |                  |
| ENSG00000163823 | CCR1              | C-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1602]                            | protein coding | 0.65                                        |                | 6.70                         | 23.59                           | 0.00    | 0.00 |                  |
| ENSG00000180113 | TDRD6             | tudor domain containing 6 [Source:HGNC Symbol;Acc:HGNC:21339]                                | protein coding | 0.65                                        |                | 2.44                         | 9.13                            | 0.00    | 0.04 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                         | Gene Type                           | Log <sub>2</sub> Change<br>1 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000149573 | MPZL2             | myelin protein zero like 2 [Source:HGNC Symbol;Acc:HGNC:3496]                                    | protein coding                      | 0.65                                           |                      | 3.73                               | 24.20                                    | 0.00    | 0.00 |                           |
| ENSG00000143226 | FCGR2A            | Fc fragment of IgG receptor IIa [Source:HGNC Symbol;Acc:HGNC:3616]                               | protein coding                      | 0.65                                           |                      | 7.13                               | 22.59                                    | 0.00    | 0.00 |                           |
| ENSG00000166527 | CLEC4D            | C-type lectin domain family 4 member D [Source:HGNC Symbol;Acc:HGNC:14554]                       | protein coding                      | 0.64                                           |                      | 4.46                               | 14.67                                    | 0.00    | 0.01 |                           |
| ENSG00000105967 | TFEC              | transcription factor EC [Source:HGNC Symbol;Acc:HGNC:11754]                                      | protein coding                      | 0.64                                           |                      | 6.36                               | 25.85                                    | 0.00    | 0.00 |                           |
| ENSG00000226091 | LINC00937         | long intergenic non-protein coding RNA 937 [Source:HGNC Symbol;Acc:HGNC:48629]                   | lincRNA                             | 0.64                                           |                      | 4.19                               | 17.57                                    | 0.00    | 0.00 |                           |
| ENSG00000137959 | IFI44L            | interferon induced protein 44 like [Source:HGNC Symbol;Acc:HGNC:17817]                           | protein coding                      | 0.64                                           |                      | 6.04                               | 22.51                                    | 0.00    | 0.00 |                           |
| ENSG00000166002 | SMCO4             | single-pass membrane protein with coiled-coil domains 4 [Source:HGNC Symbol;Acc:HGNC:24810]      | protein coding                      | 0.63                                           |                      | 4.43                               | 18.27                                    | 0.00    | 0.00 |                           |
| ENSG00000103313 | MEFV              | Mediterranean fever [Source:HGNC Symbol;Acc:HGNC:6998]                                           | protein coding                      | 0.63                                           |                      | 7.09                               | 26.47                                    | 0.00    | 0.00 |                           |
| ENSG00000164023 | SGMS2             | sphingomyelin synthase 2 [Source:HGNC Symbol;Acc:HGNC:28395]                                     | protein coding                      | 0.63                                           |                      | 5.09                               | 16.42                                    | 0.00    | 0.00 |                           |
| ENSG00000185215 | TNFAIP2           | TNF alpha induced protein 2 [Source:HGNC Symbol;Acc:HGNC:11895]                                  | protein coding                      | 0.63                                           |                      | 9.04                               | 24.74                                    | 0.00    | 0.00 |                           |
| ENSG00000139318 | DUSP6             | dual specificity phosphatase 6 [Source:HGNC Symbol;Acc:HGNC:3072]                                | protein coding                      | 0.63                                           |                      | 8.04                               | 23.09                                    | 0.00    | 0.00 |                           |
| ENSG00000171051 | FPR1              | formyl peptide receptor 1 [Source:HGNC Symbol;Acc:HGNC:3826]                                     | protein coding                      | 0.63                                           |                      | 7.73                               | 21.34                                    | 0.00    | 0.00 |                           |
| ENSG00000229754 | CXCR2P1           | C-X-C motif chemokine receptor 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:6028]                 | transcribed unprocessed pseudo-gene | 0.62                                           |                      | 4.73                               | 13.47                                    | 0.00    | 0.01 |                           |
| ENSG00000170458 | CD14              | CD14 molecule [Source:HGNC Symbol;Acc:HGNC:1628]                                                 | protein coding                      | 0.62                                           |                      | 8.62                               | 20.43                                    | 0.00    | 0.00 |                           |
| ENSG00000180061 | TMEM150B          | transmembrane protein 150B [Source:HGNC Symbol;Acc:HGNC:34415]                                   | protein coding                      | 0.62                                           |                      | 3.55                               | 18.36                                    | 0.00    | 0.00 |                           |
| ENSG00000188820 | FAM26F            | family with sequence similarity 26 member F [Source:HGNC Symbol;Acc:HGNC:33391]                  | protein coding                      | 0.62                                           |                      | 4.51                               | 9.17                                     | 0.00    | 0.04 |                           |
| ENSG00000111331 | OAS3              | 2'-5'-oligoadenylate synthetase 3 [Source:HGNC Symbol;Acc:HGNC:8088]                             | protein coding                      | 0.62                                           |                      | 7.19                               | 29.97                                    | 0.00    | 0.00 |                           |
| ENSG00000248996 |                   |                                                                                                  | antisense                           | 0.62                                           |                      | 2.70                               | 11.45                                    | 0.00    | 0.02 |                           |
| ENSG00000183019 | MCEMP1            | mast cell expressed membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:27291]                       | protein coding                      | 0.62                                           |                      | 3.97                               | 16.35                                    | 0.00    | 0.00 |                           |
| ENSG00000187840 | EIF4EBP1          | eukaryotic translation initiation factor 4E binding protein 1 [Source:HGNC Symbol;Acc:HGNC:3288] | protein coding                      | 0.62                                           |                      | 3.84                               | 15.39                                    | 0.00    | 0.00 |                           |
| ENSG00000180340 | FZD2              | frizzled class receptor 2 [Source:HGNC Symbol;Acc:HGNC:4040]                                     | protein coding                      | 0.62                                           |                      | 3.00                               | 10.11                                    | 0.00    | 0.03 |                           |
| ENSG00000088826 | SMOX              | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                             | protein coding                      | 0.62                                           |                      | 2.93                               | 11.93                                    | 0.00    | 0.02 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                                                  | Gene Type      | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000197057 | DTHD1             | death domain containing 1 [Source:HGNC Symbol;Acc:HGNC:37261]                                                             | protein coding | -0.62                                    |                | 3.90                         | 12.34                           | 0.00    | 0.01 |                  |
| ENSG00000136689 | IL1RN             | interleukin 1 receptor antagonist [Source:HGNC Symbol;Acc:HGNC:6000]                                                      | protein coding | 0.61                                     |                | 4.94                         | 15.26                           | 0.00    | 0.00 |                  |
| ENSG00000114450 | GNB4              | G protein subunit beta 4 [Source:HGNC Symbol;Acc:HGNC:20731]                                                              | protein coding | 0.61                                     |                | 5.90                         | 38.21                           | 0.00    | 0.00 |                  |
| ENSG00000082397 | EPB41L3           | erythrocyte membrane protein band 4.1 like 3 [Source:HGNC Symbol;Acc:HGNC:3380]                                           | protein coding | 0.61                                     |                | 6.15                         | 25.43                           | 0.00    | 0.00 |                  |
| ENSG00000167633 | KIR3DL1           | killer cell immunoglobulin like receptor, three Ig domains and long cytoplasmic tail 1 [Source:HGNC Symbol;Acc:HGNC:6338] | protein coding | -0.61                                    |                | 2.85                         | 9.16                            | 0.00    | 0.04 |                  |
| ENSG00000140749 | IGSF6             | immunoglobulin superfamily member 6 [Source:HGNC Symbol;Acc:HGNC:5953]                                                    | protein coding | 0.61                                     |                | 6.97                         | 17.39                           | 0.00    | 0.00 |                  |
| ENSG00000205730 | ITPRIPL2          | inositol 1,4,5-trisphosphate receptor interacting protein like 2 [Source:HGNC Symbol;Acc:HGNC:27257]                      | protein coding | 0.61                                     |                | 4.58                         | 30.15                           | 0.00    | 0.00 |                  |
| ENSG00000133106 | EPSTI1            | epithelial stromal interaction 1 [Source:HGNC Symbol;Acc:HGNC:16465]                                                      | protein coding | 0.61                                     |                | 5.86                         | 27.87                           | 0.00    | 0.00 |                  |
| ENSG00000185745 | IFIT1             | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407]                            | protein coding | 0.61                                     |                | 4.52                         | 12.62                           | 0.00    | 0.01 |                  |
| ENSG00000117281 | CD160             | CD160 molecule [Source:HGNC Symbol;Acc:HGNC:17013]                                                                        | protein coding | -0.61                                    |                | 4.67                         | 14.87                           | 0.00    | 0.01 |                  |
| ENSG00000254415 | SIGLEC14          | sialic acid binding Ig like lectin 14 [Source:HGNC Symbol;Acc:HGNC:32926]                                                 | protein coding | 0.61                                     |                | 5.92                         | 20.51                           | 0.00    | 0.00 |                  |
| ENSG00000038945 | MSR1              | macrophage scavenger receptor 1 [Source:HGNC Symbol;Acc:HGNC:7376]                                                        | protein coding | 0.60                                     |                | 3.32                         | 15.95                           | 0.00    | 0.00 |                  |
| ENSG00000186407 | CD300E            | CD300e molecule [Source:HGNC Symbol;Acc:HGNC:28874]                                                                       | protein coding | 0.60                                     |                | 7.94                         | 21.98                           | 0.00    | 0.00 |                  |
| ENSG00000128283 | CDC42EP1          | CDC42 effector protein 1 [Source:HGNC Symbol;Acc:HGNC:17014]                                                              | protein coding | 0.60                                     |                | 2.96                         | 10.06                           | 0.00    | 0.03 |                  |
| ENSG00000146592 | CREB5             | cAMP responsive element binding protein 5 [Source:HGNC Symbol;Acc:HGNC:16844]                                             | protein coding | 0.60                                     |                | 6.18                         | 20.79                           | 0.00    | 0.00 |                  |
| ENSG00000136630 | HLX               | H2.0 like homeobox [Source:HGNC Symbol;Acc:HGNC:4978]                                                                     | protein coding | 0.60                                     |                | 3.42                         | 15.13                           | 0.00    | 0.00 |                  |
| ENSG00000110318 | CEP126            | centrosomal protein 126 [Source:HGNC Symbol;Acc:HGNC:29264]                                                               | protein coding | -0.60                                    |                | 3.29                         | 10.88                           | 0.00    | 0.02 |                  |
| ENSG00000242732 | RGAG4             | retrotransposon gag domain containing 4 [Source:HGNC Symbol;Acc:HGNC:29430]                                               | protein coding | 0.60                                     |                | 3.09                         | 9.07                            | 0.00    | 0.04 |                  |
| ENSG00000114853 | ZBTB47            | zinc finger and BTB domain containing 47 [Source:HGNC Symbol;Acc:HGNC:26955]                                              | protein coding | 0.59                                     |                | 3.31                         | 15.53                           | 0.00    | 0.00 |                  |
| ENSG00000187118 | CMC1              | C-X9-C motif containing 1 [Source:HGNC Symbol;Acc:HGNC:28783]                                                             | protein coding | -0.59                                    |                | 5.01                         | 20.52                           | 0.00    | 0.00 |                  |
| ENSG00000121807 | CCR2              | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                                                         | protein coding | 0.59                                     |                | 8.01                         | 23.95                           | 0.00    | 0.00 |                  |
| ENSG00000115919 | KYNU              | kynureninase [Source:HGNC Symbol;Acc:HGNC:6469]                                                                           | protein coding | 0.59                                     |                | 5.35                         | 19.51                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                              | Gene Type      | Log <sub>2</sub> Change 1 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|-----------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000150687 | PRSS23            | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]               | protein coding | -0.59                                    |                | 4.81                         | 17.05                           | 0.00    | 0.00                 |
| ENSG00000198736 | MSRB1             | methionine sulfoxide reductase B1 [Source:HGNC Symbol;Acc:HGNC:14133] | protein coding | 0.59                                     |                | 5.95                         | 32.48                           | 0.00    | 0.00                 |
| ENSG00000197208 | SLC22A4           | solute carrier family 22 member 4 [Source:HGNC Symbol;Acc:HGNC:10968] | protein coding | 0.59                                     |                | 2.30                         | 9.24                            | 0.00    | 0.04                 |
| ENSG00000143382 | ADAMTSL4          | ADAMTS like 4 [Source:HGNC Symbol;Acc:HGNC:19706]                     | protein coding | 0.59                                     |                | 5.62                         | 16.41                           | 0.00    | 0.00                 |

**Table 17:** Genes differentially expressed at Day 1 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 1 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type                | Log <sub>2</sub> Change 2 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|--------------------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|----------------------|
| ENSG00000122786 | CALD1             | caldesmon 1 [Source:HGNC Symbol;Acc:HGNC:1441]                                            | protein coding           | 1.43                                     |                | 1.58                         | 17.71                           | 0.00    | 0.00                 |
| ENSG00000177324 | BEND2             | BEN domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28509]                               | protein coding           | 1.26                                     |                | 2.43                         | 44.85                           | 0.00    | 0.00                 |
| ENSG00000101335 | MYL9              | myosin light chain 9 [Source:HGNC Symbol;Acc:HGNC:15754]                                  | protein coding           | 1.23                                     |                | 4.00                         | 88.66                           | 0.00    | 0.00                 |
| ENSG00000004799 | PK4               | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                        | protein coding           | 1.22                                     |                | 4.97                         | 67.35                           | 0.00    | 0.00                 |
| ENSG00000236304 | PDZK1IP1          | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                           | antisense protein coding | 1.15                                     |                | 3.16                         | 44.73                           | 0.00    | 0.00                 |
| ENSG00000162366 | PDZK1IP1          | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                           | protein coding           | 1.15                                     |                | 1.39                         | 13.72                           | 0.00    | 0.02                 |
| ENSG00000163430 | FSTL1             | folliculin like 1 [Source:HGNC Symbol;Acc:HGNC:3972]                                      | protein coding           | 1.10                                     |                | 1.87                         | 19.62                           | 0.00    | 0.00                 |
| ENSG00000149131 | SERPING1          | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                               | protein coding           | 1.10                                     |                | 3.08                         | 28.33                           | 0.00    | 0.00                 |
| ENSG00000088826 | SMOX              | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                      | protein coding           | 1.06                                     |                | 3.19                         | 40.32                           | 0.00    | 0.00                 |
| ENSG00000171611 | PTCRA             | pre T-cell antigen receptor alpha [Source:HGNC Symbol;Acc:HGNC:21290]                     | protein coding           | 1.02                                     |                | 1.95                         | 21.37                           | 0.00    | 0.00                 |
| ENSG00000163737 | PF4               | platelet factor 4 [Source:HGNC Symbol;Acc:HGNC:8861]                                      | protein coding           | 1.02                                     |                | 4.68                         | 54.57                           | 0.00    | 0.00                 |
| ENSG00000184702 | SEPT5             | septin 5 [Source:HGNC Symbol;Acc:HGNC:9164]                                               | protein coding           | 1.00                                     |                | 3.41                         | 28.28                           | 0.00    | 0.00                 |
| ENSG00000161911 | TREML1            | triggering receptor expressed on myeloid cells like 1 [Source:HGNC Symbol;Acc:HGNC:20434] | protein coding           | 0.98                                     |                | 3.73                         | 47.92                           | 0.00    | 0.00                 |
| ENSG00000196787 | HIST1H2AG         | histone cluster 1 H2A family member g [Source:HGNC Symbol;Acc:HGNC:4737]                  | protein coding           | 0.98                                     |                | 2.15                         | 18.55                           | 0.00    | 0.00                 |
| ENSG00000120885 | CLU               | clusterin [Source:HGNC Symbol;Acc:HGNC:2095]                                              | protein coding           | 0.97                                     |                | 6.04                         | 64.05                           | 0.00    | 0.00                 |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type      | Log <sub>2</sub> Change 2 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000163735 | CXCL5             | C-X-C motif chemokine ligand 5 [Source:HGNC Symbol;Acc:HGNC:10642]                        | protein coding | 0.97                                     |                | 3.27                         | 26.07                           | 0.00    | 0.00 |                  |
| ENSG00000088726 | TMEM40            | transmembrane protein 40 [Source:HGNC Symbol;Acc:HGNC:25620]                              | protein coding | 0.97                                     |                | 2.40                         | 17.75                           | 0.00    | 0.00 |                  |
| ENSG00000278828 | HIST1H3H          | histone cluster 1 H3 family member h [Source:HGNC Symbol;Acc:HGNC:4775]                   | protein coding | 0.96                                     |                | 3.71                         | 20.67                           | 0.00    | 0.00 |                  |
| ENSG00000168062 | BATF2             | basic leucine zipper ATF-like transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:25163]  | protein coding | 0.94                                     |                | 1.74                         | 11.46                           | 0.00    | 0.04 |                  |
| ENSG00000005961 | ITGA2B            | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]                              | protein coding | 0.94                                     |                | 5.59                         | 61.50                           | 0.00    | 0.00 |                  |
| ENSG00000101162 | TUBB1             | tubulin beta 1 class VI [Source:HGNC Symbol;Acc:HGNC:16257]                               | protein coding | 0.93                                     |                | 6.84                         | 66.73                           | 0.00    | 0.00 |                  |
| ENSG00000085733 | CTTN              | cortactin [Source:HGNC Symbol;Acc:HGNC:3338]                                              | protein coding | 0.92                                     |                | 3.56                         | 48.87                           | 0.00    | 0.00 |                  |
| ENSG00000205309 | NT5M              | 5',3'-nucleotidase, mitochondrial [Source:HGNC Symbol;Acc:HGNC:15769]                     | protein coding | 0.91                                     |                | 2.07                         | 17.86                           | 0.00    | 0.00 |                  |
| ENSG00000113140 | SPARC             | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]             | protein coding | 0.91                                     |                | 6.45                         | 67.20                           | 0.00    | 0.00 |                  |
| ENSG00000156265 | MAP3K7CL          | MAP3K7 C-terminal like [Source:HGNC Symbol;Acc:HGNC:16457]                                | protein coding | 0.91                                     |                | 5.76                         | 34.02                           | 0.00    | 0.00 |                  |
| ENSG00000082781 | ITGB5             | integrin subunit beta 5 [Source:HGNC Symbol;Acc:HGNC:6160]                                | protein coding | 0.89                                     |                | 3.67                         | 42.31                           | 0.00    | 0.00 |                  |
| ENSG00000151023 | ENKUR             | enkurin, TRPC channel interacting protein [Source:HGNC Symbol;Acc:HGNC:28388]             | protein coding | 0.88                                     |                | 2.52                         | 21.13                           | 0.00    | 0.00 |                  |
| ENSG00000180573 | HIST1H2AC         | histone cluster 1 H2A family member c [Source:HGNC Symbol;Acc:HGNC:4733]                  | protein coding | 0.87                                     |                | 5.96                         | 39.12                           | 0.00    | 0.00 |                  |
| ENSG00000168497 | SDPR              | serum deprivation response [Source:HGNC Symbol;Acc:HGNC:10690]                            | protein coding | 0.87                                     |                | 6.50                         | 41.65                           | 0.00    | 0.00 |                  |
| ENSG00000184678 | HIST2H2BE         | histone cluster 2 H2B family member e [Source:HGNC Symbol;Acc:HGNC:4760]                  | protein coding | 0.87                                     |                | 4.58                         | 24.47                           | 0.00    | 0.00 |                  |
| ENSG00000163736 | PPBP              | pro-platelet basic protein [Source:HGNC Symbol;Acc:HGNC:9240]                             | protein coding | 0.86                                     |                | 6.41                         | 48.51                           | 0.00    | 0.00 |                  |
| ENSG00000137198 | GMPR              | guanosine monophosphate reductase [Source:HGNC Symbol;Acc:HGNC:4376]                      | protein coding | 0.85                                     |                | 2.47                         | 19.28                           | 0.00    | 0.00 |                  |
| ENSG00000250334 | LINC00989         | long intergenic non-protein coding RNA 989 [Source:HGNC Symbol;Acc:HGNC:48918]            | lincRNA        | 0.85                                     |                | 2.58                         | 12.49                           | 0.00    | 0.03 |                  |
| ENSG00000154146 | NRGN              | neurogranin [Source:HGNC Symbol;Acc:HGNC:8000]                                            | protein coding | 0.84                                     |                | 6.99                         | 39.11                           | 0.00    | 0.00 |                  |
| ENSG00000169245 | CXCL10            | C-X-C motif chemokine ligand 10 [Source:HGNC Symbol;Acc:HGNC:10637]                       | protein coding | 0.83                                     |                | 1.95                         | 12.86                           | 0.00    | 0.02 |                  |
| ENSG00000173210 | ABLIM3            | actin binding LIM protein family member 3 [Source:HGNC Symbol;Acc:HGNC:29132]             | protein coding | 0.83                                     |                | 3.30                         | 28.35                           | 0.00    | 0.00 |                  |
| ENSG00000165702 | GFI1B             | growth factor independent 1B transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4238] | protein coding | 0.83                                     |                | 3.06                         | 22.02                           | 0.00    | 0.00 |                  |
| ENSG00000119862 | LGALS1            | galectin like [Source:HGNC Symbol;Acc:HGNC:25012]                                         | protein coding | 0.83                                     |                | 2.90                         | 18.68                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                         | Gene Type                           | Log <sub>2</sub> Change<br>2 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|--------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000166091 | CMTM5             | CKLF like MARVEL transmembrane domain containing 5 [Source:HGNC Symbol;Acc:HGNC:19176]           | protein coding                      | 0.81                                        |                | 2.12                         | 14.93                           | 0.00    | 0.01 |                  |
| ENSG00000140479 | PCSK6             | proprotein convertase subtilisin/kexin type 6 [Source:HGNC Symbol;Acc:HGNC:8569]                 | protein coding                      | 0.79                                        |                | 2.46                         | 16.81                           | 0.00    | 0.01 |                  |
| ENSG00000119922 | IFIT2             | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409]   | protein coding                      | 0.79                                        |                | 6.00                         | 11.79                           | 0.00    | 0.03 |                  |
| ENSG00000128266 | GNAZ              | G protein subunit alpha z [Source:HGNC Symbol;Acc:HGNC:4395]                                     | protein coding                      | 0.79                                        |                | 2.95                         | 17.02                           | 0.00    | 0.01 |                  |
| ENSG00000198478 | SH3BGR12          | SH3 domain binding glutamate rich protein like 2 [Source:HGNC Symbol;Acc:HGNC:15567]             | protein coding                      | 0.77                                        |                | 4.51                         | 22.56                           | 0.00    | 0.00 |                  |
| ENSG00000150337 | FCGR1A            | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                                | protein coding                      | 0.75                                        |                | 2.57                         | 11.47                           | 0.00    | 0.04 |                  |
| ENSG00000187800 | PEAR1             | platelet endothelial aggregation receptor 1 [Source:HGNC Symbol;Acc:HGNC:33631]                  | protein coding                      | 0.75                                        |                | 2.72                         | 14.38                           | 0.00    | 0.01 |                  |
| ENSG00000127920 | GNG11             | G protein subunit gamma 11 [Source:HGNC Symbol;Acc:HGNC:4403]                                    | protein coding                      | 0.73                                        |                | 4.52                         | 28.04                           | 0.00    | 0.00 |                  |
| ENSG00000130489 | SCO2              | SCO2, cytochrome c oxidase assembly protein [Source:HGNC Symbol;Acc:HGNC:10604]                  | protein coding                      | 0.72                                        |                | 4.19                         | 24.44                           | 0.00    | 0.00 |                  |
| ENSG00000229754 | CXCR2P1           | C-X-C motif chemokine receptor 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:6028]                 | transcribed unprocessed pseudo-gene | 0.72                                        |                | 4.77                         | 39.58                           | 0.00    | 0.00 |                  |
| ENSG00000187699 | C2orf88           | chromosome 2 open reading frame 88 [Source:HGNC Symbol;Acc:HGNC:28191]                           | protein coding                      | 0.71                                        |                | 4.64                         | 28.80                           | 0.00    | 0.00 |                  |
| ENSG00000005249 | PRKAR2B           | protein kinase cAMP-dependent type II regulatory subunit beta [Source:HGNC Symbol;Acc:HGNC:9392] | protein coding                      | 0.71                                        |                | 5.79                         | 35.96                           | 0.00    | 0.00 |                  |
| ENSG00000111644 | ACRBP             | acrosin binding protein [Source:HGNC Symbol;Acc:HGNC:17195]                                      | protein coding                      | 0.70                                        |                | 4.38                         | 32.47                           | 0.00    | 0.00 |                  |
| ENSG00000272821 |                   |                                                                                                  | antisense                           | 0.69                                        |                | 3.35                         | 18.98                           | 0.00    | 0.00 |                  |
| ENSG00000119917 | IFIT3             | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411]   | protein coding                      | 0.69                                        |                | 5.69                         | 11.09                           | 0.00    | 0.04 |                  |
| ENSG00000254614 |                   |                                                                                                  | antisense                           | 0.69                                        |                | 2.57                         | 14.65                           | 0.00    | 0.01 |                  |
| ENSG00000162512 | SDC3              | syndecan 3 [Source:HGNC Symbol;Acc:HGNC:10660]                                                   | protein coding                      | 0.69                                        |                | 2.69                         | 14.41                           | 0.00    | 0.01 |                  |
| ENSG00000143995 | MEIS1             | Meis homeobox 1 [Source:HGNC Symbol;Acc:HGNC:7000]                                               | protein coding                      | 0.69                                        |                | 2.15                         | 10.92                           | 0.00    | 0.04 |                  |
| ENSG00000164181 | ELOVL7            | ELOVL fatty acid elongase 7 [Source:HGNC Symbol;Acc:HGNC:26292]                                  | protein coding                      | 0.68                                        |                | 2.70                         | 12.72                           | 0.00    | 0.02 |                  |
| ENSG00000259207 | ITGB3             | integrin subunit beta 3 [Source:HGNC Symbol;Acc:HGNC:6156]                                       | protein coding                      | 0.68                                        |                | 4.19                         | 16.89                           | 0.00    | 0.01 |                  |
| ENSG00000011105 | TSPAN9            | tetraspanin 9 [Source:HGNC Symbol;Acc:HGNC:21640]                                                | protein coding                      | 0.68                                        |                | 2.34                         | 13.12                           | 0.00    | 0.02 |                  |
| ENSG00000065534 | MYLK              | myosin light chain kinase [Source:HGNC Symbol;Acc:HGNC:7590]                                     | protein coding                      | 0.68                                        |                | 3.70                         | 24.30                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                          | Gene Type                           | Log <sub>2</sub> Change<br>2 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000165914 | TTC7B             | tetratricopeptide repeat domain 7B [Source:HGNC Symbol;Acc:HGNC:19858]                            | protein coding                      | 0.68                                        |                | 2.80                         | 17.22                           | 0.00    | 0.01 |                  |
| ENSG00000177989 | ODF3B             | outer dense fiber of sperm tails 3B [Source:HGNC Symbol;Acc:HGNC:34388]                           | protein coding                      | 0.67                                        |                | 5.13                         | 11.32                           | 0.00    | 0.04 |                  |
| ENSG00000141574 | SECTM1            | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                                  | protein coding                      | 0.66                                        |                | 6.41                         | 26.62                           | 0.00    | 0.00 |                  |
| ENSG00000073756 | PTGS2             | prostaglandin-endoperoxide synthase 2 [Source:HGNC Symbol;Acc:HGNC:9605]                          | protein coding                      | 0.66                                        |                | 4.81                         | 21.02                           | 0.00    | 0.00 |                  |
| ENSG00000177191 | B3GNT8            | UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase 8 [Source:HGNC Symbol;Acc:HGNC:24139] | protein coding                      | 0.66                                        |                | 2.60                         | 11.05                           | 0.00    | 0.04 |                  |
| ENSG00000143878 | RHOB              | ras homolog family member B [Source:HGNC Symbol;Acc:HGNC:668]                                     | protein coding                      | 0.66                                        |                | 6.38                         | 33.98                           | 0.00    | 0.00 |                  |
| ENSG00000183779 | ZNF703            | zinc finger protein 703 [Source:HGNC Symbol;Acc:HGNC:25883]                                       | protein coding                      | 0.65                                        |                | 4.29                         | 17.25                           | 0.00    | 0.01 |                  |
| ENSG00000173372 | C1QA              | complement C1q A chain [Source:HGNC Symbol;Acc:HGNC:1241]                                         | protein coding                      | 0.65                                        |                | 2.69                         | 10.75                           | 0.00    | 0.05 |                  |
| ENSG00000149564 | ESAM              | endothelial cell adhesion molecule [Source:HGNC Symbol;Acc:HGNC:17474]                            | protein coding                      | 0.65                                        |                | 2.91                         | 12.52                           | 0.00    | 0.03 |                  |
| ENSG00000073737 | DHRS9             | dehydrogenase/reductase 9 [Source:HGNC Symbol;Acc:HGNC:16888]                                     | protein coding                      | 0.64                                        |                | 2.94                         | 15.04                           | 0.00    | 0.01 |                  |
| ENSG00000182487 | NCF1B             | neutrophil cytosolic factor 1B pseudogene [Source:HGNC Symbol;Acc:HGNC:32522]                     | transcribed unprocessed pseudo-gene | 0.64                                        |                | 4.10                         | 16.27                           | 0.00    | 0.01 |                  |
| ENSG00000104267 | CA2               | carbonic anhydrase 2 [Source:HGNC Symbol;Acc:HGNC:1373]                                           | protein coding                      | 0.63                                        |                | 3.74                         | 15.62                           | 0.00    | 0.01 |                  |
| ENSG00000074416 | MGLL              | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                          | protein coding                      | 0.63                                        |                | 4.28                         | 18.76                           | 0.00    | 0.00 |                  |
| ENSG00000171223 | JUNB              | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205]         | protein coding                      | 0.63                                        |                | 7.47                         | 21.10                           | 0.00    | 0.00 |                  |
| ENSG00000108960 | MMD               | monocyte to macrophage differentiation associated [Source:HGNC Symbol;Acc:HGNC:7153]              | protein coding                      | 0.62                                        |                | 5.30                         | 23.47                           | 0.00    | 0.00 |                  |
| ENSG00000185340 | GAS2L1            | growth arrest specific 2 like 1 [Source:HGNC Symbol;Acc:HGNC:16955]                               | protein coding                      | 0.62                                        |                | 4.07                         | 16.73                           | 0.00    | 0.01 |                  |
| ENSG00000142089 | IFITM3            | interferon induced transmembrane protein 3 [Source:HGNC Symbol;Acc:HGNC:5414]                     | protein coding                      | 0.62                                        |                | 6.10                         | 18.71                           | 0.00    | 0.00 |                  |
| ENSG00000125148 | MT2A              | metallothionein 2A [Source:HGNC Symbol;Acc:HGNC:7406]                                             | protein coding                      | 0.62                                        |                | 3.66                         | 20.28                           | 0.00    | 0.00 |                  |
| ENSG00000173110 | HSPA6             | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]                   | protein coding                      | 0.61                                        |                | 4.26                         | 11.13                           | 0.00    | 0.04 |                  |
| ENSG00000019169 | MARCO             | macrophage receptor with collagenous structure [Source:HGNC Symbol;Acc:HGNC:6895]                 | protein coding                      | 0.59                                        |                | 3.99                         | 20.55                           | 0.00    | 0.00 |                  |
| ENSG00000188305 | C19orf35          | chromosome 19 open reading frame 35 [Source:HGNC Symbol;Acc:HGNC:24793]                           | protein coding                      | 0.59                                        |                | 2.98                         | 13.23                           | 0.00    | 0.02 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                     | Gene Type      | $Log_2$ Change<br>2 vs. treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------|----------------|------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000198948 | MFAP3L            | microfibrillar associated protein 3 like [Source:HGNC Symbol;Acc:HGNC:29083] | protein coding | 0.59                               |                | 3.84                | 15.64                           | 0.00    | 0.01 |                  |
| ENSG00000204420 | C6orf25           | chromosome 6 open reading frame 25 [Source:HGNC Symbol;Acc:HGNC:13937]       | protein coding | 0.59                               |                | 4.40                | 12.84                           | 0.00    | 0.02 |                  |

**Table 18:** Genes differentially expressed at Day 2 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute  $log_2$  fold change (Day 2 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                       | Gene Type         | $Log_2$ Change<br>3 vs. treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------|-------------------|------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000197561 | ELANE             | elastase, neutrophil expressed [Source:HGNC Symbol;Acc:HGNC:3309]                              | protein coding    | 1.15                               |                | 1.17                | 14.25                           | 0.00    | 0.04 |                  |
| ENSG00000162366 | PDZK1IP1          | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                                | protein coding    | 0.99                               |                | 1.31                | 13.84                           | 0.00    | 0.04 |                  |
| ENSG00000004799 | PDK4              | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                             | protein coding    | 0.98                               |                | 4.82                | 26.85                           | 0.00    | 0.00 |                  |
| ENSG00000182782 | HCAR2             | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                          | protein coding    | 0.78                               |                | 2.11                | 14.87                           | 0.00    | 0.04 |                  |
| ENSG00000126262 | FFAR2             | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                                  | protein coding    | 0.77                               |                | 3.88                | 27.74                           | 0.00    | 0.00 |                  |
| ENSG00000260401 |                   |                                                                                                | sense overlapping | 0.75                               |                | 2.78                | 20.44                           | 0.00    | 0.00 |                  |
| ENSG00000125538 | IL1B              | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                          | protein coding    | 0.74                               |                | 3.54                | 37.47                           | 0.00    | 0.00 |                  |
| ENSG00000173535 | TNFRSF10C         | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                        | protein coding    | 0.73                               |                | 4.76                | 37.70                           | 0.00    | 0.00 |                  |
| ENSG00000123700 | KCNJ2             | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]        | protein coding    | 0.69                               |                | 3.52                | 30.09                           | 0.00    | 0.00 |                  |
| ENSG00000232810 | TNF               | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                      | protein coding    | 0.67                               |                | 2.65                | 21.24                           | 0.00    | 0.00 |                  |
| ENSG00000204388 | HSPA1B            | heat shock protein family A (Hsp70) member 1B [Source:HGNC Symbol;Acc:HGNC:5233]               | protein coding    | 0.66                               |                | 2.86                | 22.46                           | 0.00    | 0.00 |                  |
| ENSG00000005381 | MPO               | myeloperoxidase [Source:HGNC Symbol;Acc:HGNC:7218]                                             | protein coding    | 0.65                               |                | 3.68                | 14.21                           | 0.00    | 0.04 |                  |
| ENSG00000162551 | ALPL              | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]                      | protein coding    | 0.64                               |                | 3.69                | 19.17                           | 0.00    | 0.01 |                  |
| ENSG00000119922 | IFIT2             | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | protein coding    | 0.63                               |                | 5.76                | 18.78                           | 0.00    | 0.01 |                  |
| ENSG00000149131 | SERPING1          | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                                    | protein coding    | 0.63                               |                | 2.75                | 14.44                           | 0.00    | 0.04 |                  |
| ENSG00000088827 | SIGLEC1           | sialic acid binding Ig like lectin 1 [Source:HGNC Symbol;Acc:HGNC:11127]                       | protein coding    | 0.62                               |                | 5.12                | 25.60                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                | Gene Type      | Log <sub>2</sub> Change 3 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------|----------------|----------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000154447 | SH3RF1            | SH3 domain containing ring finger 1 [Source:HGNC Symbol;Acc:HGNC:17650] | protein coding | 0.61                                         |                | 2.80                         | 14.37                           | 0.00    | 0.04 |                  |
| ENSG00000267481 |                   |                                                                         | sense intronic | -0.60                                        |                | 2.47                         | 13.32                           | 0.00    | 0.05 |                  |
| ENSG00000005961 | ITGA2B            | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]            | protein coding | 0.59                                         |                | 5.38                         | 26.61                           | 0.00    | 0.00 |                  |

**Table 19:** Genes differentially expressed at Day 3 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute  $\log_2$  fold change (Day 3 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                         | Gene Type      | Log <sub>2</sub> Change 4 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------|----------------|----------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000150687 | PRSS23            | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]          | protein coding | -0.72                                        |                | 4.80                         | 21.38                           | 0.00    | 0.01 |                  |
| ENSG00000275302 | CCL4              | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630] | protein coding | -0.70                                        |                | 4.51                         | 21.56                           | 0.00    | 0.01 |                  |

**Table 20:** Genes differentially expressed at Day 4 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute  $\log_2$  fold change (Day 4 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type       | Log <sub>2</sub> Change 5 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|-----------------|----------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | IG C gene       | 2.26                                         |                | 9.34                         | 36.76                           | 0.00    | 0.00 |                  |
| ENSG00000211946 | IGHV3-20          | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                     | IG V gene       | 2.04                                         |                | 1.37                         | 21.27                           | 0.00    | 0.00 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudogene | 2.04                                         |                | 4.00                         | 32.08                           | 0.00    | 0.00 |                  |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                  | protein coding  | 1.77                                         |                | 2.03                         | 14.28                           | 0.00    | 0.04 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | IG V gene       | 1.74                                         |                | 4.09                         | 29.55                           | 0.00    | 0.00 |                  |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                              | protein coding  | 1.60                                         |                | 3.47                         | 24.63                           | 0.00    | 0.00 |                  |
| ENSG00000211669 | IGLV3-10          | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                    | IG V gene       | 1.48                                         |                | 2.74                         | 15.07                           | 0.00    | 0.03 |                  |
| ENSG00000211976 | IGHV3-73          | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                     | IG V gene       | 1.48                                         |                | 1.20                         | 16.99                           | 0.00    | 0.01 |                  |
| ENSG00000232216 | IGHV3-43          | immunoglobulin heavy variable 3-43 [Source:HGNC Symbol;Acc:HGNC:5604]                     | IG V gene       | 1.46                                         |                | 1.84                         | 22.21                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                           | Gene Type      | Log <sub>2</sub> Change 5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]             | protein coding | 1.44                                     |                | 3.47                         | 15.52                           | 0.00    | 0.03 |                  |
| ENSG00000211933 | IGHV6-1           | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]               | IG V gene      | 1.39                                     |                | 2.69                         | 14.30                           | 0.00    | 0.04 |                  |
| ENSG00000167900 | TK1               | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                             | protein coding | 1.30                                     |                | 2.19                         | 22.01                           | 0.00    | 0.00 |                  |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]             | IG V gene      | 1.28                                     |                | 4.54                         | 30.81                           | 0.00    | 0.00 |                  |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]              | IG V gene      | 1.25                                     |                | 3.01                         | 19.21                           | 0.00    | 0.01 |                  |
| ENSG00000211659 | IGLV3-25          | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]             | IG V gene      | 1.24                                     |                | 3.58                         | 20.90                           | 0.00    | 0.00 |                  |
| ENSG00000211967 | IGHV3-53          | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]              | IG V gene      | 1.21                                     |                | 1.81                         | 14.33                           | 0.00    | 0.04 |                  |
| ENSG00000211945 | IGHV1-18          | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]              | IG V gene      | 1.21                                     |                | 2.96                         | 33.36                           | 0.00    | 0.00 |                  |
| ENSG00000211660 | IGLV2-23          | immunoglobulin lambda variable 2-23 [Source:HGNC Symbol;Acc:HGNC:5890]             | IG V gene      | 1.21                                     |                | 3.71                         | 24.23                           | 0.00    | 0.00 |                  |
| ENSG00000171848 | RRM2              | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452] | protein coding | 1.16                                     |                | 3.78                         | 19.73                           | 0.00    | 0.01 |                  |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]   | protein coding | 1.15                                     |                | 5.28                         | 14.50                           | 0.00    | 0.04 |                  |
| ENSG00000254709 | IGLL5             | immunoglobulin lambda like polypeptide 5 [Source:HGNC Symbol;Acc:HGNC:38476]       | protein coding | 1.12                                     |                | 2.09                         | 15.87                           | 0.00    | 0.02 |                  |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                | protein coding | 0.91                                     |                | 3.08                         | 13.82                           | 0.00    | 0.05 |                  |
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                      | protein coding | 0.88                                     |                | 5.81                         | 44.28                           | 0.00    | 0.00 |                  |
| ENSG00000148773 | MKI67             | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                   | protein coding | 0.85                                     |                | 4.98                         | 20.95                           | 0.00    | 0.00 |                  |
| ENSG00000244437 | IGKV3-15          | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]              | IG V gene      | 0.85                                     |                | 3.77                         | 18.42                           | 0.00    | 0.01 |                  |
| ENSG00000211962 | IGHV1-46          | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]              | IG V gene      | 0.84                                     |                | 2.66                         | 22.01                           | 0.00    | 0.00 |                  |
| ENSG00000278196 | IGLV2-8           | immunoglobulin lambda variable 2-8 [Source:HGNC Symbol;Acc:HGNC:5895]              | IG V gene      | 0.84                                     |                | 3.28                         | 15.91                           | 0.00    | 0.02 |                  |
| ENSG00000206172 | HBA1              | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                      | protein coding | 0.82                                     |                | 4.73                         | 22.32                           | 0.00    | 0.00 |                  |
| ENSG00000239951 | IGKV3-20          | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]              | IG V gene      | 0.80                                     |                | 4.67                         | 21.07                           | 0.00    | 0.00 |                  |
| ENSG00000211934 | IGHV1-2           | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]               | IG V gene      | 0.80                                     |                | 2.82                         | 13.85                           | 0.00    | 0.05 |                  |
| ENSG00000162551 | ALPL              | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]          | protein coding | 0.77                                     |                | 3.77                         | 26.72                           | 0.00    | 0.00 |                  |
| ENSG00000173535 | TNFRSF10C         | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]            | protein coding | 0.75                                     |                | 4.75                         | 34.44                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change 5 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000211966 | IGHV5-51          | immunoglobulin heavy variable 5-51 [Source:HGNC Symbol;Acc:HGNC:5659]                 | IG V gene      | 0.73                                     |                | 3.59                         | 13.83                           | 0.00    | 0.05 |                  |
| ENSG00000138160 | KIF11             | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                           | protein coding | 0.72                                     |                | 3.19                         | 16.58                           | 0.00    | 0.02 |                  |
| ENSG00000211893 | IGHG2             | immunoglobulin heavy constant gamma 2 (G2m marker) [Source:HGNC Symbol;Acc:HGNC:5526] | IG C gene      | 0.68                                     |                | 5.86                         | 17.02                           | 0.00    | 0.01 |                  |
| ENSG00000133048 | CHI3L1            | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                 | protein coding | 0.66                                     |                | 3.43                         | 14.48                           | 0.00    | 0.04 |                  |
| ENSG00000124772 | CPNE5             | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                           | protein coding | 0.65                                     |                | 4.67                         | 17.81                           | 0.00    | 0.01 |                  |
| ENSG00000186529 | CYP4F3            | cytochrome P450 family 4 subfamily F member 3 [Source:HGNC Symbol;Acc:HGNC:2646]      | protein coding | 0.64                                     |                | 4.14                         | 17.14                           | 0.00    | 0.01 |                  |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                            | protein coding | 0.63                                     |                | 9.51                         | 22.66                           | 0.00    | 0.00 |                  |
| ENSG00000162747 | FCGR3B            | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                   | protein coding | 0.61                                     |                | 6.90                         | 17.59                           | 0.00    | 0.01 |                  |
| ENSG00000239839 | DEFA3             | defensin alpha 3 [Source:HGNC Symbol;Acc:HGNC:2762]                                   | protein coding | 0.61                                     |                | 4.25                         | 13.92                           | 0.00    | 0.05 |                  |
| ENSG00000163464 | CXCR1             | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                   | protein coding | 0.60                                     |                | 5.62                         | 18.57                           | 0.00    | 0.01 |                  |

**Table 21:** Genes differentially expressed at Day 5 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 5 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type       | Log <sub>2</sub> Change 6 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|-----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000253822 | IGLV3-24          | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]       | IG V pseudogene | 7.22                                     |                | 0.44                         | 36.91                           | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | IG C gene       | 2.96                                     |                | 9.53                         | 106.80                          | 0.00    | 0.00 |                  |
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                      | IG V gene       | 2.92                                     |                | 6.49                         | 36.04                           | 0.00    | 0.00 |                  |
| ENSG00000253818 | IGLV1-41          | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]       | IG V pseudogene | 2.65                                     |                | 2.01                         | 27.02                           | 0.00    | 0.00 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | IG V gene       | 2.63                                     |                | 5.16                         | 40.05                           | 0.00    | 0.00 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudogene | 2.61                                     |                | 4.15                         | 100.90                          | 0.00    | 0.00 |                  |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | protein coding  | 2.43                                     |                | 0.85                         | 23.81                           | 0.00    | 0.00 |                  |
| ENSG00000211651 | IGLV1-44          | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                    | IG V gene       | 2.35                                     |                | 4.73                         | 20.12                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type             | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold<br>(Day pre- | Average<br>Log <sub>2</sub> CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------|-------------------|---------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                               | protein coding        | 2.32                                        |                   | 1.31                            | 24.15                                    | 0.00    | 0.00 |                           |
| ENSG00000239975 | IGKV1D-33         | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                      | IG V gene             | 2.20                                        |                   | 0.92                            | 14.69                                    | 0.00    | 0.02 |                           |
| ENSG00000271178 | IGHV3OR16-13      | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | IG V gene             | 2.16                                        |                   | 0.83                            | 19.50                                    | 0.00    | 0.00 |                           |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                      | IG V gene             | 2.06                                        |                   | 4.98                            | 82.26                                    | 0.00    | 0.00 |                           |
| ENSG00000243238 | IGKV2-30          | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                       | IG V gene             | 2.05                                        |                   | 2.69                            | 27.95                                    | 0.00    | 0.00 |                           |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                    | protein coding        | 2.05                                        |                   | 2.01                            | 41.45                                    | 0.00    | 0.00 |                           |
| ENSG00000280411 | IGHV1-69-2        | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                     | IG V gene             | 2.03                                        |                   | 2.39                            | 38.09                                    | 0.00    | 0.00 |                           |
| ENSG00000242076 | IGKV1-33          | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                       | IG V gene             | 1.98                                        |                   | 1.60                            | 17.28                                    | 0.00    | 0.00 |                           |
| ENSG00000211644 | IGLV1-51          | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                      | IG V gene             | 1.95                                        |                   | 3.93                            | 18.23                                    | 0.00    | 0.00 |                           |
| ENSG00000211659 | IGLV3-25          | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                      | IG V gene             | 1.95                                        |                   | 4.09                            | 58.45                                    | 0.00    | 0.00 |                           |
| ENSG00000211648 | IGLV1-47          | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                      | IG V gene             | 1.93                                        |                   | 3.91                            | 19.79                                    | 0.00    | 0.00 |                           |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                         | IG C gene             | 1.88                                        |                   | 6.95                            | 42.51                                    | 0.00    | 0.00 |                           |
| ENSG00000211967 | IGHV3-53          | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                       | IG V gene             | 1.86                                        |                   | 2.24                            | 70.10                                    | 0.00    | 0.00 |                           |
| ENSG00000211972 | IGHV3-66          | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                       | IG V gene             | 1.83                                        |                   | 1.28                            | 27.73                                    | 0.00    | 0.00 |                           |
| ENSG00000197476 |                   |                                                                                             | processed pseudo-gene | 1.81                                        |                   | 0.87                            | 15.36                                    | 0.00    | 0.01 |                           |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                      | protein coding        | 1.80                                        |                   | 3.32                            | 94.77                                    | 0.00    | 0.00 |                           |
| ENSG00000253451 | IGLV2-28          | immunoglobulin lambda variable 2-28 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5891]         | IG V pseudo-gene      | 1.72                                        |                   | 2.22                            | 19.58                                    | 0.00    | 0.00 |                           |
| ENSG00000211897 | IGHG3             | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]       | IG C gene             | 1.71                                        |                   | 6.03                            | 59.05                                    | 0.00    | 0.00 |                           |
| ENSG00000211933 | IGHV6-1           | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                        | IG V gene             | 1.70                                        |                   | 2.85                            | 41.79                                    | 0.00    | 0.00 |                           |
| ENSG00000211685 | IGLC7             | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                         | IG C gene             | 1.69                                        |                   | 1.33                            | 16.84                                    | 0.00    | 0.01 |                           |
| ENSG00000211652 | IGLV7-43          | immunoglobulin lambda variable 7-43 [Source:HGNC Symbol;Acc:HGNC:5929]                      | IG V gene             | 1.65                                        |                   | 2.62                            | 15.70                                    | 0.00    | 0.01 |                           |
| ENSG00000241755 | IGKV1-9           | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                        | IG V gene             | 1.65                                        |                   | 2.76                            | 19.22                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type        | Log <sub>2</sub> Change<br>6 vs. treatment) | Fold (Day pre-) | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|------------------|---------------------------------------------|-----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000254395 | IGHV4-55          | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]       | IG V pseudo-gene | 1.64                                        |                 | 0.87                         | 13.94                           | 0.00    | 0.02 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                    | IG V gene        | 1.61                                        |                 | 4.65                         | 105.27                          | 0.00    | 0.00 |                  |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                    | IG V gene        | 1.60                                        |                 | 3.30                         | 51.84                           | 0.00    | 0.00 |                  |
| ENSG00000211955 | IGHV3-33          | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                    | IG V gene        | 1.59                                        |                 | 2.38                         | 23.05                           | 0.00    | 0.00 |                  |
| ENSG00000224650 | IGHV3-74          | immunoglobulin heavy variable 3-74 [Source:HGNC Symbol;Acc:HGNC:5624]                    | IG V gene        | 1.58                                        |                 | 3.53                         | 20.58                           | 0.00    | 0.00 |                  |
| ENSG00000211976 | IGHV3-73          | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                    | IG V gene        | 1.58                                        |                 | 1.18                         | 25.25                           | 0.00    | 0.00 |                  |
| ENSG00000241294 | IGKV2-24          | immunoglobulin kappa variable 2-24 [Source:HGNC Symbol;Acc:HGNC:5781]                    | IG V gene        | 1.56                                        |                 | 2.15                         | 13.84                           | 0.00    | 0.02 |                  |
| ENSG00000239264 | TXNDC5            | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                      | protein coding   | 1.49                                        |                 | 2.63                         | 37.15                           | 0.00    | 0.00 |                  |
| ENSG00000211679 | IGLC3             | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]    | IG C gene        | 1.48                                        |                 | 6.05                         | 46.32                           | 0.00    | 0.00 |                  |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]         | protein coding   | 1.48                                        |                 | 5.28                         | 59.80                           | 0.00    | 0.00 |                  |
| ENSG00000211649 | IGLV7-46          | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930] | IG V gene        | 1.47                                        |                 | 1.72                         | 21.44                           | 0.00    | 0.00 |                  |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                    | IG V gene        | 1.43                                        |                 | 4.28                         | 47.53                           | 0.00    | 0.00 |                  |
| ENSG00000211669 | IGLV3-10          | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                   | IG V gene        | 1.43                                        |                 | 2.71                         | 30.81                           | 0.00    | 0.00 |                  |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]               | protein coding   | 1.42                                        |                 | 8.45                         | 26.33                           | 0.00    | 0.00 |                  |
| ENSG00000251546 | IGKV1D-39         | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                   | IG V gene        | 1.42                                        |                 | 1.00                         | 16.45                           | 0.00    | 0.01 |                  |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                             | protein coding   | 1.41                                        |                 | 3.19                         | 70.95                           | 0.00    | 0.00 |                  |
| ENSG00000242371 | IGKV1-39          | immunoglobulin kappa variable 1-39 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5740]  | IG V gene        | 1.39                                        |                 | 0.86                         | 15.43                           | 0.00    | 0.01 |                  |
| ENSG00000211668 | IGLV2-11          | immunoglobulin lambda variable 2-11 [Source:HGNC Symbol;Acc:HGNC:5887]                   | IG V gene        | 1.37                                        |                 | 3.80                         | 24.35                           | 0.00    | 0.00 |                  |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]    | IG C gene        | 1.36                                        |                 | 4.01                         | 27.27                           | 0.00    | 0.00 |                  |
| ENSG00000232216 | IGHV3-43          | immunoglobulin heavy variable 3-43 [Source:HGNC Symbol;Acc:HGNC:5604]                    | IG V gene        | 1.35                                        |                 | 1.62                         | 19.38                           | 0.00    | 0.00 |                  |
| ENSG00000136010 | ALDH1L2           | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]            | protein coding   | 1.31                                        |                 | 1.15                         | 14.61                           | 0.00    | 0.02 |                  |
| ENSG00000211943 | IGHV3-15          | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                    | IG V gene        | 1.27                                        |                 | 3.39                         | 23.10                           | 0.00    | 0.00 |                  |
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                    | IG V gene        | 1.21                                        |                 | 3.79                         | 25.82                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type                           | Log <sub>2</sub> Change<br>6 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000211935 | IGHV1-3           | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                     | IG V gene                           | 1.20                                           |                      | 2.69                               | 12.55                                    | 0.00    | 0.04 |                           |
| ENSG00000211941 | IGHV3-11          | immunoglobulin heavy variable 3-11 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5580] | IG V gene                           | 1.20                                           |                      | 3.08                               | 17.15                                    | 0.00    | 0.01 |                           |
| ENSG00000211947 | IGHV3-21          | immunoglobulin heavy variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5586]                    | IG V gene                           | 1.19                                           |                      | 4.04                               | 30.74                                    | 0.00    | 0.00 |                           |
| ENSG00000211592 | IGKC              | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                         | IG C gene                           | 1.19                                           |                      | 9.60                               | 46.76                                    | 0.00    | 0.00 |                           |
| ENSG00000211945 | IGHV1-18          | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                    | IG V gene                           | 1.17                                           |                      | 2.90                               | 32.06                                    | 0.00    | 0.00 |                           |
| ENSG00000211899 | IGHM              | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                      | IG C gene                           | 1.17                                           |                      | 10.22                              | 13.98                                    | 0.00    | 0.02 |                           |
| ENSG00000243466 | IGKV1-5           | immunoglobulin kappa variable 1-5 [Source:HGNC Symbol;Acc:HGNC:5741]                     | IG V gene                           | 1.16                                           |                      | 5.00                               | 23.34                                    | 0.00    | 0.00 |                           |
| ENSG00000254709 | IGLL5             | immunoglobulin lambda like polypeptide 5 [Source:HGNC Symbol;Acc:HGNC:38476]             | protein coding                      | 1.16                                           |                      | 2.05                               | 17.35                                    | 0.00    | 0.00 |                           |
| ENSG00000244575 | IGKV1-27          | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                    | IG V gene                           | 1.15                                           |                      | 2.64                               | 22.35                                    | 0.00    | 0.00 |                           |
| ENSG00000211660 | IGLV2-23          | immunoglobulin lambda variable 2-23 [Source:HGNC Symbol;Acc:HGNC:5890]                   | IG V gene                           | 1.08                                           |                      | 3.57                               | 52.43                                    | 0.00    | 0.00 |                           |
| ENSG00000282639 |                   |                                                                                          | IG V gene                           | 1.08                                           |                      | 2.01                               | 12.74                                    | 0.00    | 0.04 |                           |
| ENSG00000183508 | FAM46C            | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]          | protein coding                      | 1.07                                           |                      | 5.99                               | 25.65                                    | 0.00    | 0.00 |                           |
| ENSG00000211666 | IGLV2-14          | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                   | IG V gene                           | 1.05                                           |                      | 4.10                               | 16.05                                    | 0.00    | 0.01 |                           |
| ENSG00000239951 | IGKV3-20          | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                    | IG V gene                           | 1.02                                           |                      | 4.76                               | 44.31                                    | 0.00    | 0.00 |                           |
| ENSG00000244437 | IGKV3-15          | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                    | IG V gene                           | 1.01                                           |                      | 3.89                               | 43.40                                    | 0.00    | 0.00 |                           |
| ENSG00000211962 | IGHV1-46          | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                    | IG V gene                           | 0.98                                           |                      | 2.74                               | 22.60                                    | 0.00    | 0.00 |                           |
| ENSG00000211934 | IGHV1-2           | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]                     | IG V gene                           | 0.93                                           |                      | 2.98                               | 23.64                                    | 0.00    | 0.00 |                           |
| ENSG00000197705 | KLHL14            | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                          | protein coding                      | 0.93                                           |                      | 3.10                               | 28.68                                    | 0.00    | 0.00 |                           |
| ENSG00000278196 | IGLV2-8           | immunoglobulin lambda variable 2-8 [Source:HGNC Symbol;Acc:HGNC:5895]                    | IG V gene                           | 0.90                                           |                      | 3.33                               | 19.32                                    | 0.00    | 0.00 |                           |
| ENSG00000211959 | IGHV4-39          | immunoglobulin heavy variable 4-39 [Source:HGNC Symbol;Acc:HGNC:5651]                    | IG V gene                           | 0.88                                           |                      | 2.93                               | 15.06                                    | 0.00    | 0.01 |                           |
| ENSG00000135916 | ITM2C             | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                          | protein coding                      | 0.87                                           |                      | 6.26                               | 38.65                                    | 0.00    | 0.00 |                           |
| ENSG00000128438 | TBC1D27           | TBC1 domain family member 27 [Source:HGNC Symbol;Acc:HGNC:28104]                         | transcribed unprocessed pseudo-gene | 0.86                                           |                      | 3.24                               | 23.50                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                | Gene Type      | $\log_2$ Change<br>6 vs. pre-treatment) | Fold<br>(Day<br>pre-<br>CPM | Average<br>$\log_2$<br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|-----------------------------------------------------------------------------------------|----------------|-----------------------------------------|-----------------------------|----------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000170456 | DENND5B           | DENN domain containing 5B [Source:HGNC Symbol;Acc:HGNC:28338]                           | protein coding | 0.85                                    |                             | 4.05                       | 34.44                                    | 0.00    | 0.00 |                           |
| ENSG00000240505 | TNFRSF13B         | TNF receptor superfamily member 13B [Source:HGNC Symbol;Acc:HGNC:18153]                 | protein coding | 0.85                                    |                             | 2.98                       | 24.39                                    | 0.00    | 0.00 |                           |
| ENSG00000270550 | IGHV3-30          | immunoglobulin heavy variable 3-30 [Source:HGNC Symbol;Acc:HGNC:5591]                   | IG V gene      | 0.81                                    |                             | 3.23                       | 28.08                                    | 0.00    | 0.00 |                           |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                     | protein coding | 0.81                                    |                             | 3.03                       | 19.22                                    | 0.00    | 0.00 |                           |
| ENSG00000169679 | BUB1              | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]      | protein coding | 0.79                                    |                             | 2.54                       | 19.02                                    | 0.00    | 0.00 |                           |
| ENSG00000118985 | ELL2              | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]           | protein coding | 0.79                                    |                             | 4.94                       | 29.95                                    | 0.00    | 0.00 |                           |
| ENSG00000171241 | SHCBP1            | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                | protein coding | 0.77                                    |                             | 2.34                       | 15.31                                    | 0.00    | 0.01 |                           |
| ENSG00000282651 |                   |                                                                                         | IG V gene      | 0.76                                    |                             | 2.33                       | 12.74                                    | 0.00    | 0.04 |                           |
| ENSG00000211966 | IGHV5-51          | immunoglobulin heavy variable 5-51 [Source:HGNC Symbol;Acc:HGNC:5659]                   | IG V gene      | 0.76                                    |                             | 3.55                       | 15.39                                    | 0.00    | 0.01 |                           |
| ENSG00000177301 | KCNA2             | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220] | protein coding | 0.74                                    |                             | 2.34                       | 13.77                                    | 0.00    | 0.02 |                           |
| ENSG00000099958 | DERL3             | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                            | protein coding | 0.74                                    |                             | 4.17                       | 29.11                                    | 0.00    | 0.00 |                           |
| ENSG00000110777 | POU2AF1           | POU class 2 associating factor 1 [Source:HGNC Symbol;Acc:HGNC:9211]                     | protein coding | 0.73                                    |                             | 5.43                       | 45.79                                    | 0.00    | 0.00 |                           |
| ENSG00000171848 | RRM2              | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]      | protein coding | 0.73                                    |                             | 3.42                       | 19.19                                    | 0.00    | 0.00 |                           |
| ENSG00000124772 | CPNE5             | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                             | protein coding | 0.71                                    |                             | 4.70                       | 33.15                                    | 0.00    | 0.00 |                           |
| ENSG00000211598 | IGKV4-1           | immunoglobulin kappa variable 4-1 [Source:HGNC Symbol;Acc:HGNC:5834]                    | IG V gene      | 0.70                                    |                             | 4.78                       | 27.50                                    | 0.00    | 0.00 |                           |
| ENSG00000211949 | IGHV3-23          | immunoglobulin heavy variable 3-23 [Source:HGNC Symbol;Acc:HGNC:5588]                   | IG V gene      | 0.66                                    |                             | 4.80                       | 12.43                                    | 0.00    | 0.05 |                           |
| ENSG00000169116 | PARM1             | prostate androgen-regulated mucin-like protein 1 [Source:HGNC Symbol;Acc:HGNC:24536]    | protein coding | 0.64                                    |                             | 2.94                       | 14.85                                    | 0.00    | 0.01 |                           |
| ENSG00000135862 | LAMC1             | laminin subunit gamma 1 [Source:HGNC Symbol;Acc:HGNC:6492]                              | protein coding | 0.63                                    |                             | 3.32                       | 13.50                                    | 0.00    | 0.03 |                           |
| ENSG00000211893 | IGHG2             | immunoglobulin heavy constant gamma 2 (G2m marker) [Source:HGNC Symbol;Acc:HGNC:5526]   | IG C gene      | 0.61                                    |                             | 5.90                       | 33.67                                    | 0.00    | 0.00 |                           |
| ENSG00000148773 | MKI67             | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                        | protein coding | 0.60                                    |                             | 4.76                       | 35.82                                    | 0.00    | 0.00 |                           |
| ENSG00000168209 | DDIT4             | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                   | protein coding | -0.60                                   |                             | 4.39                       | 17.65                                    | 0.00    | 0.00 |                           |

**Table 22:** Genes differentially expressed at Day 6 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute  $\log_2$  fold change (Day 6 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                    | Gene Type       | Log <sub>2</sub> Change<br>7 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------------|-----------------|---------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000253822 | IGLV3-24          | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]         | IG V pseudogene | 6.63                                        |                | -0.13                        | 30.91                           | 0.00    | 0.00 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                      | IG V gene       | 2.73                                        |                | 5.27                         | 34.49                           | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]       | IG C gene       | 2.57                                        |                | 9.09                         | 125.81                          | 0.00    | 0.00 |                  |
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                        | IG V gene       | 2.36                                        |                | 5.22                         | 64.18                           | 0.00    | 0.00 |                  |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                              | protein coding  | 2.27                                        |                | 0.78                         | 22.88                           | 0.00    | 0.00 |                  |
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                      | IG V gene       | 2.26                                        |                | 5.84                         | 22.17                           | 0.00    | 0.00 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]   | IG C pseudogene | 2.18                                        |                | 3.65                         | 120.81                          | 0.00    | 0.00 |                  |
| ENSG00000211651 | IGLV1-44          | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                      | IG V gene       | 2.06                                        |                | 3.16                         | 36.57                           | 0.00    | 0.00 |                  |
| ENSG00000105974 | CAV1              | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                               | protein coding  | 2.05                                        |                | 0.95                         | 29.68                           | 0.00    | 0.00 |                  |
| ENSG00000271178 | IGHV3OR16-13      | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | IG V gene       | 1.93                                        |                | 0.47                         | 22.62                           | 0.00    | 0.00 |                  |
| ENSG00000211972 | IGHV3-66          | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                       | IG V gene       | 1.85                                        |                | 1.28                         | 25.49                           | 0.00    | 0.00 |                  |
| ENSG00000211659 | IGLV3-25          | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                      | IG V gene       | 1.82                                        |                | 4.03                         | 18.52                           | 0.00    | 0.00 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                       | IG V gene       | 1.80                                        |                | 5.01                         | 78.67                           | 0.00    | 0.00 |                  |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                         | IG C gene       | 1.76                                        |                | 7.23                         | 25.80                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]     | IG V gene       | 1.75                                        |                | 2.11                         | 40.91                           | 0.00    | 0.00 |                  |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                       | IG V gene       | 1.61                                        |                | 3.28                         | 103.64                          | 0.00    | 0.00 |                  |
| ENSG00000211967 | IGHV3-53          | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                       | IG V gene       | 1.60                                        |                | 2.07                         | 22.97                           | 0.00    | 0.00 |                  |
| ENSG00000178445 | GLDC              | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                    | protein coding  | 1.58                                        |                | 1.70                         | 22.34                           | 0.00    | 0.00 |                  |
| ENSG00000211950 | IGHV1-24          | immunoglobulin heavy variable 1-24 [Source:HGNC Symbol;Acc:HGNC:5551]                       | IG V gene       | 1.46                                        |                | 1.35                         | 15.31                           | 0.00    | 0.02 |                  |
| ENSG00000243238 | IGKV2-30          | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                       | IG V gene       | 1.43                                        |                | 2.06                         | 17.62                           | 0.00    | 0.01 |                  |
| ENSG00000211933 | IGHV6-1           | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                        | IG V gene       | 1.42                                        |                | 2.54                         | 49.12                           | 0.00    | 0.00 |                  |
| ENSG00000211897 | IGHG3             | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]       | IG C gene       | 1.34                                        |                | 5.77                         | 37.70                           | 0.00    | 0.00 |                  |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                      | protein coding  | 1.32                                        |                | 2.99                         | 46.26                           | 0.00    | 0.00 |                  |



| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type      | Log <sub>2</sub> Change<br>7 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|----------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                 | IG V gene      | 1.31                                           |                      | 3.82                               | 65.91                                    | 0.00    | 0.00 |                           |
| ENSG00000211644 | IGLV1-51          | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                | IG V gene      | 1.25                                           |                      | 2.54                               | 34.58                                    | 0.00    | 0.00 |                           |
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]      | protein coding | 1.25                                           |                      | 5.08                               | 43.17                                    | 0.00    | 0.00 |                           |
| ENSG00000239264 | TXNDC5            | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                   | protein coding | 1.19                                           |                      | 2.47                               | 17.95                                    | 0.00    | 0.01 |                           |
| ENSG00000211679 | IGLC3             | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857] | IG C gene      | 1.18                                           |                      | 5.76                               | 87.44                                    | 0.00    | 0.00 |                           |
| ENSG00000211955 | IGHV3-33          | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                 | IG V gene      | 1.16                                           |                      | 1.80                               | 21.55                                    | 0.00    | 0.00 |                           |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                          | protein coding | 1.16                                           |                      | 2.98                               | 37.28                                    | 0.00    | 0.00 |                           |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]            | protein coding | 1.16                                           |                      | 8.11                               | 57.51                                    | 0.00    | 0.00 |                           |
| ENSG00000211892 | IGHG4             | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528] | IG C gene      | 1.13                                           |                      | 3.92                               | 18.34                                    | 0.00    | 0.00 |                           |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                 | IG V gene      | 1.10                                           |                      | 3.98                               | 40.60                                    | 0.00    | 0.00 |                           |
| ENSG00000211943 | IGHV3-15          | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                 | IG V gene      | 1.05                                           |                      | 3.08                               | 28.14                                    | 0.00    | 0.00 |                           |
| ENSG00000211945 | IGHV1-18          | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                 | IG V gene      | 1.00                                           |                      | 2.70                               | 30.27                                    | 0.00    | 0.00 |                           |
| ENSG00000244437 | IGKV3-15          | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                 | IG V gene      | 0.99                                           |                      | 3.87                               | 39.11                                    | 0.00    | 0.00 |                           |
| ENSG00000211959 | IGHV4-39          | immunoglobulin heavy variable 4-39 [Source:HGNC Symbol;Acc:HGNC:5651]                 | IG V gene      | 0.96                                           |                      | 2.99                               | 15.51                                    | 0.00    | 0.02 |                           |
| ENSG00000211934 | IGHV1-2           | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]                  | IG V gene      | 0.85                                           |                      | 2.85                               | 17.36                                    | 0.00    | 0.01 |                           |
| ENSG00000224650 | IGHV3-74          | immunoglobulin heavy variable 3-74 [Source:HGNC Symbol;Acc:HGNC:5624]                 | IG V gene      | 0.84                                           |                      | 2.74                               | 26.90                                    | 0.00    | 0.00 |                           |
| ENSG00000211935 | IGHV1-3           | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                  | IG V gene      | 0.82                                           |                      | 2.09                               | 13.69                                    | 0.00    | 0.04 |                           |
| ENSG00000211899 | IGHM              | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                   | IG C gene      | 0.81                                           |                      | 9.41                               | 43.26                                    | 0.00    | 0.00 |                           |
| ENSG00000123989 | CHPF              | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                   | protein coding | 0.80                                           |                      | 3.04                               | 22.26                                    | 0.00    | 0.00 |                           |
| ENSG00000211592 | IGKC              | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                      | IG C gene      | 0.79                                           |                      | 9.26                               | 41.03                                    | 0.00    | 0.00 |                           |
| ENSG00000184792 | OSBP2             | oxysterol binding protein 2 [Source:HGNC Symbol;Acc:HGNC:8504]                        | protein coding | 0.78                                           |                      | 2.35                               | 17.64                                    | 0.00    | 0.01 |                           |
| ENSG00000197705 | KLHL14            | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                       | protein coding | 0.78                                           |                      | 3.02                               | 15.23                                    | 0.00    | 0.02 |                           |
| ENSG00000211947 | IGHV3-21          | immunoglobulin heavy variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5586]                 | IG V gene      | 0.75                                           |                      | 3.68                               | 13.00                                    | 0.00    | 0.05 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type                           | $Log_2$ Change<br>7 vs. treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000239951 | IGKV3-20          | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                    | IG V gene                           | 0.74                               |                | 4.56                | 13.77                           | 0.00    | 0.04 |                  |
| ENSG00000128438 | TBC1D27           | TBC1 domain family member 27 [Source:HGNC Symbol;Acc:HGNC:28104]                         | transcribed unprocessed pseudo-gene | 0.73                               |                | 3.17                | 18.29                           | 0.00    | 0.00 |                  |
| ENSG00000135916 | ITM2C             | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                          | protein coding                      | 0.73                               |                | 6.17                | 32.13                           | 0.00    | 0.00 |                  |
| ENSG00000177606 | JUN               | Jun proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6204] | protein coding                      | 0.71                               |                | 4.63                | 32.54                           | 0.00    | 0.00 |                  |
| ENSG00000187608 | ISG15             | ISG15 ubiquitin-like modifier [Source:HGNC Symbol;Acc:HGNC:4053]                         | protein coding                      | 0.70                               |                | 4.44                | 17.35                           | 0.00    | 0.01 |                  |
| ENSG00000124772 | CPNE5             | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                              | protein coding                      | 0.69                               |                | 4.68                | 30.67                           | 0.00    | 0.00 |                  |
| ENSG00000137198 | GMPR              | guanosine monophosphate reductase [Source:HGNC Symbol;Acc:HGNC:4376]                     | protein coding                      | 0.67                               |                | 2.38                | 13.30                           | 0.00    | 0.04 |                  |
| ENSG00000088826 | SMOX              | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                     | protein coding                      | 0.65                               |                | 2.91                | 15.11                           | 0.00    | 0.02 |                  |
| ENSG00000272821 |                   |                                                                                          | antisense                           | 0.64                               |                | 3.37                | 13.71                           | 0.00    | 0.04 |                  |
| ENSG00000005961 | ITGA2B            | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]                             | protein coding                      | 0.64                               |                | 5.35                | 23.61                           | 0.00    | 0.00 |                  |
| ENSG00000110777 | POU2AF1           | POU class 2 associating factor 1 [Source:HGNC Symbol;Acc:HGNC:9211]                      | protein coding                      | 0.63                               |                | 5.35                | 28.50                           | 0.00    | 0.00 |                  |
| ENSG00000099958 | DERL3             | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                             | protein coding                      | 0.63                               |                | 4.11                | 14.25                           | 0.00    | 0.03 |                  |
| ENSG00000170456 | DENND5B           | DENN domain containing 5B [Source:HGNC Symbol;Acc:HGNC:28338]                            | protein coding                      | 0.63                               |                | 3.90                | 15.41                           | 0.00    | 0.02 |                  |
| ENSG00000240505 | TNFRSF13B         | TNF receptor superfamily member 13B [Source:HGNC Symbol;Acc:HGNC:18153]                  | protein coding                      | 0.62                               |                | 2.83                | 12.98                           | 0.00    | 0.05 |                  |
| ENSG00000012223 | LTF               | lactotransferrin [Source:HGNC Symbol;Acc:HGNC:6720]                                      | protein coding                      | 0.59                               |                | 6.51                | 19.51                           | 0.00    | 0.00 |                  |
| ENSG00000170345 | FOS               | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796] | protein coding                      | 0.59                               |                | 9.32                | 18.34                           | 0.00    | 0.00 |                  |

**Table 23:** Genes differentially expressed at Day 7 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute  $log_2$  fold change (Day 7 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                | Gene Type      | $Log_2$ Change<br>8 vs. treatment) | Fold (Day pre- | Average $Log_2$ CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------|----------------|------------------------------------|----------------|---------------------|---------------------------------|---------|------|------------------|
| ENSG00000280800 |                   |                                                                         | lincRNA        | 10.21                              |                | 4.56                | 365.53                          | 0.00    | 0.00 |                  |
| ENSG00000168298 | HIST1H1E          | histone cluster 1 H1 family member e [Source:HGNC Symbol;Acc:HGNC:4718] | protein coding | 4.02                               |                | 0.01                | 16.47                           | 0.00    | 0.01 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type       | Log <sub>2</sub> Change 8 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|-----------------|------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000211662 | IGLV3-21          | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    | IG V gene       | 2.95                                     |                | 6.14                         | 36.91                           | 0.00    | 0.00 |                  |
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | IG V gene       | 2.91                                     |                | 4.48                         | 127.21                          | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | IG C gene       | 2.45                                     |                | 8.07                         | 141.83                          | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5918]  | IG V gene       | 2.43                                     |                | 3.03                         | 57.90                           | 0.00    | 0.00 |                  |
| ENSG00000115884 | SDC1              | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | protein coding  | 2.32                                     |                | 0.35                         | 14.30                           | 0.00    | 0.03 |                  |
| ENSG00000211651 | IGLV1-44          | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                    | IG V gene       | 2.05                                     |                | 3.14                         | 30.10                           | 0.00    | 0.00 |                  |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudogene | 1.95                                     |                | 3.43                         | 42.34                           | 0.00    | 0.00 |                  |
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | IG C gene       | 1.87                                     |                | 6.85                         | 33.15                           | 0.00    | 0.00 |                  |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | IG V gene       | 1.84                                     |                | 2.66                         | 62.28                           | 0.00    | 0.00 |                  |
| ENSG00000211938 | IGHV3-7           | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                      | IG V gene       | 1.83                                     |                | 4.34                         | 57.39                           | 0.00    | 0.00 |                  |
| ENSG00000241755 | IGKV1-9           | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                      | IG V gene       | 1.75                                     |                | 2.11                         | 20.12                           | 0.00    | 0.00 |                  |
| ENSG00000211959 | IGHV4-39          | immunoglobulin heavy variable 4-39 [Source:HGNC Symbol;Acc:HGNC:5651]                     | IG V gene       | 1.72                                     |                | 3.49                         | 18.49                           | 0.00    | 0.01 |                  |
| ENSG00000126262 | FFAR2             | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                             | protein coding  | 1.46                                     |                | 4.53                         | 17.32                           | 0.00    | 0.01 |                  |
| ENSG00000182782 | HCAR2             | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                     | protein coding  | 1.33                                     |                | 2.43                         | 14.37                           | 0.00    | 0.03 |                  |
| ENSG00000173535 | TNFRSF10C         | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                   | protein coding  | 1.31                                     |                | 5.26                         | 25.93                           | 0.00    | 0.00 |                  |
| ENSG00000211897 | IGHG3             | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]     | IG C gene       | 1.27                                     |                | 4.48                         | 45.12                           | 0.00    | 0.00 |                  |
| ENSG00000163464 | CXCR1             | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                       | protein coding  | 1.24                                     |                | 6.18                         | 24.38                           | 0.00    | 0.00 |                  |
| ENSG00000162747 | FCGR3B            | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                       | protein coding  | 1.22                                     |                | 7.50                         | 21.31                           | 0.00    | 0.00 |                  |
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                     | IG V gene       | 1.22                                     |                | 3.42                         | 35.12                           | 0.00    | 0.00 |                  |
| ENSG00000211673 | IGLV3-1           | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                     | IG V gene       | 1.21                                     |                | 3.73                         | 22.46                           | 0.00    | 0.00 |                  |
| ENSG00000157551 | KCNJ15            | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261]  | protein coding  | 1.18                                     |                | 4.29                         | 27.11                           | 0.00    | 0.00 |                  |
| ENSG00000211679 | IGLC3             | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]     | IG C gene       | 1.15                                     |                | 5.46                         | 44.96                           | 0.00    | 0.00 |                  |
| ENSG00000241351 | IGKV3-11          | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                     | IG V gene       | 1.12                                     |                | 3.55                         | 32.94                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                       | Gene Type             | Log <sub>2</sub> Change<br>8 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000170476 | MZB1              | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]               | protein coding        | 1.10                                           |                      | 4.70                               | 42.24                                    | 0.00    | 0.00 |                           |
| ENSG00000211943 | IGHV3-15          | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                          | IG V gene             | 1.10                                           |                      | 3.12                               | 13.67                                    | 0.00    | 0.04 |                           |
| ENSG00000149131 | SERPING1          | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                                    | protein coding        | 1.08                                           |                      | 3.16                               | 14.90                                    | 0.00    | 0.02 |                           |
| ENSG00000119922 | IFIT2             | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | protein coding        | 1.08                                           |                      | 6.20                               | 34.76                                    | 0.00    | 0.00 |                           |
| ENSG00000180871 | CXCR2             | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                            | protein coding        | 1.02                                           |                      | 7.02                               | 17.93                                    | 0.00    | 0.01 |                           |
| ENSG00000048462 | TNFRSF17          | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                         | protein coding        | 1.01                                           |                      | 2.45                               | 15.79                                    | 0.00    | 0.02 |                           |
| ENSG00000185745 | IFIT1             | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407] | protein coding        | 1.00                                           |                      | 4.99                               | 22.03                                    | 0.00    | 0.00 |                           |
| ENSG00000101057 | MYBL2             | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                   | protein coding        | 1.00                                           |                      | 2.47                               | 16.41                                    | 0.00    | 0.01 |                           |
| ENSG00000138772 | ANXA3             | annexin A3 [Source:HGNC Symbol;Acc:HGNC:541]                                                   | protein coding        | 0.99                                           |                      | 2.62                               | 18.37                                    | 0.00    | 0.01 |                           |
| ENSG00000132465 | JCHAIN            | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                     | protein coding        | 0.99                                           |                      | 7.80                               | 37.12                                    | 0.00    | 0.00 |                           |
| ENSG00000123700 | KCNJ2             | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]        | protein coding        | 0.95                                           |                      | 3.68                               | 15.84                                    | 0.00    | 0.02 |                           |
| ENSG00000232176 |                   |                                                                                                | processed pseudo-gene | 0.94                                           |                      | 4.22                               | 20.72                                    | 0.00    | 0.00 |                           |
| ENSG00000196549 | MME               | membrane metalloendopeptidase [Source:HGNC Symbol;Acc:HGNC:7154]                               | protein coding        | 0.93                                           |                      | 5.21                               | 15.05                                    | 0.00    | 0.02 |                           |
| ENSG00000004799 | PDK4              | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                             | protein coding        | 0.91                                           |                      | 4.76                               | 15.26                                    | 0.00    | 0.02 |                           |
| ENSG00000163993 | S100P             | S100 calcium binding protein P [Source:HGNC Symbol;Acc:HGNC:10504]                             | protein coding        | 0.88                                           |                      | 3.38                               | 14.70                                    | 0.00    | 0.02 |                           |
| ENSG00000133048 | CHI3L1            | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                          | protein coding        | 0.87                                           |                      | 3.65                               | 18.47                                    | 0.00    | 0.01 |                           |
| ENSG00000181409 | AATK              | apoptosis associated tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:21]                          | protein coding        | 0.85                                           |                      | 3.53                               | 13.99                                    | 0.00    | 0.03 |                           |
| ENSG00000119917 | IFIT3             | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411] | protein coding        | 0.83                                           |                      | 5.91                               | 15.11                                    | 0.00    | 0.02 |                           |
| ENSG00000008516 | MMP25             | matrix metalloproteinase 25 [Source:HGNC Symbol;Acc:HGNC:14246]                                | protein coding        | 0.81                                           |                      | 5.79                               | 20.43                                    | 0.00    | 0.00 |                           |
| ENSG00000103569 | AQP9              | aquaporin 9 [Source:HGNC Symbol;Acc:HGNC:643]                                                  | protein coding        | 0.80                                           |                      | 6.56                               | 23.14                                    | 0.00    | 0.00 |                           |
| ENSG00000239951 | IGKV3-20          | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                          | IG V gene             | 0.76                                           |                      | 4.11                               | 17.00                                    | 0.00    | 0.01 |                           |
| ENSG00000211899 | IGHM              | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                            | IG C gene             | 0.73                                           |                      | 9.31                               | 23.32                                    | 0.00    | 0.00 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                              | Gene Type                           | Log <sub>2</sub> Change<br>8 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|---------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000173110 | HSPA6             | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]       | protein coding                      | 0.73                                            |                | 4.28                         | 13.99                           | 0.00    | 0.03 |                  |
| ENSG00000124772 | CPNE5             | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                           | protein coding                      | 0.72                                            |                | 4.31                         | 23.84                           | 0.00    | 0.00 |                  |
| ENSG00000125538 | IL1B              | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                 | protein coding                      | 0.71                                            |                | 3.57                         | 19.14                           | 0.00    | 0.00 |                  |
| ENSG00000062282 | DGAT2             | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                | protein coding                      | 0.71                                            |                | 4.16                         | 15.55                           | 0.00    | 0.02 |                  |
| ENSG00000188897 |                   |                                                                                       | protein coding                      | 0.70                                            |                | 3.44                         | 14.32                           | 0.00    | 0.03 |                  |
| ENSG00000170962 | PDGFD             | platelet derived growth factor D [Source:HGNC Symbol;Acc:HGNC:30620]                  | protein coding                      | -0.69                                           |                | 3.76                         | 16.20                           | 0.00    | 0.01 |                  |
| ENSG00000183508 | FAM46C            | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]       | protein coding                      | 0.68                                            |                | 5.56                         | 14.10                           | 0.00    | 0.03 |                  |
| ENSG00000171101 | SIGLEC17P         | sialic acid binding Ig like lectin 17, pseudogene [Source:HGNC Symbol;Acc:HGNC:15604] | transcribed unprocessed pseudo-gene | -0.66                                           |                | 3.21                         | 14.09                           | 0.00    | 0.03 |                  |
| ENSG00000275302 | CCL4              | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630]                      | protein coding                      | -0.65                                           |                | 4.65                         | 18.29                           | 0.00    | 0.01 |                  |
| ENSG00000211592 | IGKC              | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                      | IG C gene                           | 0.63                                            |                | 8.74                         | 26.15                           | 0.00    | 0.00 |                  |
| ENSG00000142089 | IFITM3            | interferon induced transmembrane protein 3 [Source:HGNC Symbol;Acc:HGNC:5414]         | protein coding                      | 0.61                                            |                | 6.01                         | 17.46                           | 0.00    | 0.01 |                  |
| ENSG00000171049 | FPR2              | formyl peptide receptor 2 [Source:HGNC Symbol;Acc:HGNC:3827]                          | protein coding                      | 0.59                                            |                | 5.69                         | 13.12                           | 0.00    | 0.05 |                  |
| ENSG00000110848 | CD69              | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                      | protein coding                      | -0.59                                           |                | 5.58                         | 20.25                           | 0.00    | 0.00 |                  |

**Table 24:** Genes differentially expressed at Day 8 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 8 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type      | Log <sub>2</sub> Change<br>9 vs. pre-treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|----------------|-------------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                   | IG V gene      | 1.90                                            |                | 4.03                         | 24.64                           | 0.00    | 0.00 |                  |
| ENSG00000211896 | IGHG1             | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]    | IG C gene      | 1.56                                            |                | 8.33                         | 48.17                           | 0.00    | 0.00 |                  |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5918] | IG V gene      | 1.55                                            |                | 2.19                         | 17.29                           | 0.00    | 0.03 |                  |
| ENSG00000158578 | ALAS2             | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                          | protein coding | 1.37                                            |                | 3.05                         | 27.63                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                  | Gene Type        | Log <sub>2</sub> Change<br>9 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|-------------------------------------------------------------------------------------------|------------------|------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000211677 | IGLC2             | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | IG C gene        | 1.20                                           |                      | 6.39                               | 19.91                                    | 0.00    | 0.01 |                           |
| ENSG00000224373 | IGHV4-59          | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | IG V gene        | 1.15                                           |                      | 2.87                               | 19.21                                    | 0.00    | 0.01 |                           |
| ENSG00000253755 | IGHGP             | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | IG C pseudo-gene | 1.13                                           |                      | 2.92                               | 20.06                                    | 0.00    | 0.01 |                           |
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                             | protein coding   | 1.01                                           |                      | 5.94                               | 35.66                                    | 0.00    | 0.00 |                           |
| ENSG00000211964 | IGHV3-48          | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                     | IG V gene        | 0.93                                           |                      | 3.49                               | 21.60                                    | 0.00    | 0.01 |                           |
| ENSG00000004799 | PDK4              | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                        | protein coding   | 0.93                                           |                      | 4.74                               | 28.15                                    | 0.00    | 0.00 |                           |
| ENSG00000206172 | HBA1              | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                             | protein coding   | 0.93                                           |                      | 4.86                               | 18.54                                    | 0.00    | 0.02 |                           |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                | protein coding   | 0.75                                           |                      | 9.64                               | 31.93                                    | 0.00    | 0.00 |                           |

**Table 25:** Genes differentially expressed at Day 9 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute *log<sub>2</sub>* fold change (Day 9 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                 | Gene Type      | Log <sub>2</sub> Change<br>10 vs.<br>treatment) | Fold<br>(Day<br>pre- | Average<br>Log <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------|----------------|-------------------------------------------------|----------------------|------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000211653 | IGLV1-40          | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                   | IG V gene      | 1.60                                            |                      | 3.64                               | 24.44                                    | 0.00    | 0.00 |                           |
| ENSG00000124102 | PI3               | peptidase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:8947]                                 | protein coding | 1.46                                            |                      | 1.63                               | 15.87                                    | 0.00    | 0.02 |                           |
| ENSG00000223609 | HBD               | hemoglobin subunit delta [Source:HGNC Symbol;Acc:HGNC:4829]                              | protein coding | 1.46                                            |                      | 1.28                               | 15.91                                    | 0.00    | 0.02 |                           |
| ENSG00000158578 | ALAS2             | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                          | protein coding | 1.44                                            |                      | 3.06                               | 32.92                                    | 0.00    | 0.00 |                           |
| ENSG00000162551 | ALPL              | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]                | protein coding | 1.38                                            |                      | 4.14                               | 35.71                                    | 0.00    | 0.00 |                           |
| ENSG00000188536 | HBA2              | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                            | protein coding | 1.30                                            |                      | 6.26                               | 29.29                                    | 0.00    | 0.00 |                           |
| ENSG00000206172 | HBA1              | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                            | protein coding | 1.26                                            |                      | 5.17                               | 25.63                                    | 0.00    | 0.00 |                           |
| ENSG00000211670 | IGLV3-9           | immunoglobulin lambda variable 3-9 (gene/pseudo-gene) [Source:HGNC Symbol;Acc:HGNC:5918] | IG V gene      | 1.19                                            |                      | 1.64                               | 17.68                                    | 0.00    | 0.01 |                           |
| ENSG00000173535 | TNFRSF10C         | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                  | protein coding | 1.16                                            |                      | 5.00                               | 39.80                                    | 0.00    | 0.00 |                           |
| ENSG00000004939 | SLC4A1            | solute carrier family 4 member 1 (Diego blood group) [Source:HGNC Symbol;Acc:HGNC:11027] | protein coding | 1.16                                            |                      | 2.88                               | 15.80                                    | 0.00    | 0.02 |                           |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                                                       | Gene Type      | Log <sub>2</sub> Change 10 vs. treatment) | Fold (Day pre- | Average Log <sub>2</sub> CPM | Likelihood Ratio Test Statistic | P-Value | FDR  | Adjusted P-Value |
|-----------------|-------------------|------------------------------------------------------------------------------------------------|----------------|-------------------------------------------|----------------|------------------------------|---------------------------------|---------|------|------------------|
| ENSG00000162747 | FCGR3B            | Fc fragment of IgG receptor IIb [Source:HGNC Symbol;Acc:HGNC:3620]                             | protein coding | 1.15                                      |                | 7.14                         | 45.32                           | 0.00    | 0.00 |                  |
| ENSG00000163464 | CXCR1             | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                            | protein coding | 1.09                                      |                | 5.85                         | 56.18                           | 0.00    | 0.00 |                  |
| ENSG00000126262 | FFAR2             | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                                  | protein coding | 1.09                                      |                | 4.07                         | 27.19                           | 0.00    | 0.00 |                  |
| ENSG00000183762 | KREMEN1           | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]                 | protein coding | 1.08                                      |                | 1.94                         | 14.00                           | 0.00    | 0.04 |                  |
| ENSG00000244734 | HBB               | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                     | protein coding | 1.07                                      |                | 9.90                         | 35.63                           | 0.00    | 0.00 |                  |
| ENSG00000182782 | HCAR2             | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                          | protein coding | 1.05                                      |                | 2.23                         | 24.30                           | 0.00    | 0.00 |                  |
| ENSG00000180871 | CXCR2             | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                            | protein coding | 0.97                                      |                | 6.77                         | 45.13                           | 0.00    | 0.00 |                  |
| ENSG00000140932 | CMTM2             | CKLF like MARVEL transmembrane domain containing 2 [Source:HGNC Symbol;Acc:HGNC:19173]         | protein coding | 0.95                                      |                | 2.78                         | 24.87                           | 0.00    | 0.00 |                  |
| ENSG00000171236 | LRG1              | leucine rich alpha-2-glycoprotein 1 [Source:HGNC Symbol;Acc:HGNC:29480]                        | protein coding | 0.95                                      |                | 3.16                         | 39.46                           | 0.00    | 0.00 |                  |
| ENSG00000182885 | ADGRG3            | adhesion G protein-coupled receptor G3 [Source:HGNC Symbol;Acc:HGNC:13728]                     | protein coding | 0.92                                      |                | 3.66                         | 25.03                           | 0.00    | 0.00 |                  |
| ENSG00000133048 | CHI3L1            | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                          | protein coding | 0.92                                      |                | 3.51                         | 35.76                           | 0.00    | 0.00 |                  |
| ENSG00000108244 | KRT23             | keratin 23 [Source:HGNC Symbol;Acc:HGNC:6438]                                                  | protein coding | 0.92                                      |                | 2.17                         | 13.25                           | 0.00    | 0.05 |                  |
| ENSG00000196549 | MME               | membrane metalloendopeptidase [Source:HGNC Symbol;Acc:HGNC:7154]                               | protein coding | 0.88                                      |                | 5.02                         | 25.52                           | 0.00    | 0.00 |                  |
| ENSG00000004799 | PDK4              | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                             | protein coding | 0.85                                      |                | 4.78                         | 14.63                           | 0.00    | 0.03 |                  |
| ENSG00000157551 | KCNJ15            | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261]       | protein coding | 0.82                                      |                | 4.08                         | 23.35                           | 0.00    | 0.00 |                  |
| ENSG00000186529 | CYP4F3            | cytochrome P450 family 4 subfamily F member 3 [Source:HGNC Symbol;Acc:HGNC:2646]               | protein coding | 0.80                                      |                | 4.20                         | 16.38                           | 0.00    | 0.02 |                  |
| ENSG00000008516 | MMP25             | matrix metalloproteinase 25 [Source:HGNC Symbol;Acc:HGNC:14246]                                | protein coding | 0.79                                      |                | 5.73                         | 28.83                           | 0.00    | 0.00 |                  |
| ENSG00000148926 | ADM               | adrenomedullin [Source:HGNC Symbol;Acc:HGNC:259]                                               | protein coding | 0.78                                      |                | 2.37                         | 15.75                           | 0.00    | 0.02 |                  |
| ENSG00000173868 | PHOSPHO1          | phosphoethanolamine/phosphocholine phosphatase [Source:HGNC Symbol;Acc:HGNC:16815]             | protein coding | 0.76                                      |                | 4.15                         | 15.42                           | 0.00    | 0.02 |                  |
| ENSG00000119922 | IFIT2             | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | protein coding | 0.65                                      |                | 5.77                         | 40.22                           | 0.00    | 0.00 |                  |
| ENSG00000239653 | PSMD6-AS2         | PSMD6 antisense RNA 2 [Source:HGNC Symbol;Acc:HGNC:44125]                                      | antisense      | -0.65                                     |                | 2.99                         | 13.30                           | 0.00    | 0.05 |                  |
| ENSG00000181409 | AATK              | apoptosis associated tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:21]                          | protein coding | 0.63                                      |                | 3.55                         | 15.80                           | 0.00    | 0.02 |                  |
| ENSG00000062282 | DGAT2             | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                         | protein coding | 0.63                                      |                | 4.09                         | 24.93                           | 0.00    | 0.00 |                  |

| Ensembl Gene ID | Ensembl Gene Name | Ensembl Gene Description                                   | Gene Type                 | <i>Log</i> <sub>2</sub> Change<br>10 vs.<br>pre-treatment) | Fold<br>(Day<br>pre- | Average<br><i>Log</i> <sub>2</sub><br>CPM | Likelihood<br>Ratio<br>Test<br>Statistic | P-Value | FDR  | Ad-<br>justed P-<br>Value |
|-----------------|-------------------|------------------------------------------------------------|---------------------------|------------------------------------------------------------|----------------------|-------------------------------------------|------------------------------------------|---------|------|---------------------------|
| ENSG00000257335 | MGAM              | maltase-glucoamylase<br>[Source:HGNC<br>bol;Acc:HGNC:7043] | Sym-<br>protein<br>coding | 0.62                                                       |                      | 5.49                                      | 15.35                                    | 0.00    | 0.02 |                           |
| ENSG00000188897 |                   |                                                            | protein<br>coding         | 0.62                                                       |                      | 3.42                                      | 22.35                                    | 0.00    | 0.00 |                           |

**Table 26:** Genes differentially expressed at Day 10 compared to pre-treatment (PBMC, Trivalent Influenza Vaccine). Sorted by descending absolute *log*<sub>2</sub> fold change (Day 10 vs. pre-treatment). Gene model summaries and annotations are based on Ensembl Version 87.



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                       | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------|-------------------------|
| BCLTP1-001 | 5            | ENSG00000117228 | GBP1      | guanylate binding protein 1 [Source:HGNC Symbol;Acc:HGNC:4182]                         | 0.89                    |
| BCLTP1-001 | 5            | ENSG00000162645 | GBP2      | guanylate binding protein 2 [Source:HGNC Symbol;Acc:HGNC:4183]                         | 0.61                    |
| BCLTP1-001 | 5            | ENSG00000103226 | NOMO3     | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                  | 0.13                    |
| BCLTP1-001 | 5            | ENSG00000167325 | RRM1      | ribonucleotide reductase catalytic subunit M1 [Source:HGNC Symbol;Acc:HGNC:10451]      | 0.18                    |
| BCLTP1-001 | 5            | ENSG00000115415 | STAT1     | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362] | 0.70                    |

**Table 27:** Co-expressed gene clusters (B Cells, Day 1)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                     | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------|-------------------------|
| BCLTP2-001 | 4            | ENSG00000211599 | IGKV5-2   | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835] | 0.19                    |
| BCLTP2-001 | 4            | ENSG00000186594 | MIR22HG   | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                  | 0.53                    |
| BCLTP2-001 | 4            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]   | 1.00                    |
| BCLTP2-001 | 4            | ENSG00000004866 | ST7       | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]  | 0.26                    |
| BCLTP2-002 | 6            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]        | -0.78                   |
| BCLTP2-002 | 6            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]        | -0.81                   |
| BCLTP2-002 | 6            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]           | -0.87                   |
| BCLTP2-002 | 6            | ENSG00000166851 | PLK1      | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                | -0.09                   |
| BCLTP2-002 | 6            | ENSG00000080546 | SESN1     | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                        | -0.26                   |
| BCLTP2-002 | 6            | ENSG00000196263 | ZNF471    | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]          | -0.15                   |

**Table 28:** Co-expressed gene clusters (B Cells, Day 2)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|-------------------------|
| BCLTP3-001 | 2            | ENSG00000010310 | GIPR      | gastric inhibitory polypeptide receptor [Source:HGNC Symbol;Acc:HGNC:4271]                | -0.53                   |
| BCLTP3-001 | 2            | ENSG00000171223 | JUNB      | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205] | -0.75                   |
| BCLTP3-002 | 7            | ENSG00000011426 | ANLN      | anillin actin binding protein [Source:HGNC Symbol;Acc:HGNC:14082]                         | 0.64                    |
| BCLTP3-002 | 7            | ENSG00000007968 | E2F2      | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                             | 0.24                    |
| BCLTP3-002 | 7            | ENSG00000244116 | IGKV2-28  | immunoglobulin kappa variable 2-28 [Source:HGNC Symbol;Acc:HGNC:5783]                     | 0.36                    |
| BCLTP3-002 | 7            | ENSG00000182481 | KPNA2     | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                            | 0.41                    |
| BCLTP3-002 | 7            | ENSG00000144182 | LIPT1     | lipoyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:29569]                                   | 0.62                    |
| BCLTP3-002 | 7            | ENSG00000104738 | MCM4      | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947]         | 0.19                    |
| BCLTP3-002 | 7            | ENSG00000131747 | TOP2A     | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                          | 0.44                    |
| BCLTP3-003 | 4            | ENSG00000241666 |           |                                                                                           | -0.59                   |
| BCLTP3-003 | 4            | ENSG00000168209 | DDIT4     | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                     | -1.00                   |
| BCLTP3-003 | 4            | ENSG00000080546 | SESN1     | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                             | -0.34                   |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP3-003 | 4            | ENSG00000088826 | SMOX      | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                                                 | -0.32                      |
| BCLTP3-004 | 5            | ENSG00000227155 |           |                                                                                                                      | -0.59                      |
| BCLTP3-004 | 5            | ENSG00000255026 |           |                                                                                                                      | -0.49                      |
| BCLTP3-004 | 5            | ENSG00000271533 |           |                                                                                                                      | -0.55                      |
| BCLTP3-004 | 5            | ENSG00000274272 |           |                                                                                                                      | -0.35                      |
| BCLTP3-004 | 5            | ENSG00000280138 |           |                                                                                                                      | -0.61                      |
| BCLTP3-005 | 8            | ENSG00000278897 |           |                                                                                                                      | -0.52                      |
| BCLTP3-005 | 8            | ENSG00000279759 |           |                                                                                                                      | -0.59                      |
| BCLTP3-005 | 8            | ENSG00000181800 | CELF2-AS1 | CELF2 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:23515]                                                            | -0.76                      |
| BCLTP3-005 | 8            | ENSG00000279192 | PWAR5     | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                                               | -0.68                      |
| BCLTP3-005 | 8            | ENSG00000180747 | SMG1P3    | SMG1P3, nonsense mediated mRNA decay associated PI3K related kinase pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:49860] | -0.54                      |
| BCLTP3-005 | 8            | ENSG00000100154 | TTC28     | tetratricopeptide repeat domain 28 [Source:HGNC Symbol;Acc:HGNC:29179]                                               | -0.28                      |
| BCLTP3-005 | 8            | ENSG00000181722 | ZBTB20    | zinc finger and BTB domain containing 20 [Source:HGNC Symbol;Acc:HGNC:13503]                                         | -0.62                      |
| BCLTP3-005 | 8            | ENSG00000197714 | ZNF460    | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                                                          | -0.81                      |
| BCLTP3-006 | 7            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                                                        | -1.50                      |
| BCLTP3-006 | 7            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                                                        | -1.77                      |
| BCLTP3-006 | 7            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                                           | -1.64                      |
| BCLTP3-006 | 7            | ENSG00000220008 | LINGO3    | leucine rich repeat and Ig domain containing 3 [Source:HGNC Symbol;Acc:HGNC:21206]                                   | -0.44                      |
| BCLTP3-006 | 7            | ENSG00000185522 | LMNTD2    | lamin tail domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28561]                                                   | -0.43                      |
| BCLTP3-006 | 7            | ENSG00000120725 | SIL1      | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                                                  | -0.13                      |
| BCLTP3-006 | 7            | ENSG00000196263 | ZNF471    | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]                                                          | -0.31                      |
| BCLTP3-007 | 8            | ENSG00000280063 |           |                                                                                                                      | -0.21                      |
| BCLTP3-007 | 8            | ENSG00000110848 | CD69      | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                                                     | -0.84                      |
| BCLTP3-007 | 8            | ENSG00000161960 | EIF4A1    | eukaryotic translation initiation factor 4A1 [Source:HGNC Symbol;Acc:HGNC:3282]                                      | -0.60                      |
| BCLTP3-007 | 8            | ENSG00000178127 | NDUFV2    | NADH:ubiquinone oxidoreductase core subunit V2 [Source:HGNC Symbol;Acc:HGNC:7717]                                    | -0.68                      |
| BCLTP3-007 | 8            | ENSG00000100906 | NFKBIA    | NFKB inhibitor alpha [Source:HGNC Symbol;Acc:HGNC:7797]                                                              | -0.63                      |
| BCLTP3-007 | 8            | ENSG00000090104 | RGS1      | regulator of G-protein signaling 1 [Source:HGNC Symbol;Acc:HGNC:9991]                                                | -0.56                      |
| BCLTP3-007 | 8            | ENSG00000116741 | RGS2      | regulator of G-protein signaling 2 [Source:HGNC Symbol;Acc:HGNC:9998]                                                | -0.54                      |
| BCLTP3-007 | 8            | ENSG00000239264 | TXNDC5    | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                                                  | -0.27                      |

Table 29: Co-expressed gene clusters (B Cells, Day 3)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                  | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------|----------------------------|
| BCLTP4-001 | 2            | ENSG00000074416 | MGLL      | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]          | 0.18                       |
| BCLTP4-001 | 2            | ENSG00000149516 | MS4A3     | membrane spanning 4-domains A3 [Source:HGNC Symbol;Acc:HGNC:7317] | 0.81                       |
| BCLTP4-002 | 2            | ENSG00000138166 | DUSP5     | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071] | 0.53                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                     | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP4-002 | 2            | ENSG00000170345 | FOS         | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796]                             | 1.01                    |
| BCLTP4-003 | 8            | ENSG00000260948 |             |                                                                                                                      | -0.24                   |
| BCLTP4-003 | 8            | ENSG00000233806 | LINC01237   | long intergenic non-protein coding RNA 1237 [Source:HGNC Symbol;Acc:HGNC:49793]                                      | -0.34                   |
| BCLTP4-003 | 8            | ENSG00000178127 | NDUFV2      | NADH:ubiquinone oxidoreductase core subunit V2 [Source:HGNC Symbol;Acc:HGNC:7717]                                    | -0.33                   |
| BCLTP4-003 | 8            | ENSG00000279192 | PWAR5       | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                                               | -0.61                   |
| BCLTP4-003 | 8            | ENSG00000180747 | SMG1P3      | SMG1P3, nonsense mediated mRNA decay associated PI3K related kinase pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:49860] | -0.67                   |
| BCLTP4-003 | 8            | ENSG00000006638 | TBXA2R      | thromboxane A2 receptor [Source:HGNC Symbol;Acc:HGNC:11608]                                                          | -0.14                   |
| BCLTP4-003 | 8            | ENSG00000181722 | ZBTB20      | zinc finger and BTB domain containing 20 [Source:HGNC Symbol;Acc:HGNC:13503]                                         | -0.67                   |
| BCLTP4-003 | 8            | ENSG00000197714 | ZNF460      | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                                                          | -0.76                   |
| BCLTP4-004 | 8            | ENSG00000274272 |             |                                                                                                                      | -0.11                   |
| BCLTP4-004 | 8            | ENSG00000142675 | CNKSR1      | connector enhancer of kinase suppressor of Ras 1 [Source:HGNC Symbol;Acc:HGNC:19700]                                 | -0.07                   |
| BCLTP4-004 | 8            | ENSG00000206172 | HBA1        | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                                                        | -1.31                   |
| BCLTP4-004 | 8            | ENSG00000188536 | HBA2        | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                                                        | -1.31                   |
| BCLTP4-004 | 8            | ENSG00000244734 | HBB         | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                                           | -1.36                   |
| BCLTP4-004 | 8            | ENSG00000253691 | IGKV2OR22-4 | immunoglobulin kappa variable 2/OR22-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5813]                               | -0.27                   |
| BCLTP4-004 | 8            | ENSG00000187922 | LCN10       | lipocalin 10 [Source:HGNC Symbol;Acc:HGNC:20892]                                                                     | -0.22                   |
| BCLTP4-004 | 8            | ENSG00000168701 | TMEM208     | transmembrane protein 208 [Source:HGNC Symbol;Acc:HGNC:25015]                                                        | -0.09                   |

Table 30: Co-expressed gene clusters (B Cells, Day 4)

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|------------|------------------------------------------------------------------------------------------|-------------------------|
| BCLTP5-001 | 2            | ENSG00000280411 | IGHV1-69-2 | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                  | 0.99                    |
| BCLTP5-001 | 2            | ENSG00000135069 | PSAT1      | phosphoserine aminotransferase 1 [Source:HGNC Symbol;Acc:HGNC:19129]                     | 0.69                    |
| BCLTP5-002 | 2            | ENSG00000112984 | KIF20A     | kinesin family member 20A [Source:HGNC Symbol;Acc:HGNC:9787]                             | 1.55                    |
| BCLTP5-002 | 2            | ENSG00000088325 | TPX2       | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                   | 1.47                    |
| BCLTP5-003 | 2            | ENSG00000101057 | MYBL2      | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                             | 1.49                    |
| BCLTP5-003 | 2            | ENSG00000085840 | ORC1       | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                  | 1.49                    |
| BCLTP5-004 | 2            | ENSG00000007968 | E2F2       | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                            | 0.87                    |
| BCLTP5-004 | 2            | ENSG00000227203 | SUB1P1     | SUB1 homolog, transcriptional regulator pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:32300] | 0.80                    |
| BCLTP5-005 | 3            | ENSG00000140525 | FANCI      | Fanconi anemia complementation group I [Source:HGNC Symbol;Acc:HGNC:25568]               | 0.87                    |
| BCLTP5-005 | 3            | ENSG00000128228 | SDF2L1     | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                 | 1.20                    |
| BCLTP5-005 | 3            | ENSG00000114850 | SSR3       | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                   | 0.80                    |
| BCLTP5-006 | 2            | ENSG00000110917 | MLEC       | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                             | 0.68                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                 | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP5-006 | 2            | ENSG00000070214 | SLC44A1   | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                                            | 0.94                    |
| BCLTP5-007 | 2            | ENSG00000242076 | IGKV1-33  | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                                            | 0.95                    |
| BCLTP5-007 | 2            | ENSG00000147649 | MTDH      | metadherin [Source:HGNC Symbol;Acc:HGNC:29608]                                                                   | 0.64                    |
| BCLTP5-008 | 2            | ENSG00000138778 | CENPE     | centromere protein E [Source:HGNC Symbol;Acc:HGNC:1856]                                                          | 1.37                    |
| BCLTP5-008 | 2            | ENSG00000122952 | ZWINT     | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]                                         | 1.59                    |
| BCLTP5-009 | 3            | ENSG00000154723 | ATP5J     | ATP synthase, H <sup>+</sup> transporting, mitochondrial Fo complex subunit F6 [Source:HGNC Symbol;Acc:HGNC:847] | 0.61                    |
| BCLTP5-009 | 3            | ENSG00000127022 | CANX      | calnexin [Source:HGNC Symbol;Acc:HGNC:1473]                                                                      | 0.63                    |
| BCLTP5-009 | 3            | ENSG00000196189 | SEMA4A    | semaphorin 4A [Source:HGNC Symbol;Acc:HGNC:10729]                                                                | 0.89                    |
| BCLTP5-010 | 3            | ENSG00000094804 | CDC6      | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                                         | 1.47                    |
| BCLTP5-010 | 3            | ENSG00000132646 | PCNA      | proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:HGNC:8729]                                            | 0.70                    |
| BCLTP5-010 | 3            | ENSG00000071539 | TRIP13    | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]                                       | 1.57                    |
| BCLTP5-011 | 2            | ENSG00000126787 | DLGAP5    | DLG associated protein 5 [Source:HGNC Symbol;Acc:HGNC:16864]                                                     | 1.52                    |
| BCLTP5-011 | 2            | ENSG00000154839 | SKA1      | spindle and kinetochore associated complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28109]                         | 1.04                    |
| BCLTP5-012 | 4            | ENSG00000235162 | C12orf75  | chromosome 12 open reading frame 75 [Source:HGNC Symbol;Acc:HGNC:35164]                                          | 0.87                    |
| BCLTP5-012 | 4            | ENSG00000168496 | FEN1      | flap structure-specific endonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3650]                                        | 0.96                    |
| BCLTP5-012 | 4            | ENSG00000259706 | HSP90B2P  | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099]                       | 1.05                    |
| BCLTP5-012 | 4            | ENSG00000145050 | MANF      | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]                          | 1.08                    |
| BCLTP5-013 | 3            | ENSG00000258572 |           |                                                                                                                  | 1.05                    |
| BCLTP5-013 | 3            | ENSG00000166598 | HSP90B1   | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]                                   | 1.11                    |
| BCLTP5-013 | 3            | ENSG00000173848 | NET1      | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                                          | 1.11                    |
| BCLTP5-014 | 2            | ENSG00000089685 | BIRC5     | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                                            | 1.67                    |
| BCLTP5-014 | 2            | ENSG00000117399 | CDC20     | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                                                        | 1.63                    |
| BCLTP5-015 | 3            | ENSG00000105974 | CAV1      | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                                                    | 1.55                    |
| BCLTP5-015 | 3            | ENSG00000171241 | SHCBP1    | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                                         | 1.56                    |
| BCLTP5-015 | 3            | ENSG00000123416 | TUBA1B    | tubulin alpha 1b [Source:HGNC Symbol;Acc:HGNC:18809]                                                             | 0.65                    |
| BCLTP5-016 | 2            | ENSG00000137563 | GGH       | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                                                      | 1.36                    |
| BCLTP5-016 | 2            | ENSG00000090889 | KIF4A     | kinesin family member 4A [Source:HGNC Symbol;Acc:HGNC:13339]                                                     | 1.16                    |
| BCLTP5-017 | 3            | ENSG00000184661 | CDCA2     | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                                             | 1.84                    |
| BCLTP5-017 | 3            | ENSG00000072571 | HMMR      | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]                                         | 1.31                    |
| BCLTP5-017 | 3            | ENSG00000108106 | UBE2S     | ubiquitin conjugating enzyme E2 S [Source:HGNC Symbol;Acc:HGNC:17895]                                            | 0.83                    |
| BCLTP5-018 | 3            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                                            | 0.61                    |
| BCLTP5-018 | 3            | ENSG00000076003 | MCM6      | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949]                                | 0.91                    |
| BCLTP5-018 | 3            | ENSG00000103257 | SLC7A5    | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                                             | 0.94                    |
| BCLTP5-019 | 2            | ENSG00000169679 | BUB1      | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]                               | 1.63                    |
| BCLTP5-019 | 2            | ENSG00000064763 | FAR2      | fatty acyl-CoA reductase 2 [Source:HGNC Symbol;Acc:HGNC:25531]                                                   | 0.68                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                   | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------|----------------------------|
| BCLTP5-020 | 5            | ENSG00000138160 | KIF11     | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                        | 1.14                       |
| BCLTP5-020 | 5            | ENSG00000104738 | MCM4      | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947]  | 1.07                       |
| BCLTP5-020 | 5            | ENSG00000109805 | NCAPG     | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]          | 1.61                       |
| BCLTP5-020 | 5            | ENSG00000171848 | RRM2      | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452] | 1.83                       |
| BCLTP5-020 | 5            | ENSG00000077152 | UBE2T     | ubiquitin conjugating enzyme E2 T [Source:HGNC Symbol;Acc:HGNC:25009]              | 1.10                       |
| BCLTP5-021 | 2            | ENSG00000119326 | CTNNAL1   | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                            | 1.49                       |
| BCLTP5-021 | 2            | ENSG00000198900 | TOP1      | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]                          | 0.59                       |
| BCLTP5-022 | 2            | ENSG00000249096 |           |                                                                                    | 0.85                       |
| BCLTP5-022 | 2            | ENSG00000160712 | IL6R      | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                          | 0.94                       |
| BCLTP5-023 | 5            | ENSG00000138180 | CEP55     | centrosomal protein 55 [Source:HGNC Symbol;Acc:HGNC:1161]                          | 1.34                       |
| BCLTP5-023 | 5            | ENSG00000182481 | KPNA2     | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                     | 0.90                       |
| BCLTP5-023 | 5            | ENSG00000186594 | MIR22HG   | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                                | 0.76                       |
| BCLTP5-023 | 5            | ENSG00000137804 | NUSAP1    | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]     | 1.03                       |
| BCLTP5-023 | 5            | ENSG00000100219 | XBP1      | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                        | 1.21                       |
| BCLTP5-024 | 3            | ENSG00000135476 | ESPL1     | extra spindle pole bodies like 1, separase [Source:HGNC Symbol;Acc:HGNC:16856]     | 1.37                       |
| BCLTP5-024 | 3            | ENSG00000075218 | GTSE1     | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                     | 1.40                       |
| BCLTP5-024 | 3            | ENSG00000142945 | KIF2C     | kinesin family member 2C [Source:HGNC Symbol;Acc:HGNC:6393]                        | 1.17                       |
| BCLTP5-025 | 5            | ENSG00000178999 | AURKB     | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                | 1.44                       |
| BCLTP5-025 | 5            | ENSG00000188486 | H2AFX     | H2A histone family member X [Source:HGNC Symbol;Acc:HGNC:4739]                     | 0.81                       |
| BCLTP5-025 | 5            | ENSG00000148773 | MKI67     | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                   | 1.45                       |
| BCLTP5-025 | 5            | ENSG00000117632 | STMN1     | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                      | 0.69                       |
| BCLTP5-025 | 5            | ENSG00000131747 | TOP2A     | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                   | 1.23                       |
| BCLTP5-026 | 2            | ENSG00000153093 | ACOXL     | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                          | 2.42                       |
| BCLTP5-026 | 2            | ENSG00000244575 | IGKV1-27  | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]              | 0.89                       |
| BCLTP5-027 | 2            | ENSG00000105011 | ASF1B     | anti-silencing function 1B histone chaperone [Source:HGNC Symbol;Acc:HGNC:20996]   | 1.22                       |
| BCLTP5-027 | 2            | ENSG00000138166 | DUSP5     | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                  | 1.43                       |
| BCLTP5-028 | 2            | ENSG00000211946 | IGHV3-20  | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]              | 0.98                       |
| BCLTP5-028 | 2            | ENSG00000167476 | JSRP1     | junctional sarcoplasmic reticulum protein 1 [Source:HGNC Symbol;Acc:HGNC:24963]    | 0.99                       |
| BCLTP5-029 | 3            | ENSG00000113368 | LMNB1     | lamin B1 [Source:HGNC Symbol;Acc:HGNC:6637]                                        | 0.82                       |
| BCLTP5-029 | 3            | ENSG00000166851 | PLK1      | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                              | 1.09                       |
| BCLTP5-029 | 3            | ENSG00000068489 | PRR11     | proline rich 11 [Source:HGNC Symbol;Acc:HGNC:25619]                                | 0.94                       |
| BCLTP5-030 | 2            | ENSG00000143228 | NUF2      | NUF2, NDC80 kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:14621]      | 1.06                       |
| BCLTP5-030 | 2            | ENSG00000076382 | SPAG5     | sperm associated antigen 5 [Source:HGNC Symbol;Acc:HGNC:13452]                     | 1.25                       |
| BCLTP5-031 | 2            | ENSG00000259772 |           |                                                                                    | 0.66                       |
| BCLTP5-031 | 2            | ENSG00000163751 | CPA3      | carboxypeptidase A3 [Source:HGNC Symbol;Acc:HGNC:2298]                             | 1.39                       |
| BCLTP5-032 | 5            | ENSG00000113273 | ARSB      | arylsulfatase B [Source:HGNC Symbol;Acc:HGNC:714]                                  | 0.59                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                     | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------|-------------------------|
| BCLTP5-032 | 5            | ENSG00000172115 | CYCS      | cytochrome c, somatic [Source:HGNC Symbol;Acc:HGNC:19986]                            | 0.52                    |
| BCLTP5-032 | 5            | ENSG00000164032 | H2AFZ     | H2A histone family member Z [Source:HGNC Symbol;Acc:HGNC:4741]                       | 0.64                    |
| BCLTP5-032 | 5            | ENSG00000074416 | MGLL      | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                             | 0.93                    |
| BCLTP5-032 | 5            | ENSG00000132432 | SEC61G    | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                   | 0.90                    |
| BCLTP5-033 | 2            | ENSG00000143476 | DTL       | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288] | 1.68                    |
| BCLTP5-033 | 2            | ENSG00000211625 | IGKV3D-20 | immunoglobulin kappa variable 3D-20 [Source:HGNC Symbol;Acc:HGNC:5825]               | 0.61                    |
| BCLTP5-034 | 5            | ENSG00000173540 | GMPPB     | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                  | 0.84                    |
| BCLTP5-034 | 5            | ENSG00000112378 | PERP      | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                    | 0.95                    |
| BCLTP5-034 | 5            | ENSG00000183010 | PYCR1     | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]               | 0.88                    |
| BCLTP5-034 | 5            | ENSG00000101310 | SEC23B    | Sec23 homolog B, coat complex II component [Source:HGNC Symbol;Acc:HGNC:10702]       | 0.50                    |
| BCLTP5-034 | 5            | ENSG00000165409 | TSHR      | thyroid stimulating hormone receptor [Source:HGNC Symbol;Acc:HGNC:12373]             | 1.21                    |
| BCLTP5-035 | 6            | ENSG00000248571 |           |                                                                                      | 1.41                    |
| BCLTP5-035 | 6            | ENSG00000121807 | CCR2      | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                    | 1.46                    |
| BCLTP5-035 | 6            | ENSG00000107104 | KANK1     | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]            | 1.32                    |
| BCLTP5-035 | 6            | ENSG00000107719 | PALD1     | phosphatase domain containing, paladin 1 [Source:HGNC Symbol;Acc:HGNC:23530]         | 0.74                    |
| BCLTP5-035 | 6            | ENSG00000114902 | SPCS1     | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]               | 0.60                    |
| BCLTP5-035 | 6            | ENSG00000170348 | TMED10    | transmembrane p24 trafficking protein 10 [Source:HGNC Symbol;Acc:HGNC:16998]         | 0.54                    |
| BCLTP5-036 | 2            | ENSG00000164045 | CDC25A    | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                           | 1.72                    |
| BCLTP5-036 | 2            | ENSG00000029993 | HMGB3     | high mobility group box 3 [Source:HGNC Symbol;Acc:HGNC:5004]                         | 1.42                    |
| BCLTP5-037 | 3            | ENSG00000087586 | AURKA     | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                  | 1.41                    |
| BCLTP5-037 | 3            | ENSG00000115163 | CENPA     | centromere protein A [Source:HGNC Symbol;Acc:HGNC:1851]                              | 1.74                    |
| BCLTP5-037 | 3            | ENSG00000197780 | TAF13     | TATA-box binding protein associated factor 13 [Source:HGNC Symbol;Acc:HGNC:11546]    | 0.59                    |
| BCLTP5-038 | 4            | ENSG00000134057 | CCNB1     | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                         | 1.20                    |
| BCLTP5-038 | 4            | ENSG00000093009 | CDC45     | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]                            | 2.08                    |
| BCLTP5-038 | 4            | ENSG00000024526 | DEPDC1    | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                          | 1.66                    |
| BCLTP5-038 | 4            | ENSG00000186185 | KIF18B    | kinesin family member 18B [Source:HGNC Symbol;Acc:HGNC:27102]                        | 1.68                    |
| BCLTP5-039 | 4            | ENSG00000151725 | CENPU     | centromere protein U [Source:HGNC Symbol;Acc:HGNC:21348]                             | 1.24                    |
| BCLTP5-039 | 4            | ENSG00000101003 | GIN51     | GIN5 complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28980]                           | 1.14                    |
| BCLTP5-039 | 4            | ENSG00000037241 | RPL26L1   | ribosomal protein L26 like 1 [Source:HGNC Symbol;Acc:HGNC:17050]                     | 0.72                    |
| BCLTP5-039 | 4            | ENSG00000167553 | TUBA1C    | tubulin alpha 1c [Source:HGNC Symbol;Acc:HGNC:20768]                                 | 0.76                    |
| BCLTP5-040 | 3            | ENSG00000035499 | DEPDC1B   | DEP domain containing 1B [Source:HGNC Symbol;Acc:HGNC:24902]                         | 1.27                    |
| BCLTP5-040 | 3            | ENSG00000111206 | FOXM1     | forkhead box M1 [Source:HGNC Symbol;Acc:HGNC:3818]                                   | 1.37                    |
| BCLTP5-040 | 3            | ENSG00000134291 | TMEM106C  | transmembrane protein 106C [Source:HGNC Symbol;Acc:HGNC:28775]                       | 0.68                    |
| BCLTP5-041 | 2            | ENSG00000146670 | CDCA5     | cell division cycle associated 5 [Source:HGNC Symbol;Acc:HGNC:14626]                 | 1.94                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|-------------------------|
| BCLTP5-041 | 2            | ENSG00000100526 | CDKN3     | cyclin dependent kinase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:1791]                    | 1.44                    |
| BCLTP5-042 | 5            | ENSG00000123485 | HJURP     | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]                 | 1.88                    |
| BCLTP5-042 | 5            | ENSG00000137807 | KIF23     | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                               | 1.49                    |
| BCLTP5-042 | 5            | ENSG00000117650 | NEK2      | NIMA related kinase 2 [Source:HGNC Symbol;Acc:HGNC:7745]                                  | 1.37                    |
| BCLTP5-042 | 5            | ENSG00000168078 | PBK       | PDZ binding kinase [Source:HGNC Symbol;Acc:HGNC:18282]                                    | 2.09                    |
| BCLTP5-042 | 5            | ENSG00000176890 | TYMS      | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                                | 1.82                    |
| BCLTP5-043 | 3            | ENSG00000011426 | ANLN      | anillin actin binding protein [Source:HGNC Symbol;Acc:HGNC:14082]                         | 1.85                    |
| BCLTP5-043 | 3            | ENSG00000163170 | BOLA3     | bolA family member 3 [Source:HGNC Symbol;Acc:HGNC:24415]                                  | 0.79                    |
| BCLTP5-043 | 3            | ENSG00000251546 | IGKV1D-39 | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                    | 0.64                    |
| BCLTP5-044 | 4            | ENSG00000170312 | CDK1      | cyclin dependent kinase 1 [Source:HGNC Symbol;Acc:HGNC:1722]                              | 1.43                    |
| BCLTP5-044 | 4            | ENSG00000101412 | E2F1      | E2F transcription factor 1 [Source:HGNC Symbol;Acc:HGNC:3113]                             | 1.19                    |
| BCLTP5-044 | 4            | ENSG00000211962 | IGHV1-46  | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                     | 0.46                    |
| BCLTP5-044 | 4            | ENSG00000140105 | WARS      | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                          | 0.50                    |
| BCLTP5-045 | 5            | ENSG00000153162 | BMP6      | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                           | 1.23                    |
| BCLTP5-045 | 5            | ENSG00000211685 | IGLC7     | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                       | 0.73                    |
| BCLTP5-045 | 5            | ENSG00000121152 | NCAPH     | non-SMC condensin I complex subunit H [Source:HGNC Symbol;Acc:HGNC:1112]                  | 1.37                    |
| BCLTP5-045 | 5            | ENSG00000189233 | NUGGC     | nuclear GTPase, germinal center associated [Source:HGNC Symbol;Acc:HGNC:33550]            | 0.75                    |
| BCLTP5-045 | 5            | ENSG00000198794 | SCAMP5    | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                  | 1.09                    |
| BCLTP5-046 | 10           | ENSG00000198018 | ENTPD7    | ectonucleoside triphosphate diphosphohydrolase 7 [Source:HGNC Symbol;Acc:HGNC:19745]      | 0.72                    |
| BCLTP5-046 | 10           | ENSG00000174371 | EXO1      | exonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3511]                                          | 1.51                    |
| BCLTP5-046 | 10           | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | 1.61                    |
| BCLTP5-046 | 10           | ENSG00000211892 | IGHG4     | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]     | 0.86                    |
| BCLTP5-046 | 10           | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | 1.44                    |
| BCLTP5-046 | 10           | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | 0.62                    |
| BCLTP5-046 | 10           | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | 0.96                    |
| BCLTP5-046 | 10           | ENSG00000137812 | KNL1      | kinetochore scaffold 1 [Source:HGNC Symbol;Acc:HGNC:24054]                                | 0.71                    |
| BCLTP5-046 | 10           | ENSG00000146918 | NCAPG2    | non-SMC condensin II complex subunit G2 [Source:HGNC Symbol;Acc:HGNC:21904]               | 0.71                    |
| BCLTP5-046 | 10           | ENSG00000129235 | TXNDC17   | thioredoxin domain containing 17 [Source:HGNC Symbol;Acc:HGNC:28218]                      | 0.69                    |
| BCLTP5-047 | 2            | ENSG00000162676 | GFI1      | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]  | 1.32                    |
| BCLTP5-047 | 2            | ENSG00000146733 | PSPH      | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                              | 0.61                    |
| BCLTP5-048 | 4            | ENSG00000163808 | KIF15     | kinesin family member 15 [Source:HGNC Symbol;Acc:HGNC:17273]                              | 1.10                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                              | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------------|-------------------------|
| BCLTP5-048 | 4            | ENSG00000105976 | MET       | MET proto-oncogene, receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:7029]               | 1.03                    |
| BCLTP5-048 | 4            | ENSG00000080986 | NDC80     | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                      | 0.98                    |
| BCLTP5-048 | 4            | ENSG00000078900 | TP73      | tumor protein p73 [Source:HGNC Symbol;Acc:HGNC:12003]                                         | 1.07                    |
| BCLTP5-049 | 4            | ENSG00000106080 | FKBP14    | FK506 binding protein 14 [Source:HGNC Symbol;Acc:HGNC:18625]                                  | 0.58                    |
| BCLTP5-049 | 4            | ENSG00000183087 | GAS6      | growth arrest specific 6 [Source:HGNC Symbol;Acc:HGNC:4168]                                   | 0.68                    |
| BCLTP5-049 | 4            | ENSG00000274576 | IGHV2-70  | immunoglobulin heavy variable 2-70 [Source:HGNC Symbol;Acc:HGNC:5577]                         | 0.31                    |
| BCLTP5-049 | 4            | ENSG00000149516 | MS4A3     | membrane spanning 4-domains A3 [Source:HGNC Symbol;Acc:HGNC:7317]                             | 1.35                    |
| BCLTP5-050 | 4            | ENSG00000175984 | DENND2C   | DENN domain containing 2C [Source:HGNC Symbol;Acc:HGNC:24748]                                 | 0.95                    |
| BCLTP5-050 | 4            | ENSG00000139734 | DIAPH3    | diaphanous related formin 3 [Source:HGNC Symbol;Acc:HGNC:15480]                               | 2.32                    |
| BCLTP5-050 | 4            | ENSG00000211645 | IGLV1-50  | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]       | 1.36                    |
| BCLTP5-050 | 4            | ENSG00000111186 | WNT5B     | Wnt family member 5B [Source:HGNC Symbol;Acc:HGNC:16265]                                      | 1.86                    |
| BCLTP5-051 | 3            | ENSG00000172339 | ALG14     | ALG14, UDP-N-acetylglucosaminyltransferase subunit [Source:HGNC Symbol;Acc:HGNC:28287]        | 0.41                    |
| BCLTP5-051 | 3            | ENSG00000134489 | HRH4      | histamine receptor H4 [Source:HGNC Symbol;Acc:HGNC:17383]                                     | 0.97                    |
| BCLTP5-051 | 3            | ENSG00000173578 | XCR1      | X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1625]                             | 0.60                    |
| BCLTP5-052 | 5            | ENSG00000182197 | EXT1      | exostosin glycosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:3512]                            | 0.58                    |
| BCLTP5-052 | 5            | ENSG00000213430 | HSPD1P1   | heat shock protein family D (Hsp60) member 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:35133] | 0.85                    |
| BCLTP5-052 | 5            | ENSG00000163507 | KIAA1524  | KIAA1524 [Source:HGNC Symbol;Acc:HGNC:29302]                                                  | 0.66                    |
| BCLTP5-052 | 5            | ENSG00000154719 | MRPL39    | mitochondrial ribosomal protein L39 [Source:HGNC Symbol;Acc:HGNC:14027]                       | 0.33                    |
| BCLTP5-052 | 5            | ENSG00000025039 | RRAGD     | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                                 | 1.28                    |
| BCLTP5-053 | 4            | ENSG00000224041 | IGKV3D-15 | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824]      | 0.49                    |
| BCLTP5-053 | 4            | ENSG00000211669 | IGLV3-10  | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                        | 0.89                    |
| BCLTP5-053 | 4            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                        | 0.84                    |
| BCLTP5-053 | 4            | ENSG00000211659 | IGLV3-25  | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                        | 0.45                    |
| BCLTP5-054 | 4            | ENSG00000241666 |           |                                                                                               | -0.63                   |
| BCLTP5-054 | 4            | ENSG00000271533 |           |                                                                                               | -0.68                   |
| BCLTP5-054 | 4            | ENSG00000168209 | DDIT4     | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                         | -0.79                   |
| BCLTP5-054 | 4            | ENSG00000080546 | SESN1     | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                                 | -0.59                   |

Table 31: Co-expressed gene clusters (B Cells, Day 5)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------|-------------------------|
| BCLTP6-001 | 2            | ENSG00000105976 | MET       | MET proto-oncogene, receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:7029] | 1.32                    |
| BCLTP6-001 | 2            | ENSG00000137804 | NUSAP1    | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]  | 0.97                    |
| BCLTP6-002 | 2            | ENSG00000106105 | GARS      | glycyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:4162]                       | 0.61                    |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-002 | 2            | ENSG00000044574 | HSPA5     | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]                      | 1.25                       |
| BCLTP6-003 | 2            | ENSG00000068912 | ERLEC1    | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                                   | 1.11                       |
| BCLTP6-003 | 2            | ENSG00000118705 | RPN2      | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                                    | 1.06                       |
| BCLTP6-004 | 3            | ENSG00000197157 | SND1      | staphylococcal nuclease and tudor domain containing 1 [Source:HGNC Symbol;Acc:HGNC:30646]            | 0.59                       |
| BCLTP6-004 | 3            | ENSG00000122862 | SRGN      | serglycin [Source:HGNC Symbol;Acc:HGNC:9361]                                                         | 0.88                       |
| BCLTP6-004 | 3            | ENSG00000134825 | TMEM258   | transmembrane protein 258 [Source:HGNC Symbol;Acc:HGNC:1164]                                         | 0.82                       |
| BCLTP6-005 | 2            | ENSG00000070214 | SLC44A1   | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                                | 1.17                       |
| BCLTP6-005 | 2            | ENSG00000086598 | TMED2     | transmembrane p24 trafficking protein 2 [Source:HGNC Symbol;Acc:HGNC:16996]                          | 0.69                       |
| BCLTP6-006 | 2            | ENSG00000166598 | HSP90B1   | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]                       | 1.48                       |
| BCLTP6-006 | 2            | ENSG00000124783 | SSR1      | signal sequence receptor subunit 1 [Source:HGNC Symbol;Acc:HGNC:11323]                               | 0.75                       |
| BCLTP6-007 | 2            | ENSG00000114850 | SSR3      | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                               | 1.01                       |
| BCLTP6-007 | 2            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                               | 1.26                       |
| BCLTP6-008 | 2            | ENSG00000111885 | MAN1A1    | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                               | 1.26                       |
| BCLTP6-008 | 2            | ENSG00000100219 | XBP1      | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                          | 1.51                       |
| BCLTP6-009 | 3            | ENSG00000004468 | CD38      | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                                     | 1.26                       |
| BCLTP6-009 | 3            | ENSG00000198856 | OSTC      | oligosaccharyltransferase complex non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:24448]          | 0.89                       |
| BCLTP6-009 | 3            | ENSG00000134910 | STT3A     | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172] | 1.04                       |
| BCLTP6-010 | 2            | ENSG00000067167 | TRAM1     | translocation associated membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:20568]                      | 0.69                       |
| BCLTP6-010 | 2            | ENSG00000117143 | UAP1      | UDP-N-acetylglucosamine pyrophosphorylase 1 [Source:HGNC Symbol;Acc:HGNC:12457]                      | 0.95                       |
| BCLTP6-011 | 2            | ENSG00000178999 | AURKB     | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                                  | 1.22                       |
| BCLTP6-011 | 2            | ENSG00000171241 | SHCBP1    | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                             | 1.54                       |
| BCLTP6-012 | 2            | ENSG00000137563 | GGH       | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                                          | 1.55                       |
| BCLTP6-012 | 2            | ENSG00000103226 | NOMO3     | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                                | 0.78                       |
| BCLTP6-013 | 2            | ENSG00000127022 | CANX      | calnexin [Source:HGNC Symbol;Acc:HGNC:1473]                                                          | 0.69                       |
| BCLTP6-013 | 2            | ENSG00000164032 | H2AFZ     | H2A histone family member Z [Source:HGNC Symbol;Acc:HGNC:4741]                                       | 0.58                       |
| BCLTP6-014 | 2            | ENSG00000186810 | CXCR3     | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                                  | 1.27                       |
| BCLTP6-014 | 2            | ENSG00000121073 | SLC35B1   | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                               | 0.82                       |
| BCLTP6-015 | 2            | ENSG00000135916 | ITM2C     | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                                      | 1.17                       |
| BCLTP6-015 | 2            | ENSG00000106803 | SEC61B    | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                    | 0.94                       |
| BCLTP6-016 | 3            | ENSG00000058262 | SEC61A1   | Sec61 translocon alpha 1 subunit [Source:HGNC Symbol;Acc:HGNC:18276]                                 | 0.82                       |
| BCLTP6-016 | 3            | ENSG00000144867 | SRPRB     | SRP receptor beta subunit [Source:HGNC Symbol;Acc:HGNC:24085]                                        | 0.75                       |
| BCLTP6-016 | 3            | ENSG00000153066 | TXNDC11   | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                                 | 1.07                       |
| BCLTP6-017 | 2            | ENSG00000117724 | CENPF     | centromere protein F [Source:HGNC Symbol;Acc:HGNC:1857]                                              | 0.92                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                      | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-017 | 2            | ENSG00000173334 | TRIB1     | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                           | 1.23                    |
| BCLTP6-018 | 2            | ENSG00000101310 | SEC23B    | Sec23 homolog B, coat complex II component [Source:HGNC Symbol;Acc:HGNC:10702]        | 0.66                    |
| BCLTP6-018 | 2            | ENSG00000131871 | SELENOS   | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                   | 1.03                    |
| BCLTP6-019 | 2            | ENSG00000138709 | LARP1B    | La ribonucleoprotein domain family member 1B [Source:HGNC Symbol;Acc:HGNC:24704]      | 0.72                    |
| BCLTP6-019 | 2            | ENSG00000057657 | PRDM1     | PR/SET domain 1 [Source:HGNC Symbol;Acc:HGNC:9346]                                    | 0.95                    |
| BCLTP6-020 | 4            | ENSG00000183508 | FAM46C    | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]       | 1.03                    |
| BCLTP6-020 | 4            | ENSG00000173540 | GMPPB     | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                   | 0.84                    |
| BCLTP6-020 | 4            | ENSG00000155304 | HSPA13    | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]     | 1.04                    |
| BCLTP6-020 | 4            | ENSG00000166794 | PPIB      | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                         | 1.17                    |
| BCLTP6-021 | 5            | ENSG00000149428 | HYOU1     | hypoxia up-regulated 1 [Source:HGNC Symbol;Acc:HGNC:16931]                            | 1.02                    |
| BCLTP6-021 | 5            | ENSG00000074695 | LMAN1     | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                          | 1.12                    |
| BCLTP6-021 | 5            | ENSG00000155660 | PDIA4     | protein disulfide isomerase family A member 4 [Source:HGNC Symbol;Acc:HGNC:30167]     | 1.38                    |
| BCLTP6-021 | 5            | ENSG00000143870 | PDIA6     | protein disulfide isomerase family A member 6 [Source:HGNC Symbol;Acc:HGNC:30168]     | 1.01                    |
| BCLTP6-021 | 5            | ENSG00000112473 | SLC39A7   | solute carrier family 39 member 7 [Source:HGNC Symbol;Acc:HGNC:4927]                  | 0.76                    |
| BCLTP6-022 | 3            | ENSG00000102158 | MAGT1     | magnesium transporter 1 [Source:HGNC Symbol;Acc:HGNC:28880]                           | 0.72                    |
| BCLTP6-022 | 3            | ENSG00000167004 | PDIA3     | protein disulfide isomerase family A member 3 [Source:HGNC Symbol;Acc:HGNC:4606]      | 0.61                    |
| BCLTP6-022 | 3            | ENSG00000198900 | TOP1      | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]                             | 0.59                    |
| BCLTP6-023 | 2            | ENSG00000105974 | CAV1      | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                         | 1.96                    |
| BCLTP6-023 | 2            | ENSG00000142945 | KIF2C     | kinesin family member 2C [Source:HGNC Symbol;Acc:HGNC:6393]                           | 1.06                    |
| BCLTP6-024 | 2            | ENSG00000090520 | DNAJB11   | DnaJ heat shock protein family (Hsp40) member B11 [Source:HGNC Symbol;Acc:HGNC:14889] | 0.93                    |
| BCLTP6-024 | 2            | ENSG00000002549 | LAP3      | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                          | 0.72                    |
| BCLTP6-025 | 3            | ENSG00000232613 |           |                                                                                       | 0.72                    |
| BCLTP6-025 | 3            | ENSG00000106415 | GLCCI1    | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                          | 0.97                    |
| BCLTP6-025 | 3            | ENSG00000110917 | MLEC      | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                          | 0.74                    |
| BCLTP6-026 | 2            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                        | 1.74                    |
| BCLTP6-026 | 2            | ENSG00000198833 | UBE2J1    | ubiquitin conjugating enzyme E2 J1 [Source:HGNC Symbol;Acc:HGNC:17598]                | 0.72                    |
| BCLTP6-027 | 3            | ENSG00000120697 | ALG5      | ALG5, dolichyl-phosphate beta-glucosyltransferase [Source:HGNC Symbol;Acc:HGNC:20266] | 0.76                    |
| BCLTP6-027 | 3            | ENSG00000118985 | ELL2      | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]         | 1.37                    |
| BCLTP6-027 | 3            | ENSG00000113387 | SUB1      | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]           | 0.76                    |
| BCLTP6-028 | 2            | ENSG00000072571 | HMMR      | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]              | 1.38                    |
| BCLTP6-028 | 2            | ENSG00000132646 | PCNA      | proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:HGNC:8729]                 | 0.57                    |
| BCLTP6-029 | 2            | ENSG00000170312 | CDK1      | cyclin dependent kinase 1 [Source:HGNC Symbol;Acc:HGNC:1722]                          | 1.48                    |
| BCLTP6-029 | 2            | ENSG00000104738 | MCM4      | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947]     | 0.76                    |
| BCLTP6-030 | 2            | ENSG00000029993 | HMGB3     | high mobility group box 3 [Source:HGNC Symbol;Acc:HGNC:5004]                          | 1.41                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                           | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-030 | 2            | ENSG00000122952 | ZWINT     | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]                   | 1.58                    |
| BCLTP6-031 | 2            | ENSG00000185624 | P4HB      | prolyl 4-hydroxylase subunit beta [Source:HGNC Symbol;Acc:HGNC:8548]                       | 0.95                    |
| BCLTP6-031 | 2            | ENSG00000163053 | SLC16A14  | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                     | 1.71                    |
| BCLTP6-032 | 3            | ENSG00000108578 | BLMH      | bleomycin hydrolase [Source:HGNC Symbol;Acc:HGNC:1059]                                     | 0.62                    |
| BCLTP6-032 | 3            | ENSG00000259706 | HSP90B2P  | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099] | 1.49                    |
| BCLTP6-032 | 3            | ENSG00000147649 | MTDH      | metadherin [Source:HGNC Symbol;Acc:HGNC:29608]                                             | 0.66                    |
| BCLTP6-033 | 2            | ENSG00000143641 | GALNT2    | polypeptide N-acetylglucosaminyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:4124]           | 0.62                    |
| BCLTP6-033 | 2            | ENSG00000112893 | MAN2A1    | mannosidase alpha class 2A member 1 [Source:HGNC Symbol;Acc:HGNC:6824]                     | 0.64                    |
| BCLTP6-034 | 2            | ENSG00000198876 | DCAF12    | DDB1 and CUL4 associated factor 12 [Source:HGNC Symbol;Acc:HGNC:19911]                     | 1.08                    |
| BCLTP6-034 | 2            | ENSG00000145703 | IQGAP2    | IQ motif containing GTPase activating protein 2 [Source:HGNC Symbol;Acc:HGNC:6111]         | 0.60                    |
| BCLTP6-035 | 2            | ENSG00000198937 | CCDC167   | coiled-coil domain containing 167 [Source:HGNC Symbol;Acc:HGNC:21239]                      | 0.86                    |
| BCLTP6-035 | 2            | ENSG00000108826 | MRPL27    | mitochondrial ribosomal protein L27 [Source:HGNC Symbol;Acc:HGNC:14483]                    | 0.59                    |
| BCLTP6-036 | 2            | ENSG00000167476 | JSRP1     | junctional sarcoplasmic reticulum protein 1 [Source:HGNC Symbol;Acc:HGNC:24963]            | 0.89                    |
| BCLTP6-036 | 2            | ENSG00000122188 | LAX1      | lymphocyte transmembrane adaptor 1 [Source:HGNC Symbol;Acc:HGNC:26005]                     | 0.72                    |
| BCLTP6-037 | 2            | ENSG00000123131 | PRDX4     | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                        | 1.25                    |
| BCLTP6-037 | 2            | ENSG00000182934 | SRPRA     | SRP receptor alpha subunit [Source:HGNC Symbol;Acc:HGNC:11307]                             | 0.63                    |
| BCLTP6-038 | 2            | ENSG00000165672 | PRDX3     | peroxiredoxin 3 [Source:HGNC Symbol;Acc:HGNC:9354]                                         | 0.65                    |
| BCLTP6-038 | 2            | ENSG00000132432 | SEC61G    | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                         | 0.99                    |
| BCLTP6-039 | 3            | ENSG00000171155 | C1GALT1C1 | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                           | 1.00                    |
| BCLTP6-039 | 3            | ENSG00000136770 | DNAJC1    | DnaJ heat shock protein family (Hsp40) member C1 [Source:HGNC Symbol;Acc:HGNC:20090]       | 0.96                    |
| BCLTP6-039 | 3            | ENSG00000071537 | SEL1L     | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]                   | 0.91                    |
| BCLTP6-040 | 3            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]      | 2.15                    |
| BCLTP6-040 | 3            | ENSG00000068489 | PRR11     | proline rich 11 [Source:HGNC Symbol;Acc:HGNC:25619]                                        | 0.83                    |
| BCLTP6-040 | 3            | ENSG00000167325 | RRM1      | ribonucleotide reductase catalytic subunit M1 [Source:HGNC Symbol;Acc:HGNC:10451]          | 0.65                    |
| BCLTP6-041 | 2            | ENSG00000076003 | MCM6      | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949]          | 0.68                    |
| BCLTP6-041 | 2            | ENSG00000175063 | UBE2C     | ubiquitin conjugating enzyme E2 C [Source:HGNC Symbol;Acc:HGNC:15937]                      | 1.24                    |
| BCLTP6-042 | 3            | ENSG00000049656 | CLPTM1L   | CLPTM1 like [Source:HGNC Symbol;Acc:HGNC:24308]                                            | 0.69                    |
| BCLTP6-042 | 3            | ENSG00000167861 | HID1      | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                                 | 1.13                    |
| BCLTP6-042 | 3            | ENSG00000170476 | MZB1      | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]           | 1.07                    |
| BCLTP6-043 | 9            | ENSG00000128595 | CALU      | calumenin [Source:HGNC Symbol;Acc:HGNC:1458]                                               | 1.06                    |
| BCLTP6-043 | 9            | ENSG00000100629 | CEP128    | centrosomal protein 128 [Source:HGNC Symbol;Acc:HGNC:20359]                                | 1.37                    |
| BCLTP6-043 | 9            | ENSG00000102580 | DNAJC3    | DnaJ heat shock protein family (Hsp40) member C3 [Source:HGNC Symbol;Acc:HGNC:9439]        | 0.91                    |
| BCLTP6-043 | 9            | ENSG00000172469 | MANEA     | mannosidase endo-alpha [Source:HGNC Symbol;Acc:HGNC:21072]                                 | 1.03                    |
| BCLTP6-043 | 9            | ENSG00000065485 | PDIA5     | protein disulfide isomerase family A member 5 [Source:HGNC Symbol;Acc:HGNC:24811]          | 1.43                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                       | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-043 | 9            | ENSG00000166562 | SEC11C    | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400]  | 1.16                       |
| BCLTP6-043 | 9            | ENSG00000113615 | SEC24A    | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]      | 1.15                       |
| BCLTP6-043 | 9            | ENSG00000123352 | SPATS2    | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]           | 0.96                       |
| BCLTP6-043 | 9            | ENSG00000138768 | USO1      | USO1 vesicle transport factor [Source:HGNC Symbol;Acc:HGNC:30904]                      | 0.64                       |
| BCLTP6-044 | 2            | ENSG00000178445 | GLDC      | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                               | 1.49                       |
| BCLTP6-044 | 2            | ENSG00000104635 | SLC39A14  | solute carrier family 39 member 14 [Source:HGNC Symbol;Acc:HGNC:20858]                 | 0.63                       |
| BCLTP6-045 | 5            | ENSG00000070081 | NUCB2     | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                      | 1.19                       |
| BCLTP6-045 | 5            | ENSG00000102096 | PIM2      | Pim-2 proto-oncogene, serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:8987]       | 0.82                       |
| BCLTP6-045 | 5            | ENSG00000150961 | SEC24D    | SEC24 homolog D, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10706]      | 1.05                       |
| BCLTP6-045 | 5            | ENSG00000026751 | SLAMF7    | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                               | 1.33                       |
| BCLTP6-045 | 5            | ENSG00000065308 | TRAM2     | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]        | 1.09                       |
| BCLTP6-046 | 2            | ENSG00000174132 | FAM174A   | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]       | 1.14                       |
| BCLTP6-046 | 2            | ENSG00000211973 | IGHV1-69  | immunoglobulin heavy variable 1-69 [Source:HGNC Symbol;Acc:HGNC:5558]                  | 1.77                       |
| BCLTP6-047 | 3            | ENSG00000237649 | KIFC1     | kinesin family member C1 [Source:HGNC Symbol;Acc:HGNC:6389]                            | 1.11                       |
| BCLTP6-047 | 3            | ENSG00000074416 | MGLL      | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                               | 0.94                       |
| BCLTP6-047 | 3            | ENSG00000085840 | ORC1      | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                | 1.26                       |
| BCLTP6-048 | 2            | ENSG00000085063 | CD59      | CD59 molecule [Source:HGNC Symbol;Acc:HGNC:1689]                                       | 0.67                       |
| BCLTP6-048 | 2            | ENSG00000100228 | RAB36     | RAB36, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:9775]                   | 0.85                       |
| BCLTP6-049 | 3            | ENSG00000134285 | FKBP11    | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                           | 1.11                       |
| BCLTP6-049 | 3            | ENSG00000182054 | IDH2      | isocitrate dehydrogenase (NADP(+)) 2, mitochondrial [Source:HGNC Symbol;Acc:HGNC:5383] | 0.87                       |
| BCLTP6-049 | 3            | ENSG00000115902 | SLC1A4    | solute carrier family 1 member 4 [Source:HGNC Symbol;Acc:HGNC:10942]                   | 0.89                       |
| BCLTP6-050 | 2            | ENSG00000112984 | KIF20A    | kinesin family member 20A [Source:HGNC Symbol;Acc:HGNC:9787]                           | 1.50                       |
| BCLTP6-050 | 2            | ENSG00000088325 | TPX2      | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                 | 1.43                       |
| BCLTP6-051 | 3            | ENSG00000198130 | HIBCH     | 3-hydroxyisobutyryl-CoA hydrolase [Source:HGNC Symbol;Acc:HGNC:4908]                   | 0.62                       |
| BCLTP6-051 | 3            | ENSG00000069956 | MAPK6     | mitogen-activated protein kinase 6 [Source:HGNC Symbol;Acc:HGNC:6879]                  | 0.64                       |
| BCLTP6-051 | 3            | ENSG00000118515 | SGK1      | serum/glucocorticoid regulated kinase 1 [Source:HGNC Symbol;Acc:HGNC:10810]            | 1.15                       |
| BCLTP6-052 | 2            | ENSG00000213047 | DENND1B   | DENN domain containing 1B [Source:HGNC Symbol;Acc:HGNC:28404]                          | 0.71                       |
| BCLTP6-052 | 2            | ENSG00000239264 | TXNDC5    | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                    | 1.07                       |
| BCLTP6-053 | 3            | ENSG00000100342 | APOL1     | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                    | 0.94                       |
| BCLTP6-053 | 3            | ENSG00000129173 | E2F8      | E2F transcription factor 8 [Source:HGNC Symbol;Acc:HGNC:24727]                         | 1.96                       |
| BCLTP6-053 | 3            | ENSG00000180879 | SSR4      | signal sequence receptor subunit 4 [Source:HGNC Symbol;Acc:HGNC:11326]                 | 0.68                       |
| BCLTP6-054 | 2            | ENSG00000102471 | NDFIP2    | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                 | 1.29                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                   | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-054 | 2            | ENSG00000189233 | NUGGC     | nuclear GTPase, germinal center associated [Source:HGNC Symbol;Acc:HGNC:33550]                                     | 1.00                       |
| BCLTP6-055 | 4            | ENSG00000119912 | IDE       | insulin degrading enzyme [Source:HGNC Symbol;Acc:HGNC:5381]                                                        | 0.71                       |
| BCLTP6-055 | 4            | ENSG00000113811 | SELENOK   | selenoprotein K [Source:HGNC Symbol;Acc:HGNC:30394]                                                                | 0.71                       |
| BCLTP6-055 | 4            | ENSG00000114902 | SPCS1     | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]                                             | 0.73                       |
| BCLTP6-055 | 4            | ENSG00000170348 | TMED10    | transmembrane p24 trafficking protein 10 [Source:HGNC Symbol;Acc:HGNC:16998]                                       | 0.66                       |
| BCLTP6-056 | 3            | ENSG00000164305 | CASP3     | caspase 3 [Source:HGNC Symbol;Acc:HGNC:1504]                                                                       | 0.71                       |
| BCLTP6-056 | 3            | ENSG00000075420 | FNDC3B    | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]                                      | 1.54                       |
| BCLTP6-056 | 3            | ENSG00000168268 | NT5DC2    | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]                                            | 1.13                       |
| BCLTP6-057 | 3            | ENSG00000108829 | LRRC59    | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                                              | 0.98                       |
| BCLTP6-057 | 3            | ENSG00000111424 | VDR       | vitamin D (1,25- dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]                                 | 1.20                       |
| BCLTP6-057 | 3            | ENSG00000108953 | YWHAE     | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein epsilon [Source:HGNC Symbol;Acc:HGNC:12851] | 0.64                       |
| BCLTP6-058 | 2            | ENSG00000184661 | CDCA2     | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                                               | 1.68                       |
| BCLTP6-058 | 2            | ENSG00000131747 | TOP2A     | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                                                   | 1.18                       |
| BCLTP6-059 | 4            | ENSG00000179218 | CALR      | calreticulin [Source:HGNC Symbol;Acc:HGNC:1455]                                                                    | 0.78                       |
| BCLTP6-059 | 4            | ENSG00000074842 | MYDGF     | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                                                  | 1.43                       |
| BCLTP6-059 | 4            | ENSG00000204386 | NEU1      | neuraminidase 1 [Source:HGNC Symbol;Acc:HGNC:7758]                                                                 | 0.78                       |
| BCLTP6-059 | 4            | ENSG00000163902 | RPN1      | ribophorin I [Source:HGNC Symbol;Acc:HGNC:10381]                                                                   | 0.91                       |
| BCLTP6-060 | 2            | ENSG00000185745 | IFIT1     | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407]                     | 0.65                       |
| BCLTP6-060 | 2            | ENSG00000170027 | YWHAG     | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein gamma [Source:HGNC Symbol;Acc:HGNC:12852]   | 0.62                       |
| BCLTP6-061 | 5            | ENSG00000088298 | EDEM2     | ER degradation enhancing alpha-mannosidase like protein 2 [Source:HGNC Symbol;Acc:HGNC:15877]                      | 0.59                       |
| BCLTP6-061 | 5            | ENSG00000101294 | HM13      | histocompatibility minor 13 [Source:HGNC Symbol;Acc:HGNC:16435]                                                    | 0.89                       |
| BCLTP6-061 | 5            | ENSG00000105438 | KDELRL1   | KDEL endoplasmic reticulum protein retention receptor 1 [Source:HGNC Symbol;Acc:HGNC:6304]                         | 0.64                       |
| BCLTP6-061 | 5            | ENSG00000169223 | LMAN2     | lectin, mannose binding 2 [Source:HGNC Symbol;Acc:HGNC:16986]                                                      | 0.75                       |
| BCLTP6-061 | 5            | ENSG00000184840 | TMED9     | transmembrane p24 trafficking protein 9 [Source:HGNC Symbol;Acc:HGNC:24878]                                        | 0.76                       |
| BCLTP6-062 | 2            | ENSG00000108641 | B9D1      | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                                                         | 1.32                       |
| BCLTP6-062 | 2            | ENSG00000171444 | MCC       | mutated in colorectal cancers [Source:HGNC Symbol;Acc:HGNC:6935]                                                   | 1.20                       |
| BCLTP6-063 | 3            | ENSG00000145354 | CISD2     | CDGSH iron sulfur domain 2 [Source:HGNC Symbol;Acc:HGNC:24212]                                                     | 0.63                       |
| BCLTP6-063 | 3            | ENSG00000049860 | HEXB      | hexosaminidase subunit beta [Source:HGNC Symbol;Acc:HGNC:4879]                                                     | 0.60                       |
| BCLTP6-063 | 3            | ENSG00000132465 | JCHAIN    | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                                         | 1.22                       |
| BCLTP6-064 | 3            | ENSG00000075218 | GTSE1     | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                                                     | 1.23                       |
| BCLTP6-064 | 3            | ENSG00000112378 | PERP      | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                                                  | 1.15                       |
| BCLTP6-064 | 3            | ENSG00000071539 | TRIP13    | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]                                         | 1.23                       |
| BCLTP6-065 | 4            | ENSG00000087502 | ERGIC2    | ERGIC and golgi 2 [Source:HGNC Symbol;Acc:HGNC:30208]                                                              | 0.65                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                      | Log <sub>2</sub> FC | TIV  |
|------------|--------------|-----------------|-------------|-------------------------------------------------------------------------------------------------------|---------------------|------|
| BCLTP6-065 | 4            | ENSG00000198380 | GFPT1       | glutamine-fructose-6-phosphate transaminase [Source:HGNC Symbol;Acc:HGNC:4241]                        | 1                   | 0.69 |
| BCLTP6-065 | 4            | ENSG00000129128 | SPCS3       | signal peptidase complex subunit 3 [Source:HGNC Symbol;Acc:HGNC:26212]                                |                     | 0.69 |
| BCLTP6-065 | 4            | ENSG00000163527 | STT3B       | STT3B, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:30611] |                     | 0.71 |
| BCLTP6-066 | 3            | ENSG00000280411 | IGHV1-69-2  | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                               |                     | 1.53 |
| BCLTP6-066 | 3            | ENSG00000211685 | IGLC7       | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                                   |                     | 0.80 |
| BCLTP6-066 | 3            | ENSG00000186818 | LILRB4      | leukocyte immunoglobulin like receptor B4 [Source:HGNC Symbol;Acc:HGNC:6608]                          |                     | 1.08 |
| BCLTP6-067 | 2            | ENSG00000112312 | GMNN        | geminin, DNA replication inhibitor [Source:HGNC Symbol;Acc:HGNC:17493]                                |                     | 0.86 |
| BCLTP6-067 | 2            | ENSG00000254395 | IGHV4-55    | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]                    |                     | 0.95 |
| BCLTP6-068 | 4            | ENSG00000106462 | EZH2        | enhancer of zeste 2 polycomb repressive complex 2 subunit [Source:HGNC Symbol;Acc:HGNC:3527]          |                     | 0.61 |
| BCLTP6-068 | 4            | ENSG00000253691 | IGKV2OR22-4 | immunoglobulin kappa variable 2/OR22-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5813]                |                     | 1.50 |
| BCLTP6-068 | 4            | ENSG00000169962 | TAS1R3      | taste 1 receptor member 3 [Source:HGNC Symbol;Acc:HGNC:15661]                                         |                     | 0.39 |
| BCLTP6-068 | 4            | ENSG00000136810 | TXN         | thioredoxin [Source:HGNC Symbol;Acc:HGNC:12435]                                                       |                     | 0.80 |
| BCLTP6-069 | 2            | ENSG00000040933 | INPP4A      | inositol polyphosphate-4-phosphatase type IA [Source:HGNC Symbol;Acc:HGNC:6074]                       |                     | 0.67 |
| BCLTP6-069 | 2            | ENSG00000095380 | NANS        | N-acetylneuraminase synthase [Source:HGNC Symbol;Acc:HGNC:19237]                                      |                     | 0.70 |
| BCLTP6-070 | 2            | ENSG00000065328 | MCM10       | minichromosome maintenance 10 replication initiation factor [Source:HGNC Symbol;Acc:HGNC:18043]       |                     | 1.43 |
| BCLTP6-070 | 2            | ENSG00000148773 | MKI67       | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                                      |                     | 1.33 |
| BCLTP6-071 | 3            | ENSG00000169679 | BUB1        | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]                    |                     | 1.61 |
| BCLTP6-071 | 3            | ENSG00000145386 | CCNA2       | cyclin A2 [Source:HGNC Symbol;Acc:HGNC:1578]                                                          |                     | 1.05 |
| BCLTP6-071 | 3            | ENSG00000117632 | STMN1       | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                                         |                     | 0.60 |
| BCLTP6-072 | 4            | ENSG00000093009 | CDC45       | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]                                             |                     | 1.67 |
| BCLTP6-072 | 4            | ENSG00000094804 | CDC6        | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                              |                     | 1.52 |
| BCLTP6-072 | 4            | ENSG00000244116 | IGKV2-28    | immunoglobulin kappa variable 2-28 [Source:HGNC Symbol;Acc:HGNC:5783]                                 |                     | 0.92 |
| BCLTP6-072 | 4            | ENSG00000164109 | MAD2L1      | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]                       |                     | 0.90 |
| BCLTP6-073 | 4            | ENSG00000089685 | BIRC5       | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                                 |                     | 1.55 |
| BCLTP6-073 | 4            | ENSG00000024526 | DEPDC1      | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                                           |                     | 1.82 |
| BCLTP6-073 | 4            | ENSG00000109805 | NCAPG       | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]                             |                     | 1.60 |
| BCLTP6-073 | 4            | ENSG00000080986 | NDC80       | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                              |                     | 0.95 |
| BCLTP6-074 | 3            | ENSG00000092853 | CLSPN       | claspin [Source:HGNC Symbol;Acc:HGNC:19715]                                                           |                     | 1.11 |
| BCLTP6-074 | 3            | ENSG00000242534 | IGKV2D-28   | immunoglobulin kappa variable 2D-28 [Source:HGNC Symbol;Acc:HGNC:5799]                                |                     | 0.67 |
| BCLTP6-074 | 3            | ENSG00000108106 | UBE2S       | ubiquitin conjugating enzyme E2 S [Source:HGNC Symbol;Acc:HGNC:17895]                                 |                     | 0.53 |
| BCLTP6-075 | 2            | ENSG00000224373 | IGHV4-59    | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                                 |                     | 0.98 |
| BCLTP6-075 | 2            | ENSG00000242766 | IGKV1D-17   | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                                |                     | 1.26 |
| BCLTP6-076 | 2            | ENSG00000241351 | IGKV3-11    | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                                 |                     | 0.86 |
| BCLTP6-076 | 2            | ENSG00000166851 | PLK1        | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                                                 |                     | 0.70 |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                            | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-077 | 3            | ENSG00000011426 | ANLN      | anillin actin binding protein [Source:HGNC Symbol;Acc:HGNC:14082]                                           | 1.36                    |
| BCLTP6-077 | 3            | ENSG00000163808 | KIF15     | kinesin family member 15 [Source:HGNC Symbol;Acc:HGNC:17273]                                                | 0.89                    |
| BCLTP6-077 | 3            | ENSG00000121152 | NCAPH     | non-SMC condensin I complex subunit H [Source:HGNC Symbol;Acc:HGNC:1112]                                    | 1.23                    |
| BCLTP6-078 | 2            | ENSG00000185477 | GPRIN3    | GPRIN family member 3 [Source:HGNC Symbol;Acc:HGNC:27733]                                                   | 0.76                    |
| BCLTP6-078 | 2            | ENSG00000227203 | SUB1P1    | SUB1 homolog, transcriptional regulator pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:32300]                    | 0.76                    |
| BCLTP6-079 | 2            | ENSG00000224041 | IGKV3D-15 | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824]                    | 0.80                    |
| BCLTP6-079 | 2            | ENSG00000154839 | SKA1      | spindle and kinetochore associated complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28109]                    | 0.99                    |
| BCLTP6-080 | 5            | ENSG00000198826 | ARHGAP11A | Rho GTPase activating protein 11A [Source:HGNC Symbol;Acc:HGNC:15783]                                       | 0.91                    |
| BCLTP6-080 | 5            | ENSG00000151725 | CENPU     | centromere protein U [Source:HGNC Symbol;Acc:HGNC:21348]                                                    | 1.04                    |
| BCLTP6-080 | 5            | ENSG00000128590 | DNAJB9    | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]                         | 0.90                    |
| BCLTP6-080 | 5            | ENSG00000182481 | KPNA2     | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                                              | 0.77                    |
| BCLTP6-080 | 5            | ENSG00000197780 | TAF13     | TATA-box binding protein associated factor 13 [Source:HGNC Symbol;Acc:HGNC:11546]                           | 0.63                    |
| BCLTP6-081 | 2            | ENSG00000143942 | CHAC2     | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]                               | 1.08                    |
| BCLTP6-081 | 2            | ENSG00000119326 | CTNNAL1   | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                                                     | 1.38                    |
| BCLTP6-082 | 5            | ENSG00000117411 | B4GALT2   | beta-1,4-galactosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:925]                                          | 0.86                    |
| BCLTP6-082 | 5            | ENSG00000180535 | BHLHA15   | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]                                | 1.04                    |
| BCLTP6-082 | 5            | ENSG00000211892 | IGHG4     | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]                       | 1.09                    |
| BCLTP6-082 | 5            | ENSG00000143603 | KCNN3     | potassium calcium-activated channel subfamily N member 3 [Source:HGNC Symbol;Acc:HGNC:6292]                 | 1.03                    |
| BCLTP6-082 | 5            | ENSG00000138760 | SCARB2    | scavenger receptor class B member 2 [Source:HGNC Symbol;Acc:HGNC:1665]                                      | 0.65                    |
| BCLTP6-083 | 6            | ENSG00000124788 | ATXN1     | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                                                | 0.99                    |
| BCLTP6-083 | 6            | ENSG00000136026 | CKAP4     | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                                       | 1.06                    |
| BCLTP6-083 | 6            | ENSG00000154511 | FAM69A    | family with sequence similarity 69 member A [Source:HGNC Symbol;Acc:HGNC:32213]                             | 0.66                    |
| BCLTP6-083 | 6            | ENSG00000115677 | HDLBP     | high density lipoprotein binding protein [Source:HGNC Symbol;Acc:HGNC:4857]                                 | 0.90                    |
| BCLTP6-083 | 6            | ENSG00000228589 | SPCS2P4   | signal peptidase complex subunit 2 homolog (S. cerevisiae) pseudogene 4 [Source:HGNC Symbol;Acc:HGNC:45237] | 0.84                    |
| BCLTP6-083 | 6            | ENSG00000109501 | WFS1      | wolframin ER transmembrane glycoprotein [Source:HGNC Symbol;Acc:HGNC:12762]                                 | 0.81                    |
| BCLTP6-084 | 2            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                                         | 1.21                    |
| BCLTP6-084 | 2            | ENSG00000092621 | PHGDH     | phosphoglycerate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:8923]                                           | 0.98                    |
| BCLTP6-085 | 2            | ENSG00000066279 | ASPM      | abnormal spindle microtubule assembly [Source:HGNC Symbol;Acc:HGNC:19048]                                   | 1.15                    |
| BCLTP6-085 | 2            | ENSG00000211952 | IGHV4-28  | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                                       | 0.46                    |
| BCLTP6-086 | 4            | ENSG00000136010 | ALDH1L2   | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]                               | 1.58                    |
| BCLTP6-086 | 4            | ENSG00000198855 | FICD      | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                                                   | 0.95                    |
| BCLTP6-086 | 4            | ENSG00000100804 | PSMB5     | proteasome subunit beta 5 [Source:HGNC Symbol;Acc:HGNC:9542]                                                | 0.61                    |

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|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-086 | 4            | ENSG00000113621 | TXNDC15   | thioredoxin domain containing 15 [Source:HGNC Symbol;Acc:HGNC:20652]                       | 0.68                    |
| BCLTP6-087 | 4            | ENSG00000143476 | DTL       | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288]       | 1.51                    |
| BCLTP6-087 | 4            | ENSG00000123485 | HJURP     | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]                  | 1.60                    |
| BCLTP6-087 | 4            | ENSG00000211645 | IGLV1-50  | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]    | 1.62                    |
| BCLTP6-087 | 4            | ENSG00000176890 | TYMS      | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                                 | 1.47                    |
| BCLTP6-088 | 5            | ENSG00000123975 | CKS2      | CDC28 protein kinase regulatory subunit 2 [Source:HGNC Symbol;Acc:HGNC:2000]               | 0.78                    |
| BCLTP6-088 | 5            | ENSG00000129562 | DAD1      | defender against cell death 1 [Source:HGNC Symbol;Acc:HGNC:2664]                           | 0.64                    |
| BCLTP6-088 | 5            | ENSG00000227295 | ELL2P1    | elongation factor for RNA polymerase II 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39343] | 1.22                    |
| BCLTP6-088 | 5            | ENSG00000203914 | HSP90B3P  | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100] | 1.50                    |
| BCLTP6-088 | 5            | ENSG00000186594 | MIR22HG   | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                                        | 1.19                    |
| BCLTP6-089 | 2            | ENSG00000131153 | GINS2     | GINS complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:24575]                                 | 0.94                    |
| BCLTP6-089 | 2            | ENSG00000154277 | UCHL1     | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                      | 1.88                    |
| BCLTP6-090 | 3            | ENSG00000182197 | EXT1      | exostosin glycosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:3512]                         | 0.64                    |
| BCLTP6-090 | 3            | ENSG00000129636 | ITFG1     | integrin alpha FG-GAP repeat containing 1 [Source:HGNC Symbol;Acc:HGNC:30697]              | 0.67                    |
| BCLTP6-090 | 3            | ENSG00000079931 | MOXD1     | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                               | 1.20                    |
| BCLTP6-091 | 3            | ENSG00000172339 | ALG14     | ALG14, UDP-N-acetylglucosaminyltransferase subunit [Source:HGNC Symbol;Acc:HGNC:28287]     | 0.61                    |
| BCLTP6-091 | 3            | ENSG00000185164 | NOMO2     | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                      | 1.20                    |
| BCLTP6-091 | 3            | ENSG00000143333 | RGS16     | regulator of G-protein signaling 16 [Source:HGNC Symbol;Acc:HGNC:9997]                     | 1.22                    |
| BCLTP6-092 | 3            | ENSG00000211938 | IGHV3-7   | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                       | 2.47                    |
| BCLTP6-092 | 3            | ENSG00000107104 | KANK1     | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                  | 1.31                    |
| BCLTP6-092 | 3            | ENSG00000179222 | MAGED1    | MAGE family member D1 [Source:HGNC Symbol;Acc:HGNC:6813]                                   | 0.60                    |
| BCLTP6-093 | 4            | ENSG00000126787 | DLGAP5    | DLG associated protein 5 [Source:HGNC Symbol;Acc:HGNC:16864]                               | 1.57                    |
| BCLTP6-093 | 4            | ENSG00000138160 | KIF11     | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                                | 0.93                    |
| BCLTP6-093 | 4            | ENSG00000168078 | PBK       | PDZ binding kinase [Source:HGNC Symbol;Acc:HGNC:18282]                                     | 1.99                    |
| BCLTP6-093 | 4            | ENSG00000171848 | RRM2      | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]         | 1.68                    |
| BCLTP6-094 | 3            | ENSG00000100526 | CDKN3     | cyclin dependent kinase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:1791]                     | 1.38                    |
| BCLTP6-094 | 3            | ENSG00000137807 | KIF23     | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                                | 1.55                    |
| BCLTP6-094 | 3            | ENSG00000142731 | PLK4      | polo like kinase 4 [Source:HGNC Symbol;Acc:HGNC:11397]                                     | 0.69                    |
| BCLTP6-095 | 3            | ENSG00000235587 | GAPDHP65  | glyceraldehyde 3 phosphate dehydrogenase pseudogene 65 [Source:HGNC Symbol;Acc:HGNC:4143]  | 0.65                    |
| BCLTP6-095 | 3            | ENSG00000187837 | HIST1H1C  | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                    | 0.63                    |
| BCLTP6-095 | 3            | ENSG00000211649 | IGLV7-46  | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930]   | 0.68                    |
| BCLTP6-096 | 4            | ENSG00000110063 | DCPS      | decapping enzyme, scavenger [Source:HGNC Symbol;Acc:HGNC:29812]                            | 0.71                    |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                 | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-096 | 4            | ENSG00000211679 | IGLC3     | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]            | 0.84                       |
| BCLTP6-096 | 4            | ENSG00000167634 | NLRP7     | NLR family pyrin domain containing 7 [Source:HGNC Symbol;Acc:HGNC:22947]                         | 1.23                       |
| BCLTP6-096 | 4            | ENSG00000136161 | RCBTB2    | RCC1 and BTB domain containing protein 2 [Source:HGNC Symbol;Acc:HGNC:1914]                      | 0.83                       |
| BCLTP6-097 | 2            | ENSG00000104290 | FZD3      | frizzled class receptor 3 [Source:HGNC Symbol;Acc:HGNC:4041]                                     | 0.64                       |
| BCLTP6-097 | 2            | ENSG00000133328 | HRASLS2   | HRAS like suppressor 2 [Source:HGNC Symbol;Acc:HGNC:17824]                                       | 0.99                       |
| BCLTP6-098 | 5            | ENSG00000139193 | CD27      | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                                | 0.89                       |
| BCLTP6-098 | 5            | ENSG00000138073 | PREB      | prolactin regulatory element binding [Source:HGNC Symbol;Acc:HGNC:9356]                          | 0.63                       |
| BCLTP6-098 | 5            | ENSG00000011478 | QPCTL     | glutamyl-peptide cyclotransferase like [Source:HGNC Symbol;Acc:HGNC:25952]                       | 0.79                       |
| BCLTP6-098 | 5            | ENSG00000157020 | SEC13     | SEC13 homolog, nuclear pore and COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10697] | 0.61                       |
| BCLTP6-098 | 5            | ENSG00000120725 | SIL1      | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                              | 0.82                       |
| BCLTP6-099 | 7            | ENSG00000123989 | CHPF      | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                              | 1.44                       |
| BCLTP6-099 | 7            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]        | 1.85                       |
| BCLTP6-099 | 7            | ENSG00000108984 | MAP2K6    | mitogen-activated protein kinase kinase 6 [Source:HGNC Symbol;Acc:HGNC:6846]                     | 0.61                       |
| BCLTP6-099 | 7            | ENSG00000128228 | SDF2L1    | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                         | 1.23                       |
| BCLTP6-099 | 7            | ENSG00000136868 | SLC31A1   | solute carrier family 31 member 1 [Source:HGNC Symbol;Acc:HGNC:11016]                            | 0.82                       |
| BCLTP6-099 | 7            | ENSG00000017483 | SLC38A5   | solute carrier family 38 member 5 [Source:HGNC Symbol;Acc:HGNC:18070]                            | 0.97                       |
| BCLTP6-099 | 7            | ENSG00000116649 | SRM       | spermidine synthase [Source:HGNC Symbol;Acc:HGNC:11296]                                          | 0.63                       |
| BCLTP6-100 | 2            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                            | 0.54                       |
| BCLTP6-100 | 2            | ENSG00000099337 | KCNK6     | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281]        | 0.81                       |
| BCLTP6-101 | 4            | ENSG00000146376 | ARHGAP18  | Rho GTPase activating protein 18 [Source:HGNC Symbol;Acc:HGNC:21035]                             | 0.61                       |
| BCLTP6-101 | 4            | ENSG00000148468 | FAM171A1  | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]                | 2.42                       |
| BCLTP6-101 | 4            | ENSG00000244575 | IGKV1-27  | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                            | 1.00                       |
| BCLTP6-101 | 4            | ENSG00000025039 | RRAGD     | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                                    | 1.39                       |
| BCLTP6-102 | 2            | ENSG00000113140 | SPARC     | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]                    | 2.23                       |
| BCLTP6-102 | 2            | ENSG00000129235 | TXNDC17   | thioredoxin domain containing 17 [Source:HGNC Symbol;Acc:HGNC:28218]                             | 0.60                       |
| BCLTP6-103 | 3            | ENSG00000165272 | AQP3      | aquaporin 3 (Gill blood group) [Source:HGNC Symbol;Acc:HGNC:636]                                 | 0.94                       |
| BCLTP6-103 | 3            | ENSG00000029153 | ARNTL2    | aryl hydrocarbon receptor nuclear translocator like 2 [Source:HGNC Symbol;Acc:HGNC:18984]        | 0.78                       |
| BCLTP6-103 | 3            | ENSG00000167513 | CDT1      | chromatin licensing and DNA replication factor 1 [Source:HGNC Symbol;Acc:HGNC:24576]             | 0.71                       |
| BCLTP6-104 | 6            | ENSG00000258572 |           |                                                                                                  | 0.97                       |
| BCLTP6-104 | 6            | ENSG00000111665 | CDCA3     | cell division cycle associated 3 [Source:HGNC Symbol;Acc:HGNC:14624]                             | 1.13                       |
| BCLTP6-104 | 6            | ENSG00000135476 | ESPL1     | extra spindle pole bodies like 1, separase [Source:HGNC Symbol;Acc:HGNC:16856]                   | 0.86                       |
| BCLTP6-104 | 6            | ENSG00000140451 | PIF1      | PIF1 5'-to-3' DNA helicase [Source:HGNC Symbol;Acc:HGNC:26220]                                   | 0.69                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                            | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|--------------|---------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-104 | 6            | ENSG00000088826 | SMOX         | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                        | 1.05                       |
| BCLTP6-104 | 6            | ENSG00000076382 | SPAG5        | sperm associated antigen 5 [Source:HGNC Symbol;Acc:HGNC:13452]                              | 0.90                       |
| BCLTP6-105 | 3            | ENSG00000184164 | CRELD2       | cysteine rich with EGF like domains 2 [Source:HGNC Symbol;Acc:HGNC:28150]                   | 0.79                       |
| BCLTP6-105 | 3            | ENSG00000183087 | GAS6         | growth arrest specific 6 [Source:HGNC Symbol;Acc:HGNC:4168]                                 | 0.91                       |
| BCLTP6-105 | 3            | ENSG00000004866 | ST7          | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                         | 0.85                       |
| BCLTP6-106 | 2            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | 1.36                       |
| BCLTP6-106 | 2            | ENSG00000185155 | MIXL1        | Mix paired-like homeobox [Source:HGNC Symbol;Acc:HGNC:13363]                                | 1.15                       |
| BCLTP6-107 | 2            | ENSG00000282600 |              |                                                                                             | 0.81                       |
| BCLTP6-107 | 2            | ENSG00000211943 | IGHV3-15     | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                       | 0.92                       |
| BCLTP6-108 | 3            | ENSG00000088340 | FER1L4       | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]                  | 2.01                       |
| BCLTP6-108 | 3            | ENSG00000144724 | PTPRG        | protein tyrosine phosphatase, receptor type G [Source:HGNC Symbol;Acc:HGNC:9671]            | 0.84                       |
| BCLTP6-108 | 3            | ENSG00000198722 | UNC13B       | unc-13 homolog B [Source:HGNC Symbol;Acc:HGNC:12566]                                        | 1.47                       |
| BCLTP6-109 | 3            | ENSG00000142675 | CNKSR1       | connector enhancer of kinase suppressor of Ras 1 [Source:HGNC Symbol;Acc:HGNC:19700]        | 0.67                       |
| BCLTP6-109 | 3            | ENSG00000211651 | IGLV1-44     | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                      | 1.93                       |
| BCLTP6-109 | 3            | ENSG00000198792 | TMEM184B     | transmembrane protein 184B [Source:HGNC Symbol;Acc:HGNC:1310]                               | 0.72                       |
| BCLTP6-110 | 6            | ENSG00000123080 | CDKN2C       | cyclin dependent kinase inhibitor 2C [Source:HGNC Symbol;Acc:HGNC:1789]                     | 0.88                       |
| BCLTP6-110 | 6            | ENSG00000140525 | FANCI        | Fanconi anemia complementation group I [Source:HGNC Symbol;Acc:HGNC:25568]                  | 0.73                       |
| BCLTP6-110 | 6            | ENSG00000051341 | POLQ         | DNA polymerase theta [Source:HGNC Symbol;Acc:HGNC:9186]                                     | 1.00                       |
| BCLTP6-110 | 6            | ENSG00000037241 | RPL26L1      | ribosomal protein L26 like 1 [Source:HGNC Symbol;Acc:HGNC:17050]                            | 0.71                       |
| BCLTP6-110 | 6            | ENSG00000167900 | TK1          | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                      | 1.01                       |
| BCLTP6-110 | 6            | ENSG00000145817 | YIPF5        | Yip1 domain family member 5 [Source:HGNC Symbol;Acc:HGNC:24877]                             | 0.61                       |
| BCLTP6-111 | 3            | ENSG00000182022 | CHST15       | carbohydrate sulfotransferase 15 [Source:HGNC Symbol;Acc:HGNC:18137]                        | 0.59                       |
| BCLTP6-111 | 3            | ENSG00000162676 | GFI1         | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]    | 1.54                       |
| BCLTP6-111 | 3            | ENSG00000173218 | VANGL1       | VANGL planar cell polarity protein 1 [Source:HGNC Symbol;Acc:HGNC:15512]                    | 0.65                       |
| BCLTP6-112 | 4            | ENSG00000203760 | CENPW        | centromere protein W [Source:HGNC Symbol;Acc:HGNC:21488]                                    | 0.89                       |
| BCLTP6-112 | 4            | ENSG00000172115 | CYCS         | cytochrome c, somatic [Source:HGNC Symbol;Acc:HGNC:19986]                                   | 0.61                       |
| BCLTP6-112 | 4            | ENSG00000224607 | IGKV1D-27    | immunoglobulin kappa variable 1D-27 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5751]         | 1.22                       |
| BCLTP6-112 | 4            | ENSG00000166803 | KIAA0101     | KIAA0101 [Source:HGNC Symbol;Acc:HGNC:28961]                                                | 1.03                       |
| BCLTP6-113 | 3            | ENSG00000012048 | BRCA1        | BRCA1, DNA repair associated [Source:HGNC Symbol;Acc:HGNC:1100]                             | 0.72                       |
| BCLTP6-113 | 3            | ENSG00000090889 | KIF4A        | kinesin family member 4A [Source:HGNC Symbol;Acc:HGNC:13339]                                | 1.17                       |
| BCLTP6-113 | 3            | ENSG00000078900 | TP73         | tumor protein p73 [Source:HGNC Symbol;Acc:HGNC:12003]                                       | 1.05                       |
| BCLTP6-114 | 5            | ENSG00000064763 | FAR2         | fatty acyl-CoA reductase 2 [Source:HGNC Symbol;Acc:HGNC:25531]                              | 0.91                       |
| BCLTP6-114 | 5            | ENSG00000101003 | GINS1        | GINS complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28980]                                  | 0.89                       |
| BCLTP6-114 | 5            | ENSG00000118193 | KIF14        | kinesin family member 14 [Source:HGNC Symbol;Acc:HGNC:19181]                                | 1.08                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-114 | 5            | ENSG00000184232 | OAF         | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                                                                 | 1.01                    |
| BCLTP6-114 | 5            | ENSG00000183010 | PYCR1       | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]                                                                   | 1.14                    |
| BCLTP6-115 | 2            | ENSG00000228327 |             |                                                                                                                                          | -0.63                   |
| BCLTP6-115 | 2            | ENSG00000185522 | LMNTD2      | lamin tail domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28561]                                                                       | -0.61                   |
| BCLTP6-116 | 2            | ENSG00000182985 | CADM1       | cell adhesion molecule 1 [Source:HGNC Symbol;Acc:HGNC:5951]                                                                              | 1.13                    |
| BCLTP6-116 | 2            | ENSG00000115415 | STAT1       | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]                                                   | 0.46                    |
| BCLTP6-117 | 5            | ENSG00000216775 |             |                                                                                                                                          | 1.47                    |
| BCLTP6-117 | 5            | ENSG00000198018 | ENTPD7      | ectonucleoside triphosphate diphosphohydrolase 7 [Source:HGNC Symbol;Acc:HGNC:19745]                                                     | 0.83                    |
| BCLTP6-117 | 5            | ENSG00000168496 | FEN1        | flap structure-specific endonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3650]                                                                | 0.84                    |
| BCLTP6-117 | 5            | ENSG00000186185 | KIF18B      | kinesin family member 18B [Source:HGNC Symbol;Acc:HGNC:27102]                                                                            | 1.29                    |
| BCLTP6-117 | 5            | ENSG00000065911 | MTHFD2      | methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methylenetetrahydrofolate cyclohydrolase [Source:HGNC Symbol;Acc:HGNC:7434] | 0.83                    |
| BCLTP6-118 | 2            | ENSG00000185480 | PARPBP      | PARP1 binding protein [Source:HGNC Symbol;Acc:HGNC:26074]                                                                                | 0.92                    |
| BCLTP6-118 | 2            | ENSG00000111186 | WNT5B       | Wnt family member 5B [Source:HGNC Symbol;Acc:HGNC:16265]                                                                                 | 2.38                    |
| BCLTP6-119 | 3            | ENSG00000243238 | IGKV2-30    | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                                                                    | 1.46                    |
| BCLTP6-119 | 3            | ENSG00000239571 | IGKV2D-30   | immunoglobulin kappa variable 2D-30 [Source:HGNC Symbol;Acc:HGNC:5801]                                                                   | 1.49                    |
| BCLTP6-119 | 3            | ENSG00000211668 | IGLV2-11    | immunoglobulin lambda variable 2-11 [Source:HGNC Symbol;Acc:HGNC:5887]                                                                   | 0.66                    |
| BCLTP6-120 | 7            | ENSG00000138166 | DUSP5       | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                                                                        | 1.66                    |
| BCLTP6-120 | 7            | ENSG00000111640 | GAPDH       | glyceraldehyde-3-phosphate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:4141]                                                              | 0.73                    |
| BCLTP6-120 | 7            | ENSG00000163754 | GYG1        | glycogenin 1 [Source:HGNC Symbol;Acc:HGNC:4699]                                                                                          | 0.61                    |
| BCLTP6-120 | 7            | ENSG00000101057 | MYBL2       | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                                                             | 1.25                    |
| BCLTP6-120 | 7            | ENSG00000168653 | NDUFS5      | NADH:ubiquinone oxidoreductase subunit S5 [Source:HGNC Symbol;Acc:HGNC:7712]                                                             | 0.60                    |
| BCLTP6-120 | 7            | ENSG00000146733 | PSPH        | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                                                                             | 0.74                    |
| BCLTP6-120 | 7            | ENSG00000168701 | TMEM208     | transmembrane protein 208 [Source:HGNC Symbol;Acc:HGNC:25015]                                                                            | 0.82                    |
| BCLTP6-121 | 3            | ENSG00000255733 | IFNG-AS1    | IFNG antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:43910]                                                                                 | 0.62                    |
| BCLTP6-121 | 3            | ENSG00000231475 | IGHV4-31    | immunoglobulin heavy variable 4-31 [Source:HGNC Symbol;Acc:HGNC:5649]                                                                    | 0.61                    |
| BCLTP6-121 | 3            | ENSG00000239975 | IGKV1D-33   | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                                                                   | 1.58                    |
| BCLTP6-122 | 3            | ENSG00000270472 | IGHV3OR16-9 | immunoglobulin heavy variable 3/OR16-9 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5644]                                               | 1.56                    |
| BCLTP6-122 | 3            | ENSG00000211648 | IGLV1-47    | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                                                                   | 1.29                    |
| BCLTP6-122 | 3            | ENSG00000177301 | KCNA2       | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220]                                                  | 1.05                    |
| BCLTP6-123 | 6            | ENSG00000153093 | ACOXL       | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                                                                                | 2.20                    |
| BCLTP6-123 | 6            | ENSG00000111291 | GPRC5D      | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310]                                                  | 1.02                    |
| BCLTP6-123 | 6            | ENSG00000172965 | MIR4435-2HG | MIR4435-2 host gene [Source:HGNC Symbol;Acc:HGNC:35163]                                                                                  | 1.25                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-123 | 6            | ENSG00000239672 | NME1      | NME/NM23 nucleoside diphosphate kinase 1 [Source:HGNC Symbol;Acc:HGNC:7849]                                          | 0.76                       |
| BCLTP6-123 | 6            | ENSG00000164611 | PTTG1     | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                                                    | 1.20                       |
| BCLTP6-123 | 6            | ENSG00000100883 | SRP54     | signal recognition particle 54 [Source:HGNC Symbol;Acc:HGNC:11301]                                                   | 0.73                       |
| BCLTP6-124 | 4            | ENSG00000248571 |           |                                                                                                                      | 1.63                       |
| BCLTP6-124 | 4            | ENSG00000113273 | ARSB      | arylsulfatase B [Source:HGNC Symbol;Acc:HGNC:714]                                                                    | 0.61                       |
| BCLTP6-124 | 4            | ENSG00000121807 | CCR2      | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                                                    | 1.66                       |
| BCLTP6-124 | 4            | ENSG00000137806 | NDUFAF1   | NADH:ubiquinone oxidoreductase complex assembly factor 1 [Source:HGNC Symbol;Acc:HGNC:18828]                         | 0.60                       |
| BCLTP6-125 | 3            | ENSG00000035499 | DEPDC1B   | DEP domain containing 1B [Source:HGNC Symbol;Acc:HGNC:24902]                                                         | 0.94                       |
| BCLTP6-125 | 3            | ENSG00000164104 | HMGB2     | high mobility group box 2 [Source:HGNC Symbol;Acc:HGNC:5000]                                                         | 0.50                       |
| BCLTP6-125 | 3            | ENSG00000211976 | IGHV3-73  | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                                                | 0.84                       |
| BCLTP6-126 | 2            | ENSG00000241755 | IGKV1-9   | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                                                 | 0.93                       |
| BCLTP6-126 | 2            | ENSG00000211632 | IGKV3D-11 | immunoglobulin kappa variable 3D-11 [Source:HGNC Symbol;Acc:HGNC:5823]                                               | 0.74                       |
| BCLTP6-127 | 2            | ENSG00000280063 |           |                                                                                                                      | -0.62                      |
| BCLTP6-127 | 2            | ENSG00000180747 | SMG1P3    | SMG1P3, nonsense mediated mRNA decay associated PI3K related kinase pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:49860] | -0.40                      |
| BCLTP6-128 | 6            | ENSG00000134057 | CCNB1     | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                                                         | 0.97                       |
| BCLTP6-128 | 6            | ENSG00000007968 | E2F2      | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                                                        | 0.72                       |
| BCLTP6-128 | 6            | ENSG00000251546 | IGKV1D-39 | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                                               | 0.83                       |
| BCLTP6-128 | 6            | ENSG00000117650 | NEK2      | NIMA related kinase 2 [Source:HGNC Symbol;Acc:HGNC:7745]                                                             | 1.22                       |
| BCLTP6-128 | 6            | ENSG00000123473 | STIL      | SCL/TAL1 interrupting locus [Source:HGNC Symbol;Acc:HGNC:10879]                                                      | 0.77                       |
| BCLTP6-128 | 6            | ENSG00000167553 | TUBA1C    | tubulin alpha 1c [Source:HGNC Symbol;Acc:HGNC:20768]                                                                 | 0.57                       |
| BCLTP6-129 | 3            | ENSG00000179750 | APOBEC3B  | apolipoprotein B mRNA editing enzyme catalytic subunit 3B [Source:HGNC Symbol;Acc:HGNC:17352]                        | 0.98                       |
| BCLTP6-129 | 3            | ENSG00000087586 | AURKA     | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                                                  | 0.96                       |
| BCLTP6-129 | 3            | ENSG00000164045 | CDC25A    | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                                                           | 1.66                       |
| BCLTP6-130 | 8            | ENSG00000165895 | ARHGAP42  | Rho GTPase activating protein 42 [Source:HGNC Symbol;Acc:HGNC:26545]                                                 | 0.59                       |
| BCLTP6-130 | 8            | ENSG00000153162 | BMP6      | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                                                      | 1.06                       |
| BCLTP6-130 | 8            | ENSG00000211897 | IGHG3     | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]                                | 1.04                       |
| BCLTP6-130 | 8            | ENSG00000211592 | IGKC      | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                                                     | 0.78                       |
| BCLTP6-130 | 8            | ENSG00000176658 | MYO1D     | myosin ID [Source:HGNC Symbol;Acc:HGNC:7598]                                                                         | 0.90                       |
| BCLTP6-130 | 8            | ENSG00000163694 | RBM47     | RNA binding motif protein 47 [Source:HGNC Symbol;Acc:HGNC:30358]                                                     | 1.07                       |
| BCLTP6-130 | 8            | ENSG00000198794 | SCAMP5    | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                                             | 1.17                       |
| BCLTP6-130 | 8            | ENSG00000103257 | SLC7A5    | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                                                 | 1.11                       |
| BCLTP6-131 | 7            | ENSG00000197476 |           |                                                                                                                      | 1.60                       |
| BCLTP6-131 | 7            | ENSG00000150967 | ABCB9     | ATP binding cassette subfamily B member 9 [Source:HGNC Symbol;Acc:HGNC:50]                                           | 0.90                       |
| BCLTP6-131 | 7            | ENSG00000140743 | CDR2      | cerebellar degeneration related protein 2 [Source:HGNC Symbol;Acc:HGNC:1799]                                         | 0.62                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                              | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-------------|-----------------------------------------------------------------------------------------------|-------------------------|
| BCLTP6-131 | 7            | ENSG00000173486 | FKBP2       | FK506 binding protein 2 [Source:HGNC Symbol;Acc:HGNC:3718]                                    | 0.53                    |
| BCLTP6-131 | 7            | ENSG00000103512 | NOMO1       | NODAL modulator 1 [Source:HGNC Symbol;Acc:HGNC:30060]                                         | 0.84                    |
| BCLTP6-131 | 7            | ENSG00000102760 | RGCC        | regulator of cell cycle [Source:HGNC Symbol;Acc:HGNC:20369]                                   | 0.68                    |
| BCLTP6-131 | 7            | ENSG00000136840 | ST6GALNAC4  | ST6 N-acetylgalactosaminide alpha-2,6-sialyltransferase 4 [Source:HGNC Symbol;Acc:HGNC:17846] | 0.58                    |
| BCLTP6-132 | 4            | ENSG00000086062 | B4GALT1     | beta-1,4-galactosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:924]                            | 0.68                    |
| BCLTP6-132 | 4            | ENSG00000083444 | PLOD1       | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]          | 0.86                    |
| BCLTP6-132 | 4            | ENSG00000186522 | SEPT10      | septin 10 [Source:HGNC Symbol;Acc:HGNC:14349]                                                 | 1.01                    |
| BCLTP6-132 | 4            | ENSG00000198879 | SFMBT2      | Scm-like with four mbt domains 2 [Source:HGNC Symbol;Acc:HGNC:20256]                          | 0.59                    |
| BCLTP6-133 | 2            | ENSG00000211662 | IGLV3-21    | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                        | 1.61                    |
| BCLTP6-133 | 2            | ENSG00000137812 | KNL1        | kinetochore scaffold 1 [Source:HGNC Symbol;Acc:HGNC:24054]                                    | 0.68                    |
| BCLTP6-134 | 2            | ENSG00000241666 |             |                                                                                               | -0.90                   |
| BCLTP6-134 | 2            | ENSG00000006638 | TBXA2R      | thromboxane A2 receptor [Source:HGNC Symbol;Acc:HGNC:11608]                                   | -0.82                   |
| BCLTP6-135 | 2            | ENSG00000196839 | ADA         | adenosine deaminase [Source:HGNC Symbol;Acc:HGNC:186]                                         | 0.64                    |
| BCLTP6-135 | 2            | ENSG0000010310  | GIPR        | gastric inhibitory polypeptide receptor [Source:HGNC Symbol;Acc:HGNC:4271]                    | 0.65                    |
| BCLTP6-136 | 3            | ENSG00000188486 | H2AFX       | H2A histone family member X [Source:HGNC Symbol;Acc:HGNC:4739]                                | 0.48                    |
| BCLTP6-136 | 3            | ENSG00000123416 | TUBA1B      | tubulin alpha 1b [Source:HGNC Symbol;Acc:HGNC:18809]                                          | 0.47                    |
| BCLTP6-136 | 3            | ENSG00000140105 | WARS        | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                              | 0.77                    |
| BCLTP6-137 | 4            | ENSG00000101412 | E2F1        | E2F transcription factor 1 [Source:HGNC Symbol;Acc:HGNC:3113]                                 | 0.88                    |
| BCLTP6-137 | 4            | ENSG00000211669 | IGLV3-10    | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                        | 1.00                    |
| BCLTP6-137 | 4            | ENSG00000211659 | IGLV3-25    | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                        | 1.02                    |
| BCLTP6-137 | 4            | ENSG00000077152 | UBE2T       | ubiquitin conjugating enzyme E2 T [Source:HGNC Symbol;Acc:HGNC:25009]                         | 0.87                    |
| BCLTP6-138 | 3            | ENSG00000156970 | BUB1B       | BUB1 mitotic checkpoint serine/threonine kinase B [Source:HGNC Symbol;Acc:HGNC:1149]          | 1.04                    |
| BCLTP6-138 | 3            | ENSG00000175984 | DENND2C     | DENN domain containing 2C [Source:HGNC Symbol;Acc:HGNC:24748]                                 | 0.98                    |
| BCLTP6-138 | 3            | ENSG00000139734 | DIAPH3      | diaphanous related formin 3 [Source:HGNC Symbol;Acc:HGNC:15480]                               | 2.00                    |
| BCLTP6-139 | 4            | ENSG00000222041 | CYTOR       | cytoskeleton regulator RNA [Source:HGNC Symbol;Acc:HGNC:28717]                                | 1.05                    |
| BCLTP6-139 | 4            | ENSG00000254174 | IGHV1-12    | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]            | 1.76                    |
| BCLTP6-139 | 4            | ENSG00000259997 | IGHV1OR16-4 | immunoglobulin heavy variable 1/OR16-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5573]        | 2.13                    |
| BCLTP6-139 | 4            | ENSG00000211673 | IGLV3-1     | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                         | 1.06                    |
| BCLTP6-140 | 2            | ENSG00000279873 | LINC01126   | long intergenic non-protein coding RNA 1126 [Source:HGNC Symbol;Acc:HGNC:49275]               | -0.74                   |
| BCLTP6-140 | 2            | ENSG00000233806 | LINC01237   | long intergenic non-protein coding RNA 1237 [Source:HGNC Symbol;Acc:HGNC:49793]               | -0.50                   |
| BCLTP6-141 | 3            | ENSG00000141753 | IGFBP4      | insulin like growth factor binding protein 4 [Source:HGNC Symbol;Acc:HGNC:5473]               | -0.61                   |
| BCLTP6-141 | 3            | ENSG00000228903 | RASA4CP     | RAS p21 protein activator 4C, pseudogene [Source:HGNC Symbol;Acc:HGNC:44185]                  | -0.65                   |
| BCLTP6-141 | 3            | ENSG00000196263 | ZNF471      | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]                                   | -0.35                   |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                              | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------------|----------------------------|
| BCLTP6-142 | 3            | ENSG00000213430 | HSPD1P1   | heat shock protein family D (Hsp60) member 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:35133] | 0.80                       |
| BCLTP6-142 | 3            | ENSG00000163507 | KIAA1524  | KIAA1524 [Source:HGNC Symbol;Acc:HGNC:29302]                                                  | 0.59                       |
| BCLTP6-142 | 3            | ENSG00000154719 | MRPL39    | mitochondrial ribosomal protein L39 [Source:HGNC Symbol;Acc:HGNC:14027]                       | 0.61                       |
| BCLTP6-143 | 4            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                         | 0.67                       |
| BCLTP6-143 | 4            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                         | 1.06                       |
| BCLTP6-143 | 4            | ENSG00000240382 | IGKV1-17  | immunoglobulin kappa variable 1-17 [Source:HGNC Symbol;Acc:HGNC:5733]                         | 0.71                       |
| BCLTP6-143 | 4            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]       | 0.75                       |
| BCLTP6-144 | 3            | ENSG00000279278 |           |                                                                                               | -0.65                      |
| BCLTP6-144 | 3            | ENSG00000178127 | NDUFV2    | NADH:ubiquinone oxidoreductase core subunit V2 [Source:HGNC Symbol;Acc:HGNC:7717]             | -0.40                      |
| BCLTP6-144 | 3            | ENSG00000197714 | ZNF460    | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                                   | -0.53                      |
| BCLTP6-145 | 2            | ENSG00000254176 | IGHV3-75  | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]            | 0.62                       |
| BCLTP6-145 | 2            | ENSG00000253131 | IGHV7-56  | immunoglobulin heavy variable 7-56 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5667]            | 1.97                       |
| BCLTP6-146 | 2            | ENSG00000211933 | IGHV6-1   | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                          | 0.79                       |
| BCLTP6-146 | 2            | ENSG00000104889 | RNASEH2A  | ribonuclease H2 subunit A [Source:HGNC Symbol;Acc:HGNC:18518]                                 | 0.38                       |
| BCLTP6-147 | 4            | ENSG00000241294 | IGKV2-24  | immunoglobulin kappa variable 2-24 [Source:HGNC Symbol;Acc:HGNC:5781]                         | 1.04                       |
| BCLTP6-147 | 4            | ENSG00000253818 | IGLV1-41  | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]           | 1.43                       |
| BCLTP6-147 | 4            | ENSG00000211644 | IGLV1-51  | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                        | 1.37                       |
| BCLTP6-147 | 4            | ENSG00000107719 | PALD1     | phosphatase domain containing, paladin 1 [Source:HGNC Symbol;Acc:HGNC:23530]                  | 0.53                       |
| BCLTP6-148 | 6            | ENSG00000255026 |           |                                                                                               | -0.61                      |
| BCLTP6-148 | 6            | ENSG00000274272 |           |                                                                                               | -0.60                      |
| BCLTP6-148 | 6            | ENSG00000168209 | DDIT4     | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                         | -0.83                      |
| BCLTP6-148 | 6            | ENSG00000220008 | LINGO3    | leucine rich repeat and Ig domain containing 3 [Source:HGNC Symbol;Acc:HGNC:21206]            | -0.65                      |
| BCLTP6-148 | 6            | ENSG00000172548 | NIPAL4    | NIPA like domain containing 4 [Source:HGNC Symbol;Acc:HGNC:28018]                             | -0.76                      |
| BCLTP6-148 | 6            | ENSG00000080546 | SESN1     | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                                 | -0.62                      |

Table 32: Co-expressed gene clusters (B Cells, Day 6)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                            | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-001 | 2            | ENSG00000198856 | OSTC      | oligosaccharyltransferase complex non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:24448] | 0.69                       |
| BCLTP7-001 | 2            | ENSG00000057657 | PRDM1     | PR/SET domain 1 [Source:HGNC Symbol;Acc:HGNC:9346]                                          | 0.64                       |
| BCLTP7-002 | 2            | ENSG00000173540 | GMPPB     | GDP-mannose pyrophosphorylase B [Source:HGNC Symbol;Acc:HGNC:22932]                         | 0.65                       |
| BCLTP7-002 | 2            | ENSG00000163053 | SLC16A14  | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                      | 1.23                       |
| BCLTP7-003 | 2            | ENSG00000134285 | FKBP11    | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                                | 0.93                       |
| BCLTP7-003 | 2            | ENSG00000143333 | RGS16     | regulator of G-protein signaling 16 [Source:HGNC Symbol;Acc:HGNC:9997]                      | 1.10                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                            | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-004 | 2            | ENSG00000102580 | DNAJC3    | DnaJ heat shock protein family (Hsp40) member C3 [Source:HGNC Symbol;Acc:HGNC:9439]                         | 0.70                       |
| BCLTP7-004 | 2            | ENSG00000170476 | MZB1      | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]                            | 0.95                       |
| BCLTP7-005 | 2            | ENSG00000163902 | RPN1      | ribophorin I [Source:HGNC Symbol;Acc:HGNC:10381]                                                            | 0.76                       |
| BCLTP7-005 | 2            | ENSG00000118705 | RPN2      | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                                           | 0.87                       |
| BCLTP7-006 | 2            | ENSG00000074695 | LMAN1     | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                                                | 0.85                       |
| BCLTP7-006 | 2            | ENSG00000153066 | TXNDC11   | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                                        | 0.86                       |
| BCLTP7-007 | 3            | ENSG00000143870 | PDIA6     | protein disulfide isomerase family A member 6 [Source:HGNC Symbol;Acc:HGNC:30168]                           | 0.74                       |
| BCLTP7-007 | 3            | ENSG00000197157 | SND1      | staphylococcal nuclease and tudor domain containing 1 [Source:HGNC Symbol;Acc:HGNC:30646]                   | 0.48                       |
| BCLTP7-007 | 3            | ENSG00000116649 | SRM       | spermidine synthase [Source:HGNC Symbol;Acc:HGNC:11296]                                                     | 0.58                       |
| BCLTP7-008 | 2            | ENSG00000135916 | ITM2C     | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                                             | 1.07                       |
| BCLTP7-008 | 2            | ENSG00000074842 | MYDGF     | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                                           | 1.30                       |
| BCLTP7-009 | 2            | ENSG00000128595 | CALU      | calumenin [Source:HGNC Symbol;Acc:HGNC:1458]                                                                | 0.74                       |
| BCLTP7-009 | 2            | ENSG00000113615 | SEC24A    | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]                           | 0.91                       |
| BCLTP7-010 | 2            | ENSG00000166598 | HSP90B1   | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]                              | 1.18                       |
| BCLTP7-010 | 2            | ENSG00000203914 | HSP90B3P  | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100]                  | 1.28                       |
| BCLTP7-011 | 2            | ENSG00000164611 | PTTG1     | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                                           | 0.76                       |
| BCLTP7-011 | 2            | ENSG00000104635 | SLC39A14  | solute carrier family 39 member 14 [Source:HGNC Symbol;Acc:HGNC:20858]                                      | 0.49                       |
| BCLTP7-012 | 2            | ENSG00000002549 | LAP3      | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                                                | 0.71                       |
| BCLTP7-012 | 2            | ENSG00000228589 | SPCS2P4   | signal peptidase complex subunit 2 homolog (S. cerevisiae) pseudogene 4 [Source:HGNC Symbol;Acc:HGNC:45237] | 0.69                       |
| BCLTP7-013 | 3            | ENSG00000044574 | HSPA5     | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]                             | 0.97                       |
| BCLTP7-013 | 3            | ENSG00000070081 | NUCB2     | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                                           | 0.97                       |
| BCLTP7-013 | 3            | ENSG00000166794 | PPIB      | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                                               | 0.98                       |
| BCLTP7-014 | 2            | ENSG00000134153 | EMC7      | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]                                   | 0.60                       |
| BCLTP7-014 | 2            | ENSG00000068912 | ERLEC1    | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                                          | 0.90                       |
| BCLTP7-015 | 2            | ENSG00000017483 | SLC38A5   | solute carrier family 38 member 5 [Source:HGNC Symbol;Acc:HGNC:18070]                                       | 0.78                       |
| BCLTP7-015 | 2            | ENSG00000182934 | SRPRA     | SRP receptor alpha subunit [Source:HGNC Symbol;Acc:HGNC:11307]                                              | 0.52                       |
| BCLTP7-016 | 2            | ENSG00000119523 | ALG2      | ALG2, alpha-1,3/1,6-mannosyltransferase [Source:HGNC Symbol;Acc:HGNC:23159]                                 | 0.37                       |
| BCLTP7-016 | 2            | ENSG00000142675 | CNKSR1    | connector enhancer of kinase suppressor of Ras 1 [Source:HGNC Symbol;Acc:HGNC:19700]                        | 0.63                       |
| BCLTP7-017 | 2            | ENSG00000125844 | RRBP1     | ribosome binding protein 1 [Source:HGNC Symbol;Acc:HGNC:10448]                                              | 0.80                       |
| BCLTP7-017 | 2            | ENSG00000004866 | ST7       | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                                         | 0.74                       |
| BCLTP7-018 | 3            | ENSG00000088298 | EDEM2     | ER degradation enhancing alpha-mannosidase like protein 2 [Source:HGNC Symbol;Acc:HGNC:15877]               | 0.49                       |
| BCLTP7-018 | 3            | ENSG00000101294 | HM13      | histocompatibility minor 13 [Source:HGNC Symbol;Acc:HGNC:16435]                                             | 0.73                       |
| BCLTP7-018 | 3            | ENSG00000121073 | SLC35B1   | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                                      | 0.66                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                           | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-019 | 2            | ENSG00000168374 | ARF4      | ADP ribosylation factor 4 [Source:HGNC Symbol;Acc:HGNC:655]                                | 0.60                       |
| BCLTP7-019 | 2            | ENSG00000113811 | SELENOK   | selenoprotein K [Source:HGNC Symbol;Acc:HGNC:30394]                                        | 0.59                       |
| BCLTP7-020 | 2            | ENSG00000071539 | TRIP13    | thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:HGNC:12307]                 | 0.90                       |
| BCLTP7-020 | 2            | ENSG00000167553 | TUBA1C    | tubulin alpha 1c [Source:HGNC Symbol;Acc:HGNC:20768]                                       | 0.32                       |
| BCLTP7-021 | 4            | ENSG00000184432 | COPB2     | coatamer protein complex subunit beta 2 [Source:HGNC Symbol;Acc:HGNC:2232]                 | 0.49                       |
| BCLTP7-021 | 4            | ENSG00000106105 | GARS      | glycyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:4162]                                  | 0.51                       |
| BCLTP7-021 | 4            | ENSG00000136240 | KDEL2     | KDEL endoplasmic reticulum protein retention receptor 2 [Source:HGNC Symbol;Acc:HGNC:6305] | 0.67                       |
| BCLTP7-021 | 4            | ENSG00000112893 | MAN2A1    | mannosidase alpha class 2A member 1 [Source:HGNC Symbol;Acc:HGNC:6824]                     | 0.45                       |
| BCLTP7-022 | 3            | ENSG00000090520 | DNAJB11   | DnaJ heat shock protein family (Hsp40) member B11 [Source:HGNC Symbol;Acc:HGNC:14889]      | 0.68                       |
| BCLTP7-022 | 3            | ENSG00000171444 | MCC       | mutated in colorectal cancers [Source:HGNC Symbol;Acc:HGNC:6935]                           | 1.03                       |
| BCLTP7-022 | 3            | ENSG00000166562 | SEC11C    | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400]      | 0.93                       |
| BCLTP7-023 | 2            | ENSG00000011478 | QPCTL     | glutamyl-peptide cyclotransferase like [Source:HGNC Symbol;Acc:HGNC:25952]                 | 0.73                       |
| BCLTP7-023 | 2            | ENSG00000168701 | TMEM208   | transmembrane protein 208 [Source:HGNC Symbol;Acc:HGNC:25015]                              | 0.73                       |
| BCLTP7-024 | 4            | ENSG00000120697 | ALG5      | ALG5, dolichyl-phosphate beta-glucosyltransferase [Source:HGNC Symbol;Acc:HGNC:20266]      | 0.59                       |
| BCLTP7-024 | 4            | ENSG00000259706 | HSP90B2P  | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099] | 1.13                       |
| BCLTP7-024 | 4            | ENSG00000132432 | SEC61G    | Sec61 translocon gamma subunit [Source:HGNC Symbol;Acc:HGNC:18277]                         | 0.77                       |
| BCLTP7-024 | 4            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                     | 1.04                       |
| BCLTP7-025 | 2            | ENSG00000138073 | PREB      | prolactin regulatory element binding [Source:HGNC Symbol;Acc:HGNC:9356]                    | 0.52                       |
| BCLTP7-025 | 2            | ENSG00000184840 | TMED9     | transmembrane p24 trafficking protein 9 [Source:HGNC Symbol;Acc:HGNC:24878]                | 0.69                       |
| BCLTP7-026 | 3            | ENSG00000127022 | CANX      | calnexin [Source:HGNC Symbol;Acc:HGNC:1473]                                                | 0.46                       |
| BCLTP7-026 | 3            | ENSG00000123131 | PRDX4     | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                        | 1.03                       |
| BCLTP7-026 | 3            | ENSG00000180879 | SSR4      | signal sequence receptor subunit 4 [Source:HGNC Symbol;Acc:HGNC:11326]                     | 0.64                       |
| BCLTP7-027 | 2            | ENSG00000165272 | AQP3      | aquaporin 3 (Gill blood group) [Source:HGNC Symbol;Acc:HGNC:636]                           | 0.71                       |
| BCLTP7-027 | 2            | ENSG00000108106 | UBE2S     | ubiquitin conjugating enzyme E2 S [Source:HGNC Symbol;Acc:HGNC:17895]                      | 0.50                       |
| BCLTP7-028 | 5            | ENSG00000111291 | GPRC5D    | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310]    | 0.83                       |
| BCLTP7-028 | 5            | ENSG00000147649 | MTDH      | metadherin [Source:HGNC Symbol;Acc:HGNC:29608]                                             | 0.46                       |
| BCLTP7-028 | 5            | ENSG00000168268 | NT5DC2    | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]                    | 0.96                       |
| BCLTP7-028 | 5            | ENSG00000114850 | SSR3      | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]                     | 0.74                       |
| BCLTP7-028 | 5            | ENSG00000067167 | TRAM1     | translocation associated membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:20568]            | 0.49                       |
| BCLTP7-029 | 3            | ENSG00000139193 | CD27      | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                          | 0.85                       |
| BCLTP7-029 | 3            | ENSG00000182054 | IDH2      | isocitrate dehydrogenase (NADP(+)) 2, mitochondrial [Source:HGNC Symbol;Acc:HGNC:5383]     | 0.78                       |
| BCLTP7-029 | 3            | ENSG00000095380 | NANS      | N-acetylneuraminate synthase [Source:HGNC Symbol;Acc:HGNC:19237]                           | 0.57                       |
| BCLTP7-030 | 4            | ENSG00000004468 | CD38      | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                           | 1.07                       |
| BCLTP7-030 | 4            | ENSG00000172115 | CYCS      | cytochrome c, somatic [Source:HGNC Symbol;Acc:HGNC:19986]                                  | 0.43                       |
| BCLTP7-030 | 4            | ENSG00000131871 | SELENOS   | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                        | 0.88                       |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                       | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-030 | 4            | ENSG00000114902 | SPCS1     | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]                                                 | 0.68                       |
| BCLTP7-031 | 2            | ENSG00000182481 | KPNA2     | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                                                         | 0.62                       |
| BCLTP7-031 | 2            | ENSG00000198794 | SCAMP5    | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                                               | 1.02                       |
| BCLTP7-032 | 2            | ENSG00000100342 | APOL1     | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                                                    | 0.74                       |
| BCLTP7-032 | 2            | ENSG00000083444 | PLOD1     | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]                                   | 0.79                       |
| BCLTP7-033 | 2            | ENSG00000198876 | DCAF12    | DDB1 and CUL4 associated factor 12 [Source:HGNC Symbol;Acc:HGNC:19911]                                                 | 0.69                       |
| BCLTP7-033 | 2            | ENSG00000198833 | UBE2J1    | ubiquitin conjugating enzyme E2 J1 [Source:HGNC Symbol;Acc:HGNC:17598]                                                 | 0.53                       |
| BCLTP7-034 | 3            | ENSG00000102760 | RGCC      | regulator of cell cycle [Source:HGNC Symbol;Acc:HGNC:20369]                                                            | 0.96                       |
| BCLTP7-034 | 3            | ENSG00000134910 | STT3A     | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172]                   | 0.79                       |
| BCLTP7-034 | 3            | ENSG00000134825 | TMEM258   | transmembrane protein 258 [Source:HGNC Symbol;Acc:HGNC:1164]                                                           | 0.69                       |
| BCLTP7-035 | 2            | ENSG00000241755 | IGKV1-9   | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                                                   | 0.76                       |
| BCLTP7-035 | 2            | ENSG00000143603 | KCNN3     | potassium calcium-activated channel subfamily N member 3 [Source:HGNC Symbol;Acc:HGNC:6292]                            | 0.66                       |
| BCLTP7-036 | 4            | ENSG00000110063 | DCPS      | decapping enzyme, scavenger [Source:HGNC Symbol;Acc:HGNC:29812]                                                        | 0.64                       |
| BCLTP7-036 | 4            | ENSG00000146733 | PSPH      | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                                                           | 0.63                       |
| BCLTP7-036 | 4            | ENSG00000106803 | SEC61B    | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                                      | 0.82                       |
| BCLTP7-036 | 4            | ENSG00000136810 | TXN       | thioredoxin [Source:HGNC Symbol;Acc:HGNC:12435]                                                                        | 0.60                       |
| BCLTP7-037 | 5            | ENSG00000183508 | FAM46C    | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]                                        | 0.83                       |
| BCLTP7-037 | 5            | ENSG00000106415 | GLCC1     | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                                                           | 0.78                       |
| BCLTP7-037 | 5            | ENSG00000163694 | RBM47     | RNA binding motif protein 47 [Source:HGNC Symbol;Acc:HGNC:30358]                                                       | 0.80                       |
| BCLTP7-037 | 5            | ENSG00000026751 | SLAMF7    | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                                                               | 1.09                       |
| BCLTP7-037 | 5            | ENSG00000070214 | SLC44A1   | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                                                  | 0.89                       |
| BCLTP7-038 | 3            | ENSG00000198380 | GFPT1     | glutamine-fructose-6-phosphate transaminase 1 [Source:HGNC Symbol;Acc:HGNC:4241]                                       | 0.55                       |
| BCLTP7-038 | 3            | ENSG00000155304 | HSPA13    | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]                                      | 0.80                       |
| BCLTP7-038 | 3            | ENSG00000071537 | SEL1L     | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]                                               | 0.63                       |
| BCLTP7-039 | 4            | ENSG00000179218 | CALR      | calreticulin [Source:HGNC Symbol;Acc:HGNC:1455]                                                                        | 0.60                       |
| BCLTP7-039 | 4            | ENSG00000244038 | DDOST     | dolichyl-diphosphooligosaccharide-protein glycosyltransferase non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:2728] | 0.75                       |
| BCLTP7-039 | 4            | ENSG00000185624 | P4HB      | prolyl 4-hydroxylase subunit beta [Source:HGNC Symbol;Acc:HGNC:8548]                                                   | 0.76                       |
| BCLTP7-039 | 4            | ENSG00000122862 | SRGN      | serglycin [Source:HGNC Symbol;Acc:HGNC:9361]                                                                           | 0.62                       |
| BCLTP7-040 | 2            | ENSG00000108829 | LRRC59    | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                                                  | 0.70                       |
| BCLTP7-040 | 2            | ENSG00000103257 | SLC7A5    | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                                                   | 0.96                       |
| BCLTP7-041 | 3            | ENSG00000049656 | CLPTM1L   | CLPTM1 like [Source:HGNC Symbol;Acc:HGNC:24308]                                                                        | 0.55                       |
| BCLTP7-041 | 3            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                                                 | 1.90                       |
| BCLTP7-041 | 3            | ENSG00000110917 | MLEC      | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                                                           | 0.54                       |
| BCLTP7-042 | 3            | ENSG00000112237 | CCNC      | cyclin C [Source:HGNC Symbol;Acc:HGNC:1581]                                                                            | 0.43                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-042 | 3            | ENSG00000184164 | CRELD2    | cysteine rich with EGF like domains 2 [Source:HGNC Symbol;Acc:HGNC:28150]                 | 0.73                       |
| BCLTP7-042 | 3            | ENSG00000239264 | TXNDC5    | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                       | 1.06                       |
| BCLTP7-043 | 2            | ENSG00000169679 | BUB1      | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]        | 0.93                       |
| BCLTP7-043 | 2            | ENSG00000122952 | ZWINT     | ZW10 interacting kinetochore protein [Source:HGNC Symbol;Acc:HGNC:13195]                  | 0.99                       |
| BCLTP7-044 | 2            | ENSG00000211952 | IGHV4-28  | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                     | 0.66                       |
| BCLTP7-044 | 2            | ENSG00000146918 | NCAPG2    | non-SMC condensin II complex subunit G2 [Source:HGNC Symbol;Acc:HGNC:21904]               | 0.33                       |
| BCLTP7-045 | 5            | ENSG00000197476 |           |                                                                                           | 1.42                       |
| BCLTP7-045 | 5            | ENSG00000149428 | HYOU1     | hypoxia up-regulated 1 [Source:HGNC Symbol;Acc:HGNC:16931]                                | 0.71                       |
| BCLTP7-045 | 5            | ENSG00000103512 | NOMO1     | NODAL modulator 1 [Source:HGNC Symbol;Acc:HGNC:30060]                                     | 0.70                       |
| BCLTP7-045 | 5            | ENSG00000185164 | NOMO2     | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                     | 0.93                       |
| BCLTP7-045 | 5            | ENSG00000115902 | SLC1A4    | solute carrier family 1 member 4 [Source:HGNC Symbol;Acc:HGNC:10942]                      | 0.65                       |
| BCLTP7-046 | 3            | ENSG00000164045 | CDC25A    | cell division cycle 25A [Source:HGNC Symbol;Acc:HGNC:1725]                                | 1.18                       |
| BCLTP7-046 | 3            | ENSG00000211897 | IGHG3     | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]     | 0.87                       |
| BCLTP7-046 | 3            | ENSG00000211892 | IGHG4     | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]     | 0.77                       |
| BCLTP7-047 | 2            | ENSG00000172469 | MANEA     | mannosidase endo-alpha [Source:HGNC Symbol;Acc:HGNC:21072]                                | 0.74                       |
| BCLTP7-047 | 2            | ENSG00000138768 | USO1      | USO1 vesicle transport factor [Source:HGNC Symbol;Acc:HGNC:30904]                         | 0.45                       |
| BCLTP7-048 | 2            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | 1.77                       |
| BCLTP7-048 | 2            | ENSG00000186818 | LILRB4    | leukocyte immunoglobulin like receptor B4 [Source:HGNC Symbol;Acc:HGNC:6608]              | 0.65                       |
| BCLTP7-049 | 3            | ENSG00000171155 | C1GALT1C1 | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                          | 0.88                       |
| BCLTP7-049 | 3            | ENSG00000075218 | GTSE1     | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                            | 0.85                       |
| BCLTP7-049 | 3            | ENSG00000100228 | RAB36     | RAB36, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:9775]                      | 0.49                       |
| BCLTP7-050 | 3            | ENSG00000198937 | CCDC167   | coiled-coil domain containing 167 [Source:HGNC Symbol;Acc:HGNC:21239]                     | 0.73                       |
| BCLTP7-050 | 3            | ENSG00000111885 | MAN1A1    | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                    | 0.94                       |
| BCLTP7-050 | 3            | ENSG00000173334 | TRIB1     | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                               | 0.94                       |
| BCLTP7-051 | 3            | ENSG00000102096 | PIM2      | Pim-2 proto-oncogene, serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:8987]          | 0.71                       |
| BCLTP7-051 | 3            | ENSG00000117143 | UAP1      | UDP-N-acetylglucosamine pyrophosphorylase 1 [Source:HGNC Symbol;Acc:HGNC:12457]           | 0.68                       |
| BCLTP7-051 | 3            | ENSG00000154277 | UCHL1     | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                     | 1.97                       |
| BCLTP7-052 | 2            | ENSG00000131153 | GIN52     | GIN5 complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:24575]                                | 0.56                       |
| BCLTP7-052 | 2            | ENSG00000101057 | MYBL2     | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                              | 0.91                       |
| BCLTP7-053 | 2            | ENSG00000149554 | CHEK1     | checkpoint kinase 1 [Source:HGNC Symbol;Acc:HGNC:1925]                                    | 0.55                       |
| BCLTP7-053 | 2            | ENSG00000148773 | MKI67     | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                          | 0.76                       |
| BCLTP7-054 | 3            | ENSG00000108641 | B9D1      | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                                | 0.95                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                                                 | Log <sub>2</sub> FC<br>TIV |
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| BCLTP7-054 | 3            | ENSG00000211964 | IGHV3-48   | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                                            | 0.81                       |
| BCLTP7-054 | 3            | ENSG00000204386 | NEU1       | neuraminidase 1 [Source:HGNC Symbol;Acc:HGNC:7758]                                                               | 0.63                       |
| BCLTP7-055 | 3            | ENSG00000087586 | AURKA      | aurora kinase A [Source:HGNC Symbol;Acc:HGNC:11393]                                                              | 0.83                       |
| BCLTP7-055 | 3            | ENSG00000112378 | PERP       | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                                                | 0.79                       |
| BCLTP7-055 | 3            | ENSG00000171241 | SHCBP1     | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                                         | 1.02                       |
| BCLTP7-056 | 2            | ENSG00000108578 | BLMH       | bleomycin hydrolase [Source:HGNC Symbol;Acc:HGNC:1059]                                                           | 0.36                       |
| BCLTP7-056 | 2            | ENSG00000129235 | TXNDC17    | thioredoxin domain containing 17 [Source:HGNC Symbol;Acc:HGNC:28218]                                             | 0.65                       |
| BCLTP7-057 | 2            | ENSG00000094804 | CDC6       | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                                         | 0.96                       |
| BCLTP7-057 | 2            | ENSG00000178445 | GLDC       | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                                         | 1.28                       |
| BCLTP7-058 | 3            | ENSG00000093009 | CDC45      | cell division cycle 45 [Source:HGNC Symbol;Acc:HGNC:1739]                                                        | 1.01                       |
| BCLTP7-058 | 3            | ENSG00000242766 | IGKV1D-17  | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                                           | 1.08                       |
| BCLTP7-058 | 3            | ENSG00000165304 | MELK       | maternal embryonic leucine zipper kinase [Source:HGNC Symbol;Acc:HGNC:16870]                                     | 1.35                       |
| BCLTP7-059 | 3            | ENSG00000154723 | ATP5J      | ATP synthase, H <sup>+</sup> transporting, mitochondrial Fo complex subunit F6 [Source:HGNC Symbol;Acc:HGNC:847] | 0.59                       |
| BCLTP7-059 | 3            | ENSG00000132465 | JCHAIN     | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                                       | 1.02                       |
| BCLTP7-059 | 3            | ENSG00000165672 | PRDX3      | peroxiredoxin 3 [Source:HGNC Symbol;Acc:HGNC:9354]                                                               | 0.47                       |
| BCLTP7-060 | 2            | ENSG00000123485 | HJURP      | Holliday junction recognition protein [Source:HGNC Symbol;Acc:HGNC:25444]                                        | 1.28                       |
| BCLTP7-060 | 2            | ENSG00000131747 | TOP2A      | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                                                 | 0.59                       |
| BCLTP7-061 | 2            | ENSG00000134057 | CCNB1      | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                                                     | 0.74                       |
| BCLTP7-061 | 2            | ENSG00000137804 | NUSAP1     | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]                                   | 0.55                       |
| BCLTP7-062 | 2            | ENSG00000198855 | FICD       | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                                                        | 0.80                       |
| BCLTP7-062 | 2            | ENSG00000100883 | SRP54      | signal recognition particle 54 [Source:HGNC Symbol;Acc:HGNC:11301]                                               | 0.53                       |
| BCLTP7-063 | 2            | ENSG00000090104 | RGS1       | regulator of G-protein signaling 1 [Source:HGNC Symbol;Acc:HGNC:9991]                                            | 1.12                       |
| BCLTP7-063 | 2            | ENSG00000116741 | RGS2       | regulator of G-protein signaling 2 [Source:HGNC Symbol;Acc:HGNC:9998]                                            | 0.58                       |
| BCLTP7-064 | 5            | ENSG00000086062 | B4GALT1    | beta-1,4-galactosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:924]                                               | 0.62                       |
| BCLTP7-064 | 5            | ENSG00000105438 | KDELRL1    | KDEL endoplasmic reticulum protein retention receptor 1 [Source:HGNC Symbol;Acc:HGNC:6304]                       | 0.48                       |
| BCLTP7-064 | 5            | ENSG00000169223 | LMAN2      | lectin, mannose binding 2 [Source:HGNC Symbol;Acc:HGNC:16986]                                                    | 0.68                       |
| BCLTP7-064 | 5            | ENSG00000120725 | SIL1       | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                                              | 0.74                       |
| BCLTP7-064 | 5            | ENSG00000136840 | ST6GALNAC4 | ST6 N-acetylgalactosaminide alpha-2,6-sialyltransferase 4 [Source:HGNC Symbol;Acc:HGNC:17846]                    | 0.62                       |
| BCLTP7-065 | 4            | ENSG00000105974 | CAV1       | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                                                    | 1.77                       |
| BCLTP7-065 | 4            | ENSG00000163754 | GYG1       | glycogenin 1 [Source:HGNC Symbol;Acc:HGNC:4699]                                                                  | 0.54                       |
| BCLTP7-065 | 4            | ENSG00000074416 | MGLL       | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                                         | 0.78                       |
| BCLTP7-065 | 4            | ENSG00000100219 | XBP1       | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                                      | 1.25                       |
| BCLTP7-066 | 4            | ENSG00000085063 | CD59       | CD59 molecule [Source:HGNC Symbol;Acc:HGNC:1689]                                                                 | 0.47                       |
| BCLTP7-066 | 4            | ENSG00000111640 | GAPDH      | glyceraldehyde-3-phosphate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:4141]                                      | 0.58                       |
| BCLTP7-066 | 4            | ENSG00000137563 | GGH        | gamma-glutamyl hydrolase [Source:HGNC Symbol;Acc:HGNC:4248]                                                      | 1.07                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|-------------------------|
| BCLTP7-066 | 4            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                     | 0.70                    |
| BCLTP7-067 | 3            | ENSG00000153093 | ACOXL     | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                                 | 1.84                    |
| BCLTP7-067 | 3            | ENSG00000136026 | CKAP4     | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                     | 0.86                    |
| BCLTP7-067 | 3            | ENSG00000154511 | FAM69A    | family with sequence similarity 69 member A [Source:HGNC Symbol;Acc:HGNC:32213]           | 0.53                    |
| BCLTP7-068 | 2            | ENSG00000282600 |           |                                                                                           | 0.92                    |
| BCLTP7-068 | 2            | ENSG00000113368 | LMNB1     | lamin B1 [Source:HGNC Symbol;Acc:HGNC:6637]                                               | 0.37                    |
| BCLTP7-069 | 2            | ENSG00000165895 | ARHGAP42  | Rho GTPase activating protein 42 [Source:HGNC Symbol;Acc:HGNC:26545]                      | 0.39                    |
| BCLTP7-069 | 2            | ENSG00000185155 | MIXL1     | Mix paired-like homeobox [Source:HGNC Symbol;Acc:HGNC:13363]                              | 0.78                    |
| BCLTP7-070 | 4            | ENSG00000173486 | FKBP2     | FK506 binding protein 2 [Source:HGNC Symbol;Acc:HGNC:3718]                                | 0.59                    |
| BCLTP7-070 | 4            | ENSG00000115677 | HDLBP     | high density lipoprotein binding protein [Source:HGNC Symbol;Acc:HGNC:4857]               | 0.68                    |
| BCLTP7-070 | 4            | ENSG00000167861 | HID1      | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                                | 0.93                    |
| BCLTP7-070 | 4            | ENSG00000144867 | SRPRB     | SRP receptor beta subunit [Source:HGNC Symbol;Acc:HGNC:24085]                             | 0.58                    |
| BCLTP7-071 | 2            | ENSG00000157456 | CCNB2     | cyclin B2 [Source:HGNC Symbol;Acc:HGNC:1580]                                              | 0.67                    |
| BCLTP7-071 | 2            | ENSG00000166851 | PLK1      | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                                     | 0.44                    |
| BCLTP7-072 | 2            | ENSG00000136010 | ALDH1L2   | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]             | 1.26                    |
| BCLTP7-072 | 2            | ENSG00000087502 | ERGIC2    | ERGIC and golgi 2 [Source:HGNC Symbol;Acc:HGNC:30208]                                     | 0.46                    |
| BCLTP7-073 | 2            | ENSG00000254174 | IGHV1-12  | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]        | 2.21                    |
| BCLTP7-073 | 2            | ENSG00000154719 | MRPL39    | mitochondrial ribosomal protein L39 [Source:HGNC Symbol;Acc:HGNC:14027]                   | 0.34                    |
| BCLTP7-074 | 3            | ENSG00000089685 | BIRC5     | baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:HGNC:593]                     | 0.91                    |
| BCLTP7-074 | 3            | ENSG00000007968 | E2F2      | E2F transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:3114]                             | 0.45                    |
| BCLTP7-074 | 3            | ENSG00000176890 | TYMS      | thymidylate synthetase [Source:HGNC Symbol;Acc:HGNC:12441]                                | 1.13                    |
| BCLTP7-075 | 2            | ENSG00000140743 | CDR2      | cerebellar degeneration related protein 2 [Source:HGNC Symbol;Acc:HGNC:1799]              | 0.47                    |
| BCLTP7-075 | 2            | ENSG00000211938 | IGHV3-7   | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                      | 1.93                    |
| BCLTP7-076 | 2            | ENSG00000123975 | CKS2      | CDC28 protein kinase regulatory subunit 2 [Source:HGNC Symbol;Acc:HGNC:2000]              | 0.59                    |
| BCLTP7-076 | 2            | ENSG00000107104 | KANK1     | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                 | 1.05                    |
| BCLTP7-077 | 3            | ENSG00000117724 | CENPF     | centromere protein F [Source:HGNC Symbol;Acc:HGNC:1857]                                   | 0.42                    |
| BCLTP7-077 | 3            | ENSG00000143228 | NUF2      | NUF2, NDC80 kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:14621]             | 0.52                    |
| BCLTP7-077 | 3            | ENSG00000085840 | ORC1      | origin recognition complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:8487]                   | 1.02                    |
| BCLTP7-078 | 2            | ENSG00000111665 | CDCA3     | cell division cycle associated 3 [Source:HGNC Symbol;Acc:HGNC:14624]                      | 0.78                    |
| BCLTP7-078 | 2            | ENSG00000068489 | PRR11     | proline rich 11 [Source:HGNC Symbol;Acc:HGNC:25619]                                       | 0.51                    |
| BCLTP7-079 | 5            | ENSG00000172339 | ALG14     | UDP-N-acetylglucosaminyltransferase subunit [Source:HGNC Symbol;Acc:HGNC:28287]           | 0.63                    |
| BCLTP7-079 | 5            | ENSG00000143641 | GALNT2    | polypeptide N-acetylgalactosaminyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:4124]        | 0.48                    |
| BCLTP7-079 | 5            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | 1.43                    |
| BCLTP7-079 | 5            | ENSG00000099337 | KCNK6     | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281] | 0.59                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                   | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP7-079 | 5            | ENSG00000167004 | PDIA3     | protein disulfide isomerase family A member 3 [Source:HGNC Symbol;Acc:HGNC:4606]                                   | 0.47                    |
| BCLTP7-080 | 3            | ENSG00000104290 | FZD3      | frizzled class receptor 3 [Source:HGNC Symbol;Acc:HGNC:4041]                                                       | 0.44                    |
| BCLTP7-080 | 3            | ENSG00000242076 | IGKV1-33  | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                                              | 1.01                    |
| BCLTP7-080 | 3            | ENSG00000111186 | WNT5B     | Wnt family member 5B [Source:HGNC Symbol;Acc:HGNC:16265]                                                           | 2.24                    |
| BCLTP7-081 | 6            | ENSG00000258572 |           |                                                                                                                    | 0.86                    |
| BCLTP7-081 | 6            | ENSG0000029153  | ARNTL2    | aryl hydrocarbon receptor nuclear translocator like 2 [Source:HGNC Symbol;Acc:HGNC:18984]                          | 0.77                    |
| BCLTP7-081 | 6            | ENSG00000180535 | BHLHA15   | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]                                       | 1.03                    |
| BCLTP7-081 | 6            | ENSG00000176658 | MYO1D     | myosin ID [Source:HGNC Symbol;Acc:HGNC:7598]                                                                       | 0.66                    |
| BCLTP7-081 | 6            | ENSG00000065308 | TRAM2     | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]                                    | 0.79                    |
| BCLTP7-081 | 6            | ENSG00000108953 | YWHAE     | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein epsilon [Source:HGNC Symbol;Acc:HGNC:12851] | 0.44                    |
| BCLTP7-082 | 3            | ENSG00000145386 | CCNA2     | cyclin A2 [Source:HGNC Symbol;Acc:HGNC:1578]                                                                       | 0.51                    |
| BCLTP7-082 | 3            | ENSG00000211679 | IGLC3     | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]                              | 0.76                    |
| BCLTP7-082 | 3            | ENSG00000076003 | MCM6      | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949]                                  | 0.40                    |
| BCLTP7-083 | 2            | ENSG00000119326 | CTNNAL1   | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                                                            | 0.89                    |
| BCLTP7-083 | 2            | ENSG00000198130 | HIBCH     | 3-hydroxyisobutyryl-CoA hydrolase [Source:HGNC Symbol;Acc:HGNC:4908]                                               | 0.41                    |
| BCLTP7-084 | 3            | ENSG00000128590 | DNAJB9    | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]                                | 0.89                    |
| BCLTP7-084 | 3            | ENSG00000069956 | MAPK6     | mitogen-activated protein kinase 6 [Source:HGNC Symbol;Acc:HGNC:6879]                                              | 0.44                    |
| BCLTP7-084 | 3            | ENSG00000107833 | NPM3      | nucleophosmin/nucleoplasmin 3 [Source:HGNC Symbol;Acc:HGNC:7931]                                                   | 0.34                    |
| BCLTP7-085 | 2            | ENSG00000024526 | DEPDC1    | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                                                        | 0.88                    |
| BCLTP7-085 | 2            | ENSG00000144724 | PTPRG     | protein tyrosine phosphatase, receptor type G [Source:HGNC Symbol;Acc:HGNC:9671]                                   | 0.76                    |
| BCLTP7-086 | 2            | ENSG00000138778 | CENPE     | centromere protein E [Source:HGNC Symbol;Acc:HGNC:1856]                                                            | 0.77                    |
| BCLTP7-086 | 2            | ENSG00000100629 | CEP128    | centrosomal protein 128 [Source:HGNC Symbol;Acc:HGNC:20359]                                                        | 0.81                    |
| BCLTP7-087 | 3            | ENSG00000129562 | DAD1      | defender against cell death 1 [Source:HGNC Symbol;Acc:HGNC:2664]                                                   | 0.55                    |
| BCLTP7-087 | 3            | ENSG00000165948 | IFI27L1   | interferon alpha inducible protein 27 like 1 [Source:HGNC Symbol;Acc:HGNC:19754]                                   | 0.76                    |
| BCLTP7-087 | 3            | ENSG00000186594 | MIR22HG   | MIR22 host gene [Source:HGNC Symbol;Acc:HGNC:28219]                                                                | 1.09                    |
| BCLTP7-088 | 3            | ENSG00000064763 | FAR2      | fatty acyl-CoA reductase 2 [Source:HGNC Symbol;Acc:HGNC:25531]                                                     | 0.76                    |
| BCLTP7-088 | 3            | ENSG00000211645 | IGLV1-50  | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]                            | 1.40                    |
| BCLTP7-088 | 3            | ENSG00000160712 | IL6R      | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                                                          | 0.60                    |
| BCLTP7-089 | 7            | ENSG00000118985 | ELL2      | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]                                      | 1.09                    |
| BCLTP7-089 | 7            | ENSG00000075420 | FNDC3B    | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]                                      | 1.22                    |
| BCLTP7-089 | 7            | ENSG00000145050 | MANF      | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]                            | 1.03                    |
| BCLTP7-089 | 7            | ENSG00000088826 | SMOX      | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                                               | 1.20                    |
| BCLTP7-089 | 7            | ENSG00000123352 | SPATS2    | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]                                       | 0.72                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                           | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|------------|--------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-089 | 7            | ENSG00000113387 | SUB1       | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]                | 0.59                       |
| BCLTP7-089 | 7            | ENSG00000111424 | VDR        | vitamin D (1,25- dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]         | 0.94                       |
| BCLTP7-090 | 3            | ENSG00000211662 | IGLV3-21   | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                     | 1.98                       |
| BCLTP7-090 | 3            | ENSG00000138760 | SCARB2     | scavenger receptor class B member 2 [Source:HGNC Symbol;Acc:HGNC:1665]                     | 0.47                       |
| BCLTP7-090 | 3            | ENSG00000145817 | YIPF5      | Yip1 domain family member 5 [Source:HGNC Symbol;Acc:HGNC:24877]                            | 0.40                       |
| BCLTP7-091 | 3            | ENSG00000138166 | DUSP5      | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                          | 1.34                       |
| BCLTP7-091 | 3            | ENSG00000162676 | GFI1       | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]   | 1.43                       |
| BCLTP7-091 | 3            | ENSG00000134291 | TMEM106C   | transmembrane protein 106C [Source:HGNC Symbol;Acc:HGNC:28775]                             | 0.33                       |
| BCLTP7-092 | 4            | ENSG00000280411 | IGHV1-69-2 | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                    | 1.12                       |
| BCLTP7-092 | 4            | ENSG00000254395 | IGHV4-55   | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]         | 0.95                       |
| BCLTP7-092 | 4            | ENSG00000211592 | IGKC       | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                           | 0.53                       |
| BCLTP7-092 | 4            | ENSG00000211632 | IGKV3D-11  | immunoglobulin kappa variable 3D-11 [Source:HGNC Symbol;Acc:HGNC:5823]                     | 0.66                       |
| BCLTP7-093 | 3            | ENSG00000259772 |            |                                                                                            | 0.57                       |
| BCLTP7-093 | 3            | ENSG00000135069 | PSAT1      | phosphoserine aminotransferase 1 [Source:HGNC Symbol;Acc:HGNC:19129]                       | 0.67                       |
| BCLTP7-093 | 3            | ENSG00000070540 | WIPI1      | WD repeat domain, phosphoinositide interacting 1 [Source:HGNC Symbol;Acc:HGNC:25471]       | 0.62                       |
| BCLTP7-094 | 2            | ENSG00000248571 |            |                                                                                            | 1.42                       |
| BCLTP7-094 | 2            | ENSG00000118515 | SGK1       | serum/glucocorticoid regulated kinase 1 [Source:HGNC Symbol;Acc:HGNC:10810]                | 1.07                       |
| BCLTP7-095 | 3            | ENSG00000153162 | BMP6       | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                            | 0.96                       |
| BCLTP7-095 | 3            | ENSG00000227295 | ELL2P1     | elongation factor for RNA polymerase II 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39343] | 0.68                       |
| BCLTP7-095 | 3            | ENSG00000168653 | NDUFS5     | NADH:ubiquinone oxidoreductase subunit S5 [Source:HGNC Symbol;Acc:HGNC:7712]               | 0.36                       |
| BCLTP7-096 | 2            | ENSG00000211659 | IGLV3-25   | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                     | 0.95                       |
| BCLTP7-096 | 2            | ENSG00000102471 | NDFIP2     | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                     | 0.93                       |
| BCLTP7-097 | 5            | ENSG00000124788 | ATXN1      | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                               | 0.76                       |
| BCLTP7-097 | 5            | ENSG00000049860 | HEXB       | hexosaminidase subunit beta [Source:HGNC Symbol;Acc:HGNC:4879]                             | 0.45                       |
| BCLTP7-097 | 5            | ENSG00000173848 | NET1       | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                    | 0.84                       |
| BCLTP7-097 | 5            | ENSG00000198792 | TMEM184B   | transmembrane protein 184B [Source:HGNC Symbol;Acc:HGNC:1310]                              | 0.57                       |
| BCLTP7-097 | 5            | ENSG00000173218 | VANGL1     | VANGL planar cell polarity protein 1 [Source:HGNC Symbol;Acc:HGNC:15512]                   | 0.57                       |
| BCLTP7-098 | 2            | ENSG00000243238 | IGKV2-30   | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                      | 0.95                       |
| BCLTP7-098 | 2            | ENSG00000239571 | IGKV2D-30  | immunoglobulin kappa variable 2D-30 [Source:HGNC Symbol;Acc:HGNC:5801]                     | 1.11                       |
| BCLTP7-099 | 6            | ENSG00000117399 | CDC20      | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                                  | 0.88                       |
| BCLTP7-099 | 6            | ENSG00000143476 | DTL        | denticleless E3 ubiquitin protein ligase homolog [Source:HGNC Symbol;Acc:HGNC:30288]       | 1.04                       |
| BCLTP7-099 | 6            | ENSG00000109805 | NCAPG      | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]                  | 1.06                       |
| BCLTP7-099 | 6            | ENSG00000171848 | RRM2       | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]         | 1.09                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                                 | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|--------------|--------------------------------------------------------------------------------------------------|-------------------------|
| BCLTP7-099 | 6            | ENSG00000154839 | SKA1         | spindle and kinetochore associated complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28109]         | 0.79                    |
| BCLTP7-099 | 6            | ENSG00000077152 | UBE2T        | ubiquitin conjugating enzyme E2 T [Source:HGNC Symbol;Acc:HGNC:25009]                            | 0.95                    |
| BCLTP7-100 | 3            | ENSG00000113273 | ARSB         | arylsulfatase B [Source:HGNC Symbol;Acc:HGNC:714]                                                | 0.44                    |
| BCLTP7-100 | 3            | ENSG00000182197 | EXT1         | exostosin glycosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:3512]                               | 0.44                    |
| BCLTP7-100 | 3            | ENSG00000184232 | OAF          | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                         | 0.94                    |
| BCLTP7-101 | 3            | ENSG00000167513 | CDT1         | chromatin licensing and DNA replication factor 1 [Source:HGNC Symbol;Acc:HGNC:24576]             | 0.34                    |
| BCLTP7-101 | 3            | ENSG00000261834 | IGHV3OR16-15 | immunoglobulin heavy variable 3/OR16-15 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5639]          | 1.89                    |
| BCLTP7-101 | 3            | ENSG00000122188 | LAX1         | lymphocyte transmembrane adaptor 1 [Source:HGNC Symbol;Acc:HGNC:26005]                           | 0.46                    |
| BCLTP7-102 | 2            | ENSG00000240382 | IGKV1-17     | immunoglobulin kappa variable 1-17 [Source:HGNC Symbol;Acc:HGNC:5733]                            | 0.63                    |
| BCLTP7-102 | 2            | ENSG00000211670 | IGLV3-9      | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]          | 1.49                    |
| BCLTP7-103 | 2            | ENSG00000211972 | IGHV3-66     | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                            | 0.94                    |
| BCLTP7-103 | 2            | ENSG00000211649 | IGLV7-46     | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930]         | 0.73                    |
| BCLTP7-104 | 2            | ENSG00000213430 | HSPD1P1      | heat shock protein family D (Hsp60) member 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:35133]    | 0.59                    |
| BCLTP7-104 | 2            | ENSG00000079931 | MOXD1        | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                                     | 0.96                    |
| BCLTP7-105 | 2            | ENSG00000211935 | IGHV1-3      | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                             | 0.41                    |
| BCLTP7-105 | 2            | ENSG00000259997 | IGHV1OR16-4  | immunoglobulin heavy variable 1/OR16-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5573]           | 2.21                    |
| BCLTP7-106 | 2            | ENSG00000105011 | ASF1B        | anti-silencing function 1B histone chaperone [Source:HGNC Symbol;Acc:HGNC:20996]                 | 0.58                    |
| BCLTP7-106 | 2            | ENSG00000211644 | IGLV1-51     | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                           | 0.71                    |
| BCLTP7-107 | 2            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637]      | 0.86                    |
| BCLTP7-107 | 2            | ENSG00000211668 | IGLV2-11     | immunoglobulin lambda variable 2-11 [Source:HGNC Symbol;Acc:HGNC:5887]                           | 0.26                    |
| BCLTP7-108 | 4            | ENSG00000211946 | IGHV3-20     | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                            | 0.93                    |
| BCLTP7-108 | 4            | ENSG00000166803 | KIAA0101     | KIAA0101 [Source:HGNC Symbol;Acc:HGNC:28961]                                                     | 0.93                    |
| BCLTP7-108 | 4            | ENSG00000164109 | MAD2L1       | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]                  | 0.62                    |
| BCLTP7-108 | 4            | ENSG00000078900 | TP73         | tumor protein p73 [Source:HGNC Symbol;Acc:HGNC:12003]                                            | 0.91                    |
| BCLTP7-109 | 7            | ENSG00000129636 | ITFG1        | integrin alpha FG-GAP repeat containing 1 [Source:HGNC Symbol;Acc:HGNC:30697]                    | 0.49                    |
| BCLTP7-109 | 7            | ENSG00000179222 | MAGED1       | MAGE family member D1 [Source:HGNC Symbol;Acc:HGNC:6813]                                         | 0.56                    |
| BCLTP7-109 | 7            | ENSG00000239672 | NME1         | NME/NM23 nucleoside diphosphate kinase 1 [Source:HGNC Symbol;Acc:HGNC:7849]                      | 0.52                    |
| BCLTP7-109 | 7            | ENSG00000103226 | NOMO3        | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                            | 0.81                    |
| BCLTP7-109 | 7            | ENSG00000104889 | RNASEH2A     | ribonuclease H2 subunit A [Source:HGNC Symbol;Acc:HGNC:18518]                                    | 0.20                    |
| BCLTP7-109 | 7            | ENSG0000025039  | RRAGD        | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                                    | 1.02                    |
| BCLTP7-109 | 7            | ENSG00000157020 | SEC13        | SEC13 homolog, nuclear pore and COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10697] | 0.52                    |
| BCLTP7-110 | 4            | ENSG00000178999 | AURKB        | aurora kinase B [Source:HGNC Symbol;Acc:HGNC:11390]                                              | 0.84                    |
| BCLTP7-110 | 4            | ENSG00000211973 | IGHV1-69     | immunoglobulin heavy variable 1-69 [Source:HGNC Symbol;Acc:HGNC:5558]                            | 1.16                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                                        | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-110 | 4            | ENSG00000211651 | IGLV1-44    | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                                                                  | 1.48                       |
| BCLTP7-110 | 4            | ENSG00000065328 | MCM10       | minichromosome maintenance 10 replication initiation factor [Source:HGNC Symbol;Acc:HGNC:18043]                                         | 0.98                       |
| BCLTP7-111 | 3            | ENSG00000198018 | ENTPD7      | ectonucleoside triphosphate diphosphohydrolase 7 [Source:HGNC Symbol;Acc:HGNC:19745]                                                    | 0.59                       |
| BCLTP7-111 | 3            | ENSG00000177301 | KCNA2       | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220]                                                 | 0.65                       |
| BCLTP7-111 | 3            | ENSG00000065911 | MTHFD2      | methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methenyltetrahydrofolate cyclohydrolase [Source:HGNC Symbol;Acc:HGNC:7434] | 0.60                       |
| BCLTP7-112 | 3            | ENSG00000139734 | DIAPH3      | diaphanous related formin 3 [Source:HGNC Symbol;Acc:HGNC:15480]                                                                         | 1.48                       |
| BCLTP7-112 | 3            | ENSG00000133328 | HRASLS2     | HRAS like suppressor 2 [Source:HGNC Symbol;Acc:HGNC:17824]                                                                              | 0.83                       |
| BCLTP7-112 | 3            | ENSG00000163808 | KIF15       | kinesin family member 15 [Source:HGNC Symbol;Acc:HGNC:17273]                                                                            | 0.55                       |
| BCLTP7-113 | 5            | ENSG00000150967 | ABCB9       | ATP binding cassette subfamily B member 9 [Source:HGNC Symbol;Acc:HGNC:50]                                                              | 0.73                       |
| BCLTP7-113 | 5            | ENSG00000117411 | B4GALT2     | beta-1,4-galactosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:925]                                                                      | 0.63                       |
| BCLTP7-113 | 5            | ENSG00000010310 | GIPR        | gastric inhibitory polypeptide receptor [Source:HGNC Symbol;Acc:HGNC:4271]                                                              | 0.82                       |
| BCLTP7-113 | 5            | ENSG00000167476 | JSRP1       | junctional sarcoplasmic reticulum protein 1 [Source:HGNC Symbol;Acc:HGNC:24963]                                                         | 1.03                       |
| BCLTP7-113 | 5            | ENSG00000198879 | SFMBT2      | Scm-like with four mbt domains 2 [Source:HGNC Symbol;Acc:HGNC:20256]                                                                    | 0.34                       |
| BCLTP7-114 | 8            | ENSG00000230006 | ANKRD36BP2  | ankyrin repeat domain 36B pseudogene 2 [Source:HGNC Symbol;Acc:HGNC:33607]                                                              | 0.55                       |
| BCLTP7-114 | 8            | ENSG00000184661 | CDCA2       | cell division cycle associated 2 [Source:HGNC Symbol;Acc:HGNC:14623]                                                                    | 1.38                       |
| BCLTP7-114 | 8            | ENSG00000072571 | HMMR        | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]                                                                | 0.83                       |
| BCLTP7-114 | 8            | ENSG00000138160 | KIF11       | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                                                                             | 0.52                       |
| BCLTP7-114 | 8            | ENSG00000112984 | KIF20A      | kinesin family member 20A [Source:HGNC Symbol;Acc:HGNC:9787]                                                                            | 0.76                       |
| BCLTP7-114 | 8            | ENSG00000132646 | PCNA        | proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:HGNC:8729]                                                                   | 0.35                       |
| BCLTP7-114 | 8            | ENSG00000088325 | TPX2        | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                                                                  | 0.70                       |
| BCLTP7-114 | 8            | ENSG00000175063 | UBE2C       | ubiquitin conjugating enzyme E2 C [Source:HGNC Symbol;Acc:HGNC:15937]                                                                   | 0.98                       |
| BCLTP7-115 | 4            | ENSG00000182985 | CADM1       | cell adhesion molecule 1 [Source:HGNC Symbol;Acc:HGNC:5951]                                                                             | 0.62                       |
| BCLTP7-115 | 4            | ENSG00000145354 | CISD2       | CDGSH iron sulfur domain 2 [Source:HGNC Symbol;Acc:HGNC:24212]                                                                          | 0.47                       |
| BCLTP7-115 | 4            | ENSG00000213047 | DENND1B     | DENN domain containing 1B [Source:HGNC Symbol;Acc:HGNC:28404]                                                                           | 0.56                       |
| BCLTP7-115 | 4            | ENSG00000172965 | MIR4435-2HG | MIR4435-2 host gene [Source:HGNC Symbol;Acc:HGNC:35163]                                                                                 | 0.92                       |
| BCLTP7-116 | 4            | ENSG00000249096 |             |                                                                                                                                         | 0.60                       |
| BCLTP7-116 | 4            | ENSG00000179750 | APOBEC3B    | apolipoprotein B mRNA editing enzyme catalytic subunit 3B [Source:HGNC Symbol;Acc:HGNC:17352]                                           | 0.81                       |
| BCLTP7-116 | 4            | ENSG00000123080 | CDKN2C      | cyclin dependent kinase inhibitor 2C [Source:HGNC Symbol;Acc:HGNC:1789]                                                                 | 0.48                       |
| BCLTP7-116 | 4            | ENSG00000211685 | IGLC7       | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                                                                     | 0.43                       |
| BCLTP7-117 | 9            | ENSG00000143942 | CHAC2       | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]                                                           | 0.62                       |
| BCLTP7-117 | 9            | ENSG00000148468 | FAM171A1    | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]                                                       | 2.23                       |



| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                          | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-------------|-------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-117 | 9            | ENSG00000174132 | FAM174A     | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]          | 0.92                       |
| BCLTP7-117 | 9            | ENSG00000088340 | FER1L4      | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]                | 2.09                       |
| BCLTP7-117 | 9            | ENSG00000164032 | H2AFZ       | H2A histone family member Z [Source:HGNC Symbol;Acc:HGNC:4741]                            | 0.42                       |
| BCLTP7-117 | 9            | ENSG00000224373 | IGHV4-59    | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | 1.26                       |
| BCLTP7-117 | 9            | ENSG00000115884 | SDC1        | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | 1.87                       |
| BCLTP7-117 | 9            | ENSG00000227203 | SUB1P1      | SUB1 homolog, transcriptional regulator pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:32300]  | 0.75                       |
| BCLTP7-117 | 9            | ENSG00000167900 | TK1         | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                    | 0.63                       |
| BCLTP7-118 | 5            | ENSG00000156970 | BUB1B       | BUB1 mitotic checkpoint serine/threonine kinase B [Source:HGNC Symbol;Acc:HGNC:1149]      | 0.56                       |
| BCLTP7-118 | 5            | ENSG00000255733 | IFNG-AS1    | IFNG antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:43910]                                  | 0.47                       |
| BCLTP7-118 | 5            | ENSG00000239975 | IGKV1D-33   | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                    | 1.25                       |
| BCLTP7-118 | 5            | ENSG00000189233 | NUGGC       | nuclear GTPase, germinal center associated [Source:HGNC Symbol;Acc:HGNC:33550]            | 0.76                       |
| BCLTP7-118 | 5            | ENSG00000165409 | TSHR        | thyroid stimulating hormone receptor [Source:HGNC Symbol;Acc:HGNC:12373]                  | 1.25                       |
| BCLTP7-119 | 2            | ENSG00000260948 |             |                                                                                           | -0.70                      |
| BCLTP7-119 | 2            | ENSG00000204634 | TBC1D8      | TBC1 domain family member 8 [Source:HGNC Symbol;Acc:HGNC:17791]                           | -0.83                      |
| BCLTP7-120 | 3            | ENSG00000186810 | CXCR3       | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                       | 1.09                       |
| BCLTP7-120 | 3            | ENSG00000235587 | GAPDHP65    | glyceraldehyde 3 phosphate dehydrogenase pseudogene 65 [Source:HGNC Symbol;Acc:HGNC:4143] | 0.51                       |
| BCLTP7-120 | 3            | ENSG00000198722 | UNC13B      | unc-13 homolog B [Source:HGNC Symbol;Acc:HGNC:12566]                                      | 1.15                       |
| BCLTP7-121 | 7            | ENSG00000146670 | CDCA5       | cell division cycle associated 5 [Source:HGNC Symbol;Acc:HGNC:14626]                      | 1.01                       |
| BCLTP7-121 | 7            | ENSG00000100526 | CDKN3       | cyclin dependent kinase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:1791]                    | 1.13                       |
| BCLTP7-121 | 7            | ENSG00000115163 | CENPA       | centromere protein A [Source:HGNC Symbol;Acc:HGNC:1851]                                   | 1.41                       |
| BCLTP7-121 | 7            | ENSG00000169607 | CKAP2L      | cytoskeleton associated protein 2 like [Source:HGNC Symbol;Acc:HGNC:26877]                | 0.87                       |
| BCLTP7-121 | 7            | ENSG00000137807 | KIF23       | kinesin family member 23 [Source:HGNC Symbol;Acc:HGNC:6392]                               | 1.09                       |
| BCLTP7-121 | 7            | ENSG00000080986 | NDC80       | NDC80, kinetochore complex component [Source:HGNC Symbol;Acc:HGNC:16909]                  | 0.65                       |
| BCLTP7-121 | 7            | ENSG00000117650 | NEK2        | NIMA related kinase 2 [Source:HGNC Symbol;Acc:HGNC:7745]                                  | 0.57                       |
| BCLTP7-122 | 6            | ENSG00000170345 | FOS         | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796]  | 0.69                       |
| BCLTP7-122 | 6            | ENSG00000244575 | IGKV1-27    | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                     | 0.50                       |
| BCLTP7-122 | 6            | ENSG00000244116 | IGKV2-28    | immunoglobulin kappa variable 2-28 [Source:HGNC Symbol;Acc:HGNC:5783]                     | 0.64                       |
| BCLTP7-122 | 6            | ENSG00000242534 | IGKV2D-28   | immunoglobulin kappa variable 2D-28 [Source:HGNC Symbol;Acc:HGNC:5799]                    | 0.37                       |
| BCLTP7-122 | 6            | ENSG00000253691 | IGKV2OR22-4 | immunoglobulin kappa variable 2/OR22-4 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5813]    | 0.83                       |
| BCLTP7-122 | 6            | ENSG00000185480 | PARPBP      | PARP1 binding protein [Source:HGNC Symbol;Acc:HGNC:26074]                                 | 0.24                       |
| BCLTP7-123 | 2            | ENSG00000211945 | IGHV1-18    | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                     | 0.39                       |
| BCLTP7-123 | 2            | ENSG00000253818 | IGLV1-41    | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]       | 0.71                       |
| BCLTP7-124 | 3            | ENSG00000101439 | CST3        | cystatin C [Source:HGNC Symbol;Acc:HGNC:2475]                                             | -1.07                      |
| BCLTP7-124 | 3            | ENSG00000160883 | HK3         | hexokinase 3 [Source:HGNC Symbol;Acc:HGNC:4925]                                           | -0.66                      |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP7-124 | 3            | ENSG00000196263 | ZNF471      | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]                                                          | -0.56                      |
| BCLTP7-125 | 4            | ENSG00000227155 |             |                                                                                                                      | -0.38                      |
| BCLTP7-125 | 4            | ENSG00000278897 |             |                                                                                                                      | -0.62                      |
| BCLTP7-125 | 4            | ENSG00000279192 | PWAR5       | Prader Willi/Angelman region RNA 5 [Source:HGNC Symbol;Acc:HGNC:30090]                                               | -0.64                      |
| BCLTP7-125 | 4            | ENSG00000197714 | ZNF460      | zinc finger protein 460 [Source:HGNC Symbol;Acc:HGNC:21628]                                                          | -0.70                      |
| BCLTP7-126 | 5            | ENSG00000187837 | HIST1H1C    | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                                              | 0.61                       |
| BCLTP7-126 | 5            | ENSG00000211967 | IGHV3-53    | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                                                | 0.84                       |
| BCLTP7-126 | 5            | ENSG00000211933 | IGHV6-1     | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                                                 | 0.61                       |
| BCLTP7-126 | 5            | ENSG00000211673 | IGLV3-1     | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                                                | 1.30                       |
| BCLTP7-126 | 5            | ENSG00000004799 | PKD4        | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                                                   | 0.47                       |
| BCLTP7-127 | 8            | ENSG00000106080 | FKBP14      | FK506 binding protein 14 [Source:HGNC Symbol;Acc:HGNC:18625]                                                         | 0.39                       |
| BCLTP7-127 | 8            | ENSG00000185745 | IFIT1       | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407]                       | 0.60                       |
| BCLTP7-127 | 8            | ENSG00000270472 | IGHV3OR16-9 | immunoglobulin heavy variable 3/OR16-9 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5644]                           | 1.30                       |
| BCLTP7-127 | 8            | ENSG00000211648 | IGLV1-47    | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                                               | 1.17                       |
| BCLTP7-127 | 8            | ENSG00000253822 | IGLV3-24    | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]                                  | 1.42                       |
| BCLTP7-127 | 8            | ENSG00000115415 | STAT1       | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]                               | 0.39                       |
| BCLTP7-127 | 8            | ENSG00000102595 | UGGT2       | UDP-glucose glycoprotein glucosyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:15664]                                   | 0.45                       |
| BCLTP7-127 | 8            | ENSG00000170027 | YWHAG       | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein gamma [Source:HGNC Symbol;Acc:HGNC:12852]     | 0.46                       |
| BCLTP7-128 | 3            | ENSG00000166825 | ANPEP       | alanyl aminopeptidase, membrane [Source:HGNC Symbol;Acc:HGNC:500]                                                    | -0.64                      |
| BCLTP7-128 | 3            | ENSG00000147459 | DOCK5       | dedicator of cytokinesis 5 [Source:HGNC Symbol;Acc:HGNC:23476]                                                       | -0.93                      |
| BCLTP7-128 | 3            | ENSG00000120708 | TGFBI       | transforming growth factor beta induced [Source:HGNC Symbol;Acc:HGNC:11771]                                          | -0.74                      |
| BCLTP7-129 | 7            | ENSG00000241666 |             |                                                                                                                      | -0.59                      |
| BCLTP7-129 | 7            | ENSG00000274272 |             |                                                                                                                      | -0.35                      |
| BCLTP7-129 | 7            | ENSG00000141753 | IGFBP4      | insulin like growth factor binding protein 4 [Source:HGNC Symbol;Acc:HGNC:5473]                                      | -0.27                      |
| BCLTP7-129 | 7            | ENSG00000224699 | LAMTOR5-AS1 | LAMTOR5 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:40823]                                                          | -0.67                      |
| BCLTP7-129 | 7            | ENSG00000187922 | LCN10       | lipocalin 10 [Source:HGNC Symbol;Acc:HGNC:20892]                                                                     | -0.38                      |
| BCLTP7-129 | 7            | ENSG00000220008 | LINGO3      | leucine rich repeat and Ig domain containing 3 [Source:HGNC Symbol;Acc:HGNC:21206]                                   | -0.33                      |
| BCLTP7-129 | 7            | ENSG00000185522 | LMNTD2      | lamin tail domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28561]                                                   | -0.34                      |
| BCLTP7-130 | 6            | ENSG00000274422 |             |                                                                                                                      | -0.76                      |
| BCLTP7-130 | 6            | ENSG00000279759 |             |                                                                                                                      | -0.44                      |
| BCLTP7-130 | 6            | ENSG00000279873 | LINC01126   | long intergenic non-protein coding RNA 1126 [Source:HGNC Symbol;Acc:HGNC:49275]                                      | -0.35                      |
| BCLTP7-130 | 6            | ENSG00000233806 | LINC01237   | long intergenic non-protein coding RNA 1237 [Source:HGNC Symbol;Acc:HGNC:49793]                                      | -0.60                      |
| BCLTP7-130 | 6            | ENSG00000180747 | SMG1P3      | SMG1P3, nonsense mediated mRNA decay associated PI3K related kinase pseudogene 3 [Source:HGNC Symbol;Acc:HGNC:49860] | -0.59                      |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                            | Log <sub>2</sub> FC | TIV   |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------|---------------------|-------|
| BCLTP7-130 | 6            | ENSG00000006638 | TBXA2R    | thromboxane A2 receptor [Source:HGNC Symbol;Acc:HGNC:11608] |                     | -0.30 |

**Table 33:** Co-expressed gene clusters (B Cells, Day 7)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                       | Log <sub>2</sub> FC | TIV  |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------------------------|---------------------|------|
| BCLTP8-001 | 2            | ENSG00000112473 | SLC39A7   | solute carrier family 39 member 7 [Source:HGNC Symbol;Acc:HGNC:4927]                                                   |                     | 0.43 |
| BCLTP8-001 | 2            | ENSG00000239264 | TXNDC5    | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                                                    |                     | 0.67 |
| BCLTP8-002 | 2            | ENSG00000150961 | SEC24D    | SEC24 homolog D, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10706]                                      |                     | 0.64 |
| BCLTP8-002 | 2            | ENSG00000026751 | SLAMF7    | SLAM family member 7 [Source:HGNC Symbol;Acc:HGNC:21394]                                                               |                     | 0.89 |
| BCLTP8-003 | 2            | ENSG00000134285 | FKBP11    | FK506 binding protein 11 [Source:HGNC Symbol;Acc:HGNC:18624]                                                           |                     | 0.73 |
| BCLTP8-003 | 2            | ENSG00000143603 | KCNN3     | potassium calcium-activated channel subfamily N member 3 [Source:HGNC Symbol;Acc:HGNC:6292]                            |                     | 0.86 |
| BCLTP8-004 | 2            | ENSG00000168268 | NT5DC2    | 5'-nucleotidase domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25717]                                                |                     | 0.74 |
| BCLTP8-004 | 2            | ENSG00000071537 | SEL1L     | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]                                               |                     | 0.48 |
| BCLTP8-005 | 2            | ENSG00000119912 | IDE       | insulin degrading enzyme [Source:HGNC Symbol;Acc:HGNC:5381]                                                            |                     | 0.42 |
| BCLTP8-005 | 2            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                                                 |                     | 1.74 |
| BCLTP8-006 | 3            | ENSG00000163902 | RPN1      | ribophorin I [Source:HGNC Symbol;Acc:HGNC:10381]                                                                       |                     | 0.53 |
| BCLTP8-006 | 3            | ENSG00000118705 | RPN2      | ribophorin II [Source:HGNC Symbol;Acc:HGNC:10382]                                                                      |                     | 0.63 |
| BCLTP8-006 | 3            | ENSG00000124783 | SSR1      | signal sequence receptor subunit 1 [Source:HGNC Symbol;Acc:HGNC:11323]                                                 |                     | 0.41 |
| BCLTP8-007 | 2            | ENSG00000132465 | JCHAIN    | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                                             |                     | 0.84 |
| BCLTP8-007 | 2            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                                                 |                     | 0.75 |
| BCLTP8-008 | 2            | ENSG00000106105 | GARS      | glycyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:4162]                                                              |                     | 0.37 |
| BCLTP8-008 | 2            | ENSG00000170476 | MZB1      | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]                                       |                     | 0.77 |
| BCLTP8-009 | 2            | ENSG00000068912 | ERLEC1    | endoplasmic reticulum lectin 1 [Source:HGNC Symbol;Acc:HGNC:25222]                                                     |                     | 0.72 |
| BCLTP8-009 | 2            | ENSG00000112893 | MAN2A1    | mannosidase alpha class 2A member 1 [Source:HGNC Symbol;Acc:HGNC:6824]                                                 |                     | 0.33 |
| BCLTP8-010 | 2            | ENSG00000145050 | MANF      | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]                                |                     | 0.74 |
| BCLTP8-010 | 2            | ENSG00000113387 | SUB1      | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]                                            |                     | 0.43 |
| BCLTP8-011 | 2            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                                                 |                     | 2.05 |
| BCLTP8-011 | 2            | ENSG00000163527 | STT3B     | STT3B, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:30611]                  |                     | 0.34 |
| BCLTP8-012 | 3            | ENSG00000244038 | DDOST     | dolichyl-diphosphooligosaccharide-protein glycosyltransferase non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:2728] |                     | 0.53 |
| BCLTP8-012 | 3            | ENSG00000102580 | DNAJC3    | DnaJ heat shock protein family (Hsp40) member C3 [Source:HGNC Symbol;Acc:HGNC:9439]                                    |                     | 0.51 |
| BCLTP8-012 | 3            | ENSG00000167861 | HID1      | HID1 domain containing [Source:HGNC Symbol;Acc:HGNC:15736]                                                             |                     | 0.88 |
| BCLTP8-013 | 2            | ENSG00000074695 | LMAN1     | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                                                           |                     | 0.69 |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP8-013 | 2            | ENSG00000147649 | MTDH      | metadherin [Source:HGNC Symbol;Acc:HGNC:29608]                                                       | 0.30                       |
| BCLTP8-014 | 5            | ENSG00000123989 | CHPF      | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                                  | 1.13                       |
| BCLTP8-014 | 5            | ENSG00000135916 | ITM2C     | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                                      | 0.83                       |
| BCLTP8-014 | 5            | ENSG00000074842 | MYDGF     | myeloid derived growth factor [Source:HGNC Symbol;Acc:HGNC:16948]                                    | 0.94                       |
| BCLTP8-014 | 5            | ENSG00000155660 | PDIA4     | protein disulfide isomerase family A member 4 [Source:HGNC Symbol;Acc:HGNC:30167]                    | 0.82                       |
| BCLTP8-014 | 5            | ENSG00000118363 | SPCS2     | signal peptidase complex subunit 2 [Source:HGNC Symbol;Acc:HGNC:28962]                               | 0.29                       |
| BCLTP8-015 | 2            | ENSG00000120697 | ALG5      | ALG5, dolichyl-phosphate beta-glucosyltransferase [Source:HGNC Symbol;Acc:HGNC:20266]                | 0.38                       |
| BCLTP8-015 | 2            | ENSG00000074416 | MGLL      | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                             | 0.60                       |
| BCLTP8-016 | 2            | ENSG00000069849 | ATP1B3    | ATPase Na <sup>+</sup> /K <sup>+</sup> transporting subunit beta 3 [Source:HGNC Symbol;Acc:HGNC:806] | 0.33                       |
| BCLTP8-016 | 2            | ENSG00000105974 | CAV1      | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                                        | 1.49                       |
| BCLTP8-017 | 2            | ENSG00000104635 | SLC39A14  | solute carrier family 39 member 14 [Source:HGNC Symbol;Acc:HGNC:20858]                               | 0.37                       |
| BCLTP8-017 | 2            | ENSG00000123352 | SPATS2    | spermatogenesis associated serine rich 2 [Source:HGNC Symbol;Acc:HGNC:18650]                         | 0.60                       |
| BCLTP8-018 | 3            | ENSG00000044574 | HSPA5     | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]                      | 0.68                       |
| BCLTP8-018 | 3            | ENSG00000166794 | PPIB      | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                                        | 0.67                       |
| BCLTP8-018 | 3            | ENSG00000153066 | TXNDC11   | thioredoxin domain containing 11 [Source:HGNC Symbol;Acc:HGNC:28030]                                 | 0.61                       |
| BCLTP8-019 | 2            | ENSG00000139193 | CD27      | CD27 molecule [Source:HGNC Symbol;Acc:HGNC:11922]                                                    | 0.64                       |
| BCLTP8-019 | 2            | ENSG00000121073 | SLC35B1   | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                               | 0.48                       |
| BCLTP8-020 | 3            | ENSG00000100342 | APOL1     | apolipoprotein L1 [Source:HGNC Symbol;Acc:HGNC:618]                                                  | 0.58                       |
| BCLTP8-020 | 3            | ENSG00000136026 | CKAP4     | cytoskeleton associated protein 4 [Source:HGNC Symbol;Acc:HGNC:16991]                                | 0.68                       |
| BCLTP8-020 | 3            | ENSG00000198900 | TOP1      | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]                                            | 0.34                       |
| BCLTP8-021 | 2            | ENSG00000143942 | CHAC2     | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]                        | 0.64                       |
| BCLTP8-021 | 2            | ENSG00000083444 | PLOD1     | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]                 | 0.59                       |
| BCLTP8-022 | 2            | ENSG00000164032 | H2AFZ     | H2A histone family member Z [Source:HGNC Symbol;Acc:HGNC:4741]                                       | 0.26                       |
| BCLTP8-022 | 2            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                                       | 1.62                       |
| BCLTP8-023 | 4            | ENSG00000155304 | HSPA13    | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375]                    | 0.62                       |
| BCLTP8-023 | 4            | ENSG00000113615 | SEC24A    | SEC24 homolog A, COPII coat complex component [Source:HGNC Symbol;Acc:HGNC:10703]                    | 0.66                       |
| BCLTP8-023 | 4            | ENSG00000058262 | SEC61A1   | Sec61 translocon alpha 1 subunit [Source:HGNC Symbol;Acc:HGNC:18276]                                 | 0.47                       |
| BCLTP8-023 | 4            | ENSG00000182934 | SRPRA     | SRP receptor alpha subunit [Source:HGNC Symbol;Acc:HGNC:11307]                                       | 0.39                       |
| BCLTP8-024 | 8            | ENSG00000183508 | FAM46C    | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]                      | 0.66                       |
| BCLTP8-024 | 8            | ENSG00000106415 | GLCC1     | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                                         | 0.58                       |
| BCLTP8-024 | 8            | ENSG00000070081 | NUCB2     | nucleobindin 2 [Source:HGNC Symbol;Acc:HGNC:8044]                                                    | 0.80                       |
| BCLTP8-024 | 8            | ENSG00000198856 | OSTC      | oligosaccharyltransferase complex non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:24448]          | 0.50                       |
| BCLTP8-024 | 8            | ENSG00000102096 | PIM2      | Pim-2 proto-oncogene, serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:8987]                     | 0.52                       |
| BCLTP8-024 | 8            | ENSG00000123131 | PRDX4     | peroxiredoxin 4 [Source:HGNC Symbol;Acc:HGNC:17169]                                                  | 0.89                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|------------|------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP8-024 | 8            | ENSG00000070214 | SLC44A1    | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]                                | 0.61                       |
| BCLTP8-024 | 8            | ENSG00000129128 | SPCS3      | signal peptidase complex subunit 3 [Source:HGNC Symbol;Acc:HGNC:26212]                               | 0.38                       |
| BCLTP8-025 | 2            | ENSG00000049860 | HEXB       | hexosaminidase subunit beta [Source:HGNC Symbol;Acc:HGNC:4879]                                       | 0.35                       |
| BCLTP8-025 | 2            | ENSG00000079931 | MOXD1      | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                                         | 0.70                       |
| BCLTP8-026 | 4            | ENSG00000118985 | ELL2       | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]                        | 0.81                       |
| BCLTP8-026 | 4            | ENSG00000138709 | LARP1B     | La ribonucleoprotein domain family member 1B [Source:HGNC Symbol;Acc:HGNC:24704]                     | 0.42                       |
| BCLTP8-026 | 4            | ENSG00000163694 | RBM47      | RNA binding motif protein 47 [Source:HGNC Symbol;Acc:HGNC:30358]                                     | 0.51                       |
| BCLTP8-026 | 4            | ENSG00000065308 | TRAM2      | translocation associated membrane protein 2 [Source:HGNC Symbol;Acc:HGNC:16855]                      | 0.61                       |
| BCLTP8-027 | 5            | ENSG00000153093 | ACOXL      | acyl-CoA oxidase-like [Source:HGNC Symbol;Acc:HGNC:25621]                                            | 1.39                       |
| BCLTP8-027 | 5            | ENSG00000198937 | CCDC167    | coiled-coil domain containing 167 [Source:HGNC Symbol;Acc:HGNC:21239]                                | 0.56                       |
| BCLTP8-027 | 5            | ENSG00000049656 | CLPTM1L    | CLPTM1 like [Source:HGNC Symbol;Acc:HGNC:24308]                                                      | 0.39                       |
| BCLTP8-027 | 5            | ENSG00000173848 | NET1       | neuroepithelial cell transforming 1 [Source:HGNC Symbol;Acc:HGNC:14592]                              | 0.69                       |
| BCLTP8-027 | 5            | ENSG00000134910 | STT3A      | STT3A, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:6172] | 0.59                       |
| BCLTP8-028 | 2            | ENSG00000211964 | IGHV3-48   | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                                | 0.77                       |
| BCLTP8-028 | 2            | ENSG00000198833 | UBE2J1     | ubiquitin conjugating enzyme E2 J1 [Source:HGNC Symbol;Acc:HGNC:17598]                               | 0.40                       |
| BCLTP8-029 | 3            | ENSG00000134153 | EMC7       | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]                            | 0.37                       |
| BCLTP8-029 | 3            | ENSG00000148468 | FAM171A1   | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]                    | 1.79                       |
| BCLTP8-029 | 3            | ENSG00000134825 | TMEM258    | transmembrane protein 258 [Source:HGNC Symbol;Acc:HGNC:1164]                                         | 0.44                       |
| BCLTP8-030 | 3            | ENSG00000242766 | IGKV1D-17  | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                               | 0.86                       |
| BCLTP8-030 | 3            | ENSG00000095380 | NANS       | N-acetylneuraminate synthase [Source:HGNC Symbol;Acc:HGNC:19237]                                     | 0.47                       |
| BCLTP8-030 | 3            | ENSG00000173334 | TRIB1      | tribbles pseudokinase 1 [Source:HGNC Symbol;Acc:HGNC:16891]                                          | 0.73                       |
| BCLTP8-031 | 3            | ENSG00000112237 | CCNC       | cyclin C [Source:HGNC Symbol;Acc:HGNC:1581]                                                          | 0.30                       |
| BCLTP8-031 | 3            | ENSG00000211938 | IGHV3-7    | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                                 | 1.33                       |
| BCLTP8-031 | 3            | ENSG00000136840 | ST6GALNAC4 | ST6 N-acetylglactosaminide alpha-2,6-sialyltransferase 4 [Source:HGNC Symbol;Acc:HGNC:17846]         | 0.55                       |
| BCLTP8-032 | 3            | ENSG00000124788 | ATXN1      | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                                         | 0.57                       |
| BCLTP8-032 | 3            | ENSG00000185164 | NOMO2      | NODAL modulator 2 [Source:HGNC Symbol;Acc:HGNC:22652]                                                | 0.79                       |
| BCLTP8-032 | 3            | ENSG00000115902 | SLC1A4     | solute carrier family 1 member 4 [Source:HGNC Symbol;Acc:HGNC:10942]                                 | 0.55                       |
| BCLTP8-033 | 3            | ENSG00000103226 | NOMO3      | NODAL modulator 3 [Source:HGNC Symbol;Acc:HGNC:25242]                                                | 0.50                       |
| BCLTP8-033 | 3            | ENSG00000113811 | SELENOK    | selenoprotein K [Source:HGNC Symbol;Acc:HGNC:30394]                                                  | 0.44                       |
| BCLTP8-033 | 3            | ENSG00000170348 | TMED10     | transmembrane p24 trafficking protein 10 [Source:HGNC Symbol;Acc:HGNC:16998]                         | 0.38                       |
| BCLTP8-034 | 5            | ENSG00000004468 | CD38       | CD38 molecule [Source:HGNC Symbol;Acc:HGNC:1667]                                                     | 0.78                       |
| BCLTP8-034 | 5            | ENSG00000129562 | DAD1       | defender against cell death 1 [Source:HGNC Symbol;Acc:HGNC:2664]                                     | 0.30                       |
| BCLTP8-034 | 5            | ENSG00000259706 | HSP90B2P   | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099]           | 0.90                       |
| BCLTP8-034 | 5            | ENSG00000204386 | NEU1       | neuraminidase 1 [Source:HGNC Symbol;Acc:HGNC:7758]                                                   | 0.55                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                                                        | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP8-034 | 5            | ENSG00000131871 | SELENOS   | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                                                                                     | 0.73                       |
| BCLTP8-035 | 3            | ENSG00000108578 | BLMH      | bleomycin hydrolase [Source:HGNC Symbol;Acc:HGNC:1059]                                                                                  | 0.34                       |
| BCLTP8-035 | 3            | ENSG00000106803 | SEC61B    | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                                                       | 0.59                       |
| BCLTP8-035 | 3            | ENSG00000163053 | SLC16A14  | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                                                                  | 1.14                       |
| BCLTP8-036 | 3            | ENSG00000110917 | MLEC      | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                                                                            | 0.38                       |
| BCLTP8-036 | 3            | ENSG00000065911 | MTHFD2    | methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2, methenyltetrahydrofolate cyclohydrolase [Source:HGNC Symbol;Acc:HGNC:7434] | 0.48                       |
| BCLTP8-036 | 3            | ENSG00000103257 | SLC7A5    | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                                                                    | 0.76                       |
| BCLTP8-037 | 4            | ENSG00000168374 | ARF4      | ADP ribosylation factor 4 [Source:HGNC Symbol;Acc:HGNC:655]                                                                             | 0.43                       |
| BCLTP8-037 | 4            | ENSG00000086062 | B4GALT1   | beta-1,4-galactosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:924]                                                                      | 0.40                       |
| BCLTP8-037 | 4            | ENSG00000120725 | SIL1      | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                                                                     | 0.59                       |
| BCLTP8-037 | 4            | ENSG00000184840 | TMED9     | transmembrane p24 trafficking protein 9 [Source:HGNC Symbol;Acc:HGNC:24878]                                                             | 0.45                       |
| BCLTP8-038 | 5            | ENSG00000010310 | GIPR      | gastric inhibitory polypeptide receptor [Source:HGNC Symbol;Acc:HGNC:4271]                                                              | 0.54                       |
| BCLTP8-038 | 5            | ENSG00000111885 | MAN1A1    | mannosidase alpha class 1A member 1 [Source:HGNC Symbol;Acc:HGNC:6821]                                                                  | 0.70                       |
| BCLTP8-038 | 5            | ENSG00000143870 | PDIA6     | protein disulfide isomerase family A member 6 [Source:HGNC Symbol;Acc:HGNC:30168]                                                       | 0.53                       |
| BCLTP8-038 | 5            | ENSG00000128228 | SDF2L1    | stromal cell derived factor 2 like 1 [Source:HGNC Symbol;Acc:HGNC:10676]                                                                | 0.68                       |
| BCLTP8-038 | 5            | ENSG00000108953 | YWHAE     | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein epsilon [Source:HGNC Symbol;Acc:HGNC:12851]                      | 0.32                       |
| BCLTP8-039 | 3            | ENSG00000143641 | GALNT2    | polypeptide N-acetylgalactosaminyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:4124]                                                      | 0.38                       |
| BCLTP8-039 | 3            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                                                                     | 1.34                       |
| BCLTP8-039 | 3            | ENSG00000002549 | LAP3      | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                                                                            | 0.48                       |
| BCLTP8-040 | 5            | ENSG00000180535 | BHLHA15   | basic helix-loop-helix family member a15 [Source:HGNC Symbol;Acc:HGNC:22265]                                                            | 0.96                       |
| BCLTP8-040 | 5            | ENSG00000087502 | ERGIC2    | ERGIC and golgi 2 [Source:HGNC Symbol;Acc:HGNC:30208]                                                                                   | 0.48                       |
| BCLTP8-040 | 5            | ENSG00000075420 | FNDC3B    | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]                                                           | 1.03                       |
| BCLTP8-040 | 5            | ENSG00000108829 | LRRC59    | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]                                                                   | 0.61                       |
| BCLTP8-040 | 5            | ENSG00000183010 | PYCR1     | pyrroline-5-carboxylate reductase 1 [Source:HGNC Symbol;Acc:HGNC:9721]                                                                  | 0.99                       |
| BCLTP8-041 | 2            | ENSG00000171155 | C1GALT1C1 | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                                                                        | 0.55                       |
| BCLTP8-041 | 2            | ENSG00000125844 | RRBP1     | ribosome binding protein 1 [Source:HGNC Symbol;Acc:HGNC:10448]                                                                          | 0.64                       |
| BCLTP8-042 | 5            | ENSG00000154723 | ATP5J     | ATP synthase, H+ transporting, mitochondrial Fo complex subunit F6 [Source:HGNC Symbol;Acc:HGNC:847]                                    | 0.37                       |
| BCLTP8-042 | 5            | ENSG00000203914 | HSP90B3P  | heat shock protein 90 beta family member 3, pseudogene [Source:HGNC Symbol;Acc:HGNC:12100]                                              | 0.94                       |
| BCLTP8-042 | 5            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]                                                   | 1.68                       |
| BCLTP8-042 | 5            | ENSG00000102471 | NDFIP2    | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                                                                  | 0.86                       |
| BCLTP8-042 | 5            | ENSG00000100219 | XBP1      | X-box binding protein 1 [Source:HGNC Symbol;Acc:HGNC:12801]                                                                             | 1.02                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|-------------------------|
| BCLTP8-043 | 2            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                     | 0.68                    |
| BCLTP8-043 | 2            | ENSG00000114902 | SPCS1     | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]                    | 0.51                    |
| BCLTP8-044 | 2            | ENSG00000153162 | BMP6      | bone morphogenetic protein 6 [Source:HGNC Symbol;Acc:HGNC:1073]                           | 0.81                    |
| BCLTP8-044 | 2            | ENSG00000211892 | IGHG4     | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]     | 0.68                    |
| BCLTP8-045 | 5            | ENSG00000064763 | FAR2      | fatty acyl-CoA reductase 2 [Source:HGNC Symbol;Acc:HGNC:25531]                            | 0.69                    |
| BCLTP8-045 | 5            | ENSG00000198380 | GFPT1     | glutamine-fructose-6-phosphate transaminase 1 [Source:HGNC Symbol;Acc:HGNC:4241]          | 0.46                    |
| BCLTP8-045 | 5            | ENSG00000211952 | IGHV4-28  | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                     | 0.92                    |
| BCLTP8-045 | 5            | ENSG00000138768 | USO1      | USO1 vesicle transport factor [Source:HGNC Symbol;Acc:HGNC:30904]                         | 0.33                    |
| BCLTP8-045 | 5            | ENSG00000111424 | VDR       | vitamin D (1,25-dihydroxyvitamin D3) receptor [Source:HGNC Symbol;Acc:HGNC:12679]         | 0.67                    |
| BCLTP8-046 | 3            | ENSG00000128590 | DNAJB9    | DnaJ heat shock protein family (Hsp40) member B9 [Source:HGNC Symbol;Acc:HGNC:6968]       | 0.69                    |
| BCLTP8-046 | 3            | ENSG00000211933 | IGHV6-1   | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                      | 0.42                    |
| BCLTP8-046 | 3            | ENSG00000069956 | MAPK6     | mitogen-activated protein kinase 6 [Source:HGNC Symbol;Acc:HGNC:6879]                     | 0.36                    |
| BCLTP8-047 | 2            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | 1.51                    |
| BCLTP8-047 | 2            | ENSG00000146733 | PSPH      | phosphoserine phosphatase [Source:HGNC Symbol;Acc:HGNC:9577]                              | 0.59                    |
| BCLTP8-048 | 4            | ENSG00000174132 | FAM174A   | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]          | 0.69                    |
| BCLTP8-048 | 4            | ENSG00000088340 | FER1L4    | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]                | 1.71                    |
| BCLTP8-048 | 4            | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | 1.23                    |
| BCLTP8-048 | 4            | ENSG00000113140 | SPARC     | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]             | 1.84                    |
| BCLTP8-049 | 2            | ENSG00000107104 | KANK1     | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                 | 0.81                    |
| BCLTP8-049 | 2            | ENSG00000264522 | OTUD7B    | OTU deubiquitinase 7B [Source:HGNC Symbol;Acc:HGNC:16683]                                 | 0.51                    |
| BCLTP8-050 | 2            | ENSG00000233806 | LINC01237 | long intergenic non-protein coding RNA 1237 [Source:HGNC Symbol;Acc:HGNC:49793]           | -0.31                   |
| BCLTP8-050 | 2            | ENSG00000181722 | ZBTB20    | zinc finger and BTB domain containing 20 [Source:HGNC Symbol;Acc:HGNC:13503]              | -0.59                   |
| BCLTP8-051 | 6            | ENSG00000111291 | GPRC5D    | G protein-coupled receptor class C group 5 member D [Source:HGNC Symbol;Acc:HGNC:13310]   | 0.73                    |
| BCLTP8-051 | 6            | ENSG00000099337 | KCNK6     | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281] | 0.58                    |
| BCLTP8-051 | 6            | ENSG00000184232 | OAF       | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                  | 0.93                    |
| BCLTP8-051 | 6            | ENSG00000037241 | RPL26L1   | ribosomal protein L26 like 1 [Source:HGNC Symbol;Acc:HGNC:17050]                          | 0.44                    |
| BCLTP8-051 | 6            | ENSG00000100883 | SRP54     | signal recognition particle 54 [Source:HGNC Symbol;Acc:HGNC:11301]                        | 0.46                    |
| BCLTP8-051 | 6            | ENSG00000145817 | YIPF5     | Yip1 domain family member 5 [Source:HGNC Symbol;Acc:HGNC:24877]                           | 0.33                    |
| BCLTP8-052 | 4            | ENSG00000115163 | CENPA     | centromere protein A [Source:HGNC Symbol;Acc:HGNC:1851]                                   | 0.89                    |
| BCLTP8-052 | 4            | ENSG00000254395 | IGHV4-55  | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]        | 0.83                    |
| BCLTP8-052 | 4            | ENSG00000211592 | IGKC      | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                          | 0.31                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                 | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-------------|------------------------------------------------------------------------------------------------------------------|----------------------------|
| BCLTP8-052 | 4            | ENSG00000117632 | STMN1       | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                                                    | 0.19                       |
| BCLTP8-053 | 3            | ENSG00000282600 |             |                                                                                                                  | 1.26                       |
| BCLTP8-053 | 3            | ENSG00000119523 | ALG2        | ALG2, alpha-1,3/1,6-mannosyltransferase [Source:HGNC Symbol;Acc:HGNC:23159]                                      | 0.43                       |
| BCLTP8-053 | 3            | ENSG00000186810 | CXCR3       | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                                              | 1.14                       |
| BCLTP8-054 | 3            | ENSG00000280411 | IGHV1-69-2  | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                                          | 0.73                       |
| BCLTP8-054 | 3            | ENSG00000211632 | IGKV3D-11   | immunoglobulin kappa variable 3D-11 [Source:HGNC Symbol;Acc:HGNC:5823]                                           | 0.53                       |
| BCLTP8-054 | 3            | ENSG00000211645 | IGLV1-50    | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]                          | 1.78                       |
| BCLTP8-055 | 5            | ENSG00000138166 | DUSP5       | dual specificity phosphatase 5 [Source:HGNC Symbol;Acc:HGNC:3071]                                                | 0.82                       |
| BCLTP8-055 | 5            | ENSG00000162676 | GFI1        | growth factor independent 1 transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4237]                         | 1.25                       |
| BCLTP8-055 | 5            | ENSG00000163754 | GYG1        | glycogenin 1 [Source:HGNC Symbol;Acc:HGNC:4699]                                                                  | 0.28                       |
| BCLTP8-055 | 5            | ENSG00000211670 | IGLV3-9     | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]                          | 1.91                       |
| BCLTP8-055 | 5            | ENSG00000197780 | TAF13       | TATA-box binding protein associated factor 13 [Source:HGNC Symbol;Acc:HGNC:11546]                                | 0.49                       |
| BCLTP8-056 | 3            | ENSG00000024526 | DEPDC1      | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                                                      | 0.44                       |
| BCLTP8-056 | 3            | ENSG00000254176 | IGHV3-75    | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]                               | 1.47                       |
| BCLTP8-056 | 3            | ENSG00000240382 | IGKV1-17    | immunoglobulin kappa variable 1-17 [Source:HGNC Symbol;Acc:HGNC:5733]                                            | 0.45                       |
| BCLTP8-057 | 2            | ENSG00000181800 | CELF2-AS1   | CELF2 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:23515]                                                        | -0.82                      |
| BCLTP8-057 | 2            | ENSG00000224699 | LAMTOR5-AS1 | LAMTOR5 antisense RNA 1 [Source:HGNC Symbol;Acc:HGNC:40823]                                                      | -0.44                      |
| BCLTP8-058 | 2            | ENSG00000211673 | IGLV3-1     | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                                            | 1.07                       |
| BCLTP8-058 | 2            | ENSG00000104889 | RNASEH2A    | ribonuclease H2 subunit A [Source:HGNC Symbol;Acc:HGNC:18518]                                                    | 0.25                       |
| BCLTP8-059 | 3            | ENSG00000137806 | NDUFAF1     | NADH:ubiquinone oxidoreductase complex assembly factor 1 [Source:HGNC Symbol;Acc:HGNC:18828]                     | 0.41                       |
| BCLTP8-059 | 3            | ENSG00000107719 | PALD1       | phosphatase domain containing, paladin 1 [Source:HGNC Symbol;Acc:HGNC:23530]                                     | 0.37                       |
| BCLTP8-059 | 3            | ENSG00000025039 | RRAGD       | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                                                    | 0.82                       |
| BCLTP8-060 | 4            | ENSG00000259772 |             |                                                                                                                  | 0.52                       |
| BCLTP8-060 | 4            | ENSG00000253822 | IGLV3-24    | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]                              | 1.76                       |
| BCLTP8-060 | 4            | ENSG00000092621 | PHGDH       | phosphoglycerate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:8923]                                                | 0.53                       |
| BCLTP8-060 | 4            | ENSG00000170027 | YWHAG       | tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein gamma [Source:HGNC Symbol;Acc:HGNC:12852] | 0.44                       |
| BCLTP8-061 | 3            | ENSG00000274272 |             |                                                                                                                  | -0.29                      |
| BCLTP8-061 | 3            | ENSG00000178127 | NDUFV2      | NADH:ubiquinone oxidoreductase core subunit V2 [Source:HGNC Symbol;Acc:HGNC:7717]                                | -0.93                      |
| BCLTP8-061 | 3            | ENSG00000100154 | TTC28       | tetratricopeptide repeat domain 28 [Source:HGNC Symbol;Acc:HGNC:29179]                                           | -0.64                      |
| BCLTP8-062 | 6            | ENSG00000216775 |             |                                                                                                                  | 1.15                       |
| BCLTP8-062 | 6            | ENSG00000178445 | GLDC        | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                                         | 1.01                       |
| BCLTP8-062 | 6            | ENSG00000164109 | MAD2L1      | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]                                  | 0.45                       |
| BCLTP8-062 | 6            | ENSG00000172965 | MIR4435-2HG | MIR4435-2 host gene [Source:HGNC Symbol;Acc:HGNC:35163]                                                          | 0.63                       |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                              | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------------|----------------------------|
| BCLTP8-062 | 6            | ENSG00000198794 | SCAMP5    | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                      | 0.96                       |
| BCLTP8-062 | 6            | ENSG00000169962 | TAS1R3    | taste 1 receptor member 3 [Source:HGNC Symbol;Acc:HGNC:15661]                                 | 0.65                       |
| BCLTP8-063 | 4            | ENSG00000187837 | HIST1H1C  | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                       | 0.31                       |
| BCLTP8-063 | 4            | ENSG00000254174 | IGHV1-12  | immunoglobulin heavy variable 1-12 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5546]            | 1.70                       |
| BCLTP8-063 | 4            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                         | 0.67                       |
| BCLTP8-063 | 4            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                         | 0.96                       |
| BCLTP8-064 | 4            | ENSG00000213430 | HSPD1P1   | heat shock protein family D (Hsp60) member 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:35133] | 0.46                       |
| BCLTP8-064 | 4            | ENSG00000211599 | IGKV5-2   | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835]                          | 0.63                       |
| BCLTP8-064 | 4            | ENSG00000144182 | LIPT1     | lipoyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:29569]                                       | 0.44                       |
| BCLTP8-064 | 4            | ENSG00000173578 | XCR1      | X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1625]                             | 1.08                       |
| BCLTP8-065 | 3            | ENSG00000248571 |           |                                                                                               | 1.09                       |
| BCLTP8-065 | 3            | ENSG00000224041 | IGKV3D-15 | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824]      | 0.56                       |
| BCLTP8-065 | 3            | ENSG00000185480 | PARBP     | PARP1 binding protein [Source:HGNC Symbol;Acc:HGNC:26074]                                     | 0.39                       |
| BCLTP8-066 | 8            | ENSG00000232176 |           |                                                                                               | -0.83                      |
| BCLTP8-066 | 8            | ENSG00000241666 |           |                                                                                               | -0.73                      |
| BCLTP8-066 | 8            | ENSG00000168209 | DDIT4     | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                         | -0.86                      |
| BCLTP8-066 | 8            | ENSG00000141753 | IGFBP4    | insulin like growth factor binding protein 4 [Source:HGNC Symbol;Acc:HGNC:5473]               | -0.31                      |
| BCLTP8-066 | 8            | ENSG00000172548 | NIPAL4    | NIPA like domain containing 4 [Source:HGNC Symbol;Acc:HGNC:28018]                             | -0.21                      |
| BCLTP8-066 | 8            | ENSG00000080546 | SESN1     | sestrin 1 [Source:HGNC Symbol;Acc:HGNC:21595]                                                 | -0.59                      |
| BCLTP8-066 | 8            | ENSG00000006638 | TBXA2R    | thromboxane A2 receptor [Source:HGNC Symbol;Acc:HGNC:11608]                                   | -0.51                      |
| BCLTP8-066 | 8            | ENSG00000196263 | ZNF471    | zinc finger protein 471 [Source:HGNC Symbol;Acc:HGNC:23226]                                   | -0.67                      |

Table 34: Co-expressed gene clusters (B Cells, Day 8)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                        | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------|----------------------------|
| BCLTP9-001 | 2            | ENSG00000211892 | IGHG4     | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]   | 0.30                       |
| BCLTP9-001 | 2            | ENSG00000254176 | IGHV3-75  | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]      | 1.45                       |
| BCLTP9-002 | 2            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918] | 1.64                       |
| BCLTP9-002 | 2            | ENSG00000113140 | SPARC     | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]           | 1.52                       |
| BCLTP9-003 | 2            | ENSG00000124788 | ATXN1     | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                            | 0.38                       |
| BCLTP9-003 | 2            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                  | 1.37                       |
| BCLTP9-004 | 3            | ENSG00000108641 | B9D1      | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                              | 0.65                       |
| BCLTP9-004 | 3            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                           | 1.40                       |
| BCLTP9-004 | 3            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                              | 1.55                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|-------------------------|
| BCLTP9-005 | 5            | ENSG00000121807 | CCR2      | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                        | 0.83                    |
| BCLTP9-005 | 5            | ENSG00000174132 | FAM174A   | family with sequence similarity 174 member A [Source:HGNC Symbol;Acc:HGNC:24943]         | 0.70                    |
| BCLTP9-005 | 5            | ENSG00000088340 | FER1L4    | fer-1 like family member 4, pseudogene [Source:HGNC Symbol;Acc:HGNC:15801]               | 1.19                    |
| BCLTP9-005 | 5            | ENSG00000224041 | IGKV3D-15 | immunoglobulin kappa variable 3D-15 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5824] | 0.31                    |
| BCLTP9-005 | 5            | ENSG00000169962 | TAS1R3    | taste 1 receptor member 3 [Source:HGNC Symbol;Acc:HGNC:15661]                            | 0.49                    |
| BCLTP9-006 | 4            | ENSG00000158578 | ALAS2     | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                          | 1.83                    |
| BCLTP9-006 | 4            | ENSG00000107104 | KANK1     | KN motif and ankyrin repeat domains 1 [Source:HGNC Symbol;Acc:HGNC:19309]                | 0.54                    |
| BCLTP9-006 | 4            | ENSG00000179222 | MAGED1    | MAGE family member D1 [Source:HGNC Symbol;Acc:HGNC:6813]                                 | 0.22                    |
| BCLTP9-006 | 4            | ENSG00000004866 | ST7       | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                      | 0.43                    |
| BCLTP9-007 | 10           | ENSG00000119523 | ALG2      | ALG2, alpha-1,3/1,6-mannosyltransferase [Source:HGNC Symbol;Acc:HGNC:23159]              | 0.28                    |
| BCLTP9-007 | 10           | ENSG00000186810 | CXCR3     | C-X-C motif chemokine receptor 3 [Source:HGNC Symbol;Acc:HGNC:4540]                      | 0.79                    |
| BCLTP9-007 | 10           | ENSG00000134153 | EMC7      | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]                | 0.32                    |
| BCLTP9-007 | 10           | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                            | 1.42                    |
| BCLTP9-007 | 10           | ENSG00000049860 | HEXB      | hexosaminidase subunit beta [Source:HGNC Symbol;Acc:HGNC:4879]                           | 0.31                    |
| BCLTP9-007 | 10           | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                    | 0.98                    |
| BCLTP9-007 | 10           | ENSG00000079931 | MOXD1     | monooxygenase DBH like 1 [Source:HGNC Symbol;Acc:HGNC:21063]                             | 0.60                    |
| BCLTP9-007 | 10           | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                           | 1.39                    |
| BCLTP9-007 | 10           | ENSG00000163053 | SLC16A14  | solute carrier family 16 member 14 [Source:HGNC Symbol;Acc:HGNC:26417]                   | 0.90                    |
| BCLTP9-007 | 10           | ENSG00000173218 | VANGL1    | VANGL planar cell polarity protein 1 [Source:HGNC Symbol;Acc:HGNC:15512]                 | 0.32                    |
| BCLTP9-008 | 3            | ENSG00000211673 | IGLV3-1   | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                    | 0.70                    |
| BCLTP9-008 | 3            | ENSG00000129636 | ITFG1     | integrin alpha FG-GAP repeat containing 1 [Source:HGNC Symbol;Acc:HGNC:30697]            | 0.26                    |
| BCLTP9-008 | 3            | ENSG00000025039 | RRAGD     | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                            | 0.42                    |

Table 35: Co-expressed gene clusters (B Cells, Day 9)

| Cluster ID  | Cluster Size | Gene ID         | Gene Name | Gene Description                                                          | Log <sub>2</sub> FC TIV |
|-------------|--------------|-----------------|-----------|---------------------------------------------------------------------------|-------------------------|
| BCLTP10-001 | 2            | ENSG00000211599 | IGKV5-2   | immunoglobulin kappa variable 5-2 [Source:HGNC Symbol;Acc:HGNC:5835]      | 0.76                    |
| BCLTP10-001 | 2            | ENSG00000179222 | MAGED1    | MAGE family member D1 [Source:HGNC Symbol;Acc:HGNC:6813]                  | 0.14                    |
| BCLTP10-002 | 4            | ENSG00000123080 | CDKN2C    | cyclin dependent kinase inhibitor 2C [Source:HGNC Symbol;Acc:HGNC:1789]   | -0.16                   |
| BCLTP10-002 | 4            | ENSG00000101439 | CST3      | cystatin C [Source:HGNC Symbol;Acc:HGNC:2475]                             | -0.88                   |
| BCLTP10-002 | 4            | ENSG00000160883 | HK3       | hexokinase 3 [Source:HGNC Symbol;Acc:HGNC:4925]                           | -0.68                   |
| BCLTP10-002 | 4            | ENSG00000166851 | PLK1      | polo like kinase 1 [Source:HGNC Symbol;Acc:HGNC:9077]                     | -0.28                   |
| BCLTP10-003 | 6            | ENSG00000134153 | EMC7      | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301] | 0.14                    |

| Cluster ID  | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                        | Log <sub>2</sub> FC<br>TIV |
|-------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------|----------------------------|
| BCLTP10-003 | 6            | ENSG00000231475 | IGHV4-31  | immunoglobulin heavy variable 4-31 [Source:HGNC Symbol;Acc:HGNC:5649]                   | 0.29                       |
| BCLTP10-003 | 6            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918] | 1.52                       |
| BCLTP10-003 | 6            | ENSG00000120725 | SIL1      | SIL1 nucleotide exchange factor [Source:HGNC Symbol;Acc:HGNC:24624]                     | 0.11                       |
| BCLTP10-003 | 6            | ENSG00000114902 | SPCS1     | signal peptidase complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:23401]                  | 0.07                       |
| BCLTP10-003 | 6            | ENSG00000154277 | UCHL1     | ubiquitin C-terminal hydrolase L1 [Source:HGNC Symbol;Acc:HGNC:12513]                   | 0.36                       |

**Table 36:** Co-expressed gene clusters (B Cells, Day 10)

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                      | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------------------|----------------------------|
| BCLALLTP-001 | 2            | ENSG00000183508 | FAM46C    | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]                       |                            |
| BCLALLTP-001 | 2            | ENSG00000106415 | GLCC1     | glucocorticoid induced 1 [Source:HGNC Symbol;Acc:HGNC:18713]                                          |                            |
| BCLALLTP-002 | 5            | ENSG00000166598 | HSP90B1   | heat shock protein 90 beta family member 1 [Source:HGNC Symbol;Acc:HGNC:12028]                        |                            |
| BCLALLTP-002 | 5            | ENSG00000044574 | HSPA5     | heat shock protein family A (Hsp70) member 5 [Source:HGNC Symbol;Acc:HGNC:5238]                       |                            |
| BCLALLTP-002 | 5            | ENSG00000074695 | LMAN1     | lectin, mannose binding 1 [Source:HGNC Symbol;Acc:HGNC:6631]                                          |                            |
| BCLALLTP-002 | 5            | ENSG00000166794 | PPIB      | peptidylprolyl isomerase B [Source:HGNC Symbol;Acc:HGNC:9255]                                         |                            |
| BCLALLTP-002 | 5            | ENSG00000166562 | SEC11C    | SEC11 homolog C, signal peptidase complex subunit [Source:HGNC Symbol;Acc:HGNC:23400]                 |                            |
| BCLALLTP-003 | 2            | ENSG00000106803 | SEC61B    | Sec61 translocon beta subunit [Source:HGNC Symbol;Acc:HGNC:16993]                                     |                            |
| BCLALLTP-003 | 2            | ENSG00000121073 | SLC35B1   | solute carrier family 35 member B1 [Source:HGNC Symbol;Acc:HGNC:20798]                                |                            |
| BCLALLTP-004 | 3            | ENSG00000168374 | ARF4      | ADP ribosylation factor 4 [Source:HGNC Symbol;Acc:HGNC:655]                                           |                            |
| BCLALLTP-004 | 3            | ENSG00000124783 | SSR1      | signal sequence receptor subunit 1 [Source:HGNC Symbol;Acc:HGNC:11323]                                |                            |
| BCLALLTP-004 | 3            | ENSG00000170348 | TMED10    | transmembrane p24 trafficking protein 10 [Source:HGNC Symbol;Acc:HGNC:16998]                          |                            |
| BCLALLTP-005 | 2            | ENSG00000110063 | DCPS      | decapping enzyme, scavenger [Source:HGNC Symbol;Acc:HGNC:29812]                                       |                            |
| BCLALLTP-005 | 2            | ENSG00000176658 | MYO1D     | myosin ID [Source:HGNC Symbol;Acc:HGNC:7598]                                                          |                            |
| BCLALLTP-006 | 2            | ENSG00000111640 | GAPDH     | glyceraldehyde-3-phosphate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:4141]                           |                            |
| BCLALLTP-006 | 2            | ENSG00000101057 | MYBL2     | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                          |                            |
| BCLALLTP-007 | 4            | ENSG00000136770 | DNAJC1    | DnaJ heat shock protein family (Hsp40) member C1 [Source:HGNC Symbol;Acc:HGNC:20090]                  |                            |
| BCLALLTP-007 | 4            | ENSG00000129128 | SPCS3     | signal peptidase complex subunit 3 [Source:HGNC Symbol;Acc:HGNC:26212]                                |                            |
| BCLALLTP-007 | 4            | ENSG00000163527 | STT3B     | STT3B, catalytic subunit of the oligosaccharyltransferase complex [Source:HGNC Symbol;Acc:HGNC:30611] |                            |
| BCLALLTP-007 | 4            | ENSG00000067167 | TRAM1     | translocation associated membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:20568]                       |                            |
| BCLALLTP-008 | 8            | ENSG00000259706 | HSP90B2P  | heat shock protein 90 beta family member 2, pseudogene [Source:HGNC Symbol;Acc:HGNC:12099]            |                            |
| BCLALLTP-008 | 8            | ENSG00000145050 | MANF      | mesencephalic astrocyte derived neurotrophic factor [Source:HGNC Symbol;Acc:HGNC:15461]               |                            |
| BCLALLTP-008 | 8            | ENSG00000198856 | OSTC      | oligosaccharyltransferase complex non-catalytic subunit [Source:HGNC Symbol;Acc:HGNC:24448]           |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                  | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------|----------------------------|
| BCLALLTP-008 | 8            | ENSG00000131871 | SELENOS   | selenoprotein S [Source:HGNC Symbol;Acc:HGNC:30396]                               |                            |
| BCLALLTP-008 | 8            | ENSG00000070214 | SLC44A1   | solute carrier family 44 member 1 [Source:HGNC Symbol;Acc:HGNC:18798]             |                            |
| BCLALLTP-008 | 8            | ENSG00000114850 | SSR3      | signal sequence receptor subunit 3 [Source:HGNC Symbol;Acc:HGNC:11325]            |                            |
| BCLALLTP-008 | 8            | ENSG00000113387 | SUB1      | SUB1 homolog, transcriptional regulator [Source:HGNC Symbol;Acc:HGNC:19985]       |                            |
| BCLALLTP-008 | 8            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]            |                            |
| BCLALLTP-009 | 2            | ENSG00000243238 | IGKV2-30  | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]             |                            |
| BCLALLTP-009 | 2            | ENSG00000239571 | IGKV2D-30 | immunoglobulin kappa variable 2D-30 [Source:HGNC Symbol;Acc:HGNC:5801]            |                            |
| BCLALLTP-010 | 3            | ENSG00000106105 | GARS      | glycyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:4162]                         |                            |
| BCLALLTP-010 | 3            | ENSG00000108829 | LRRC59    | leucine rich repeat containing 59 [Source:HGNC Symbol;Acc:HGNC:28817]             |                            |
| BCLALLTP-010 | 3            | ENSG00000110917 | MLEC      | malectin [Source:HGNC Symbol;Acc:HGNC:28973]                                      |                            |
| BCLALLTP-011 | 2            | ENSG00000182481 | KPNA2     | karyopherin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:6395]                    |                            |
| BCLALLTP-011 | 2            | ENSG00000167325 | RRM1      | ribonucleotide reductase catalytic subunit M1 [Source:HGNC Symbol;Acc:HGNC:10451] |                            |
| BCLALLTP-012 | 7            | ENSG00000171155 | C1GALT1C1 | C1GALT1 specific chaperone 1 [Source:HGNC Symbol;Acc:HGNC:24338]                  |                            |
| BCLALLTP-012 | 7            | ENSG00000075420 | FNDC3B    | fibronectin type III domain containing 3B [Source:HGNC Symbol;Acc:HGNC:24670]     |                            |
| BCLALLTP-012 | 7            | ENSG00000198380 | GFPT1     | glutamine-fructose-6-phosphate transaminase 1 [Source:HGNC Symbol;Acc:HGNC:4241]  |                            |
| BCLALLTP-012 | 7            | ENSG00000155304 | HSPA13    | heat shock protein family A (Hsp70) member 13 [Source:HGNC Symbol;Acc:HGNC:11375] |                            |
| BCLALLTP-012 | 7            | ENSG00000172469 | MANEA     | mannosidase endo-alpha [Source:HGNC Symbol;Acc:HGNC:21072]                        |                            |
| BCLALLTP-012 | 7            | ENSG00000071537 | SEL1L     | SEL1L ERAD E3 ligase adaptor subunit [Source:HGNC Symbol;Acc:HGNC:10717]          |                            |
| BCLALLTP-012 | 7            | ENSG00000138768 | USO1      | USO1 vesicle transport factor [Source:HGNC Symbol;Acc:HGNC:30904]                 |                            |
| BCLALLTP-013 | 3            | ENSG00000135476 | ESPL1     | extra spindle pole bodies like 1, separase [Source:HGNC Symbol;Acc:HGNC:16856]    |                            |
| BCLALLTP-013 | 3            | ENSG00000237649 | KIFC1     | kinesin family member C1 [Source:HGNC Symbol;Acc:HGNC:6389]                       |                            |
| BCLALLTP-013 | 3            | ENSG00000076382 | SPAG5     | sperm associated antigen 5 [Source:HGNC Symbol;Acc:HGNC:13452]                    |                            |
| BCLALLTP-014 | 3            | ENSG00000165272 | AQP3      | aquaporin 3 (Gill blood group) [Source:HGNC Symbol;Acc:HGNC:636]                  |                            |
| BCLALLTP-014 | 3            | ENSG00000160712 | IL6R      | interleukin 6 receptor [Source:HGNC Symbol;Acc:HGNC:6019]                         |                            |
| BCLALLTP-014 | 3            | ENSG00000112378 | PERP      | PERP, TP53 apoptosis effector [Source:HGNC Symbol;Acc:HGNC:17637]                 |                            |
| BCLALLTP-015 | 2            | ENSG00000198826 | ARHGAP11A | Rho GTPase activating protein 11A [Source:HGNC Symbol;Acc:HGNC:15783]             |                            |
| BCLALLTP-015 | 2            | ENSG00000051341 | POLQ      | DNA polymerase theta [Source:HGNC Symbol;Acc:HGNC:9186]                           |                            |
| BCLALLTP-016 | 8            | ENSG00000145386 | CCNA2     | cyclin A2 [Source:HGNC Symbol;Acc:HGNC:1578]                                      |                            |
| BCLALLTP-016 | 8            | ENSG00000117399 | CDC20     | cell division cycle 20 [Source:HGNC Symbol;Acc:HGNC:1723]                         |                            |
| BCLALLTP-016 | 8            | ENSG00000072571 | HMMR      | hyaluronan mediated motility receptor [Source:HGNC Symbol;Acc:HGNC:5012]          |                            |
| BCLALLTP-016 | 8            | ENSG00000138160 | KIF11     | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                       |                            |
| BCLALLTP-016 | 8            | ENSG00000104738 | MCM4      | minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:HGNC:6947] |                            |
| BCLALLTP-016 | 8            | ENSG00000076003 | MCM6      | minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:HGNC:6949] |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                             | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------------|----------------------------|
| BCLALLTP-016 | 8            | ENSG00000132646 | PCNA      | proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:HGNC:8729]                        |                            |
| BCLALLTP-016 | 8            | ENSG00000131747 | TOP2A     | topoisomerase (DNA) II alpha [Source:HGNC Symbol;Acc:HGNC:11989]                             |                            |
| BCLALLTP-017 | 4            | ENSG00000124788 | ATXN1     | ataxin 1 [Source:HGNC Symbol;Acc:HGNC:10548]                                                 |                            |
| BCLALLTP-017 | 4            | ENSG00000140743 | CDR2      | cerebellar degeneration related protein 2 [Source:HGNC Symbol;Acc:HGNC:1799]                 |                            |
| BCLALLTP-017 | 4            | ENSG00000211938 | IGHV3-7   | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                         |                            |
| BCLALLTP-017 | 4            | ENSG00000070540 | WIPI1     | WD repeat domain, phosphoinositide interacting 1 [Source:HGNC Symbol;Acc:HGNC:25471]         |                            |
| BCLALLTP-018 | 2            | ENSG00000198855 | FICD      | FIC domain containing [Source:HGNC Symbol;Acc:HGNC:18416]                                    |                            |
| BCLALLTP-018 | 2            | ENSG00000145817 | YIPF5     | Yip1 domain family member 5 [Source:HGNC Symbol;Acc:HGNC:24877]                              |                            |
| BCLALLTP-019 | 3            | ENSG00000040933 | INPP4A    | inositol polyphosphate-4-phosphatase type I A [Source:HGNC Symbol;Acc:HGNC:6074]             |                            |
| BCLALLTP-019 | 3            | ENSG00000122188 | LAX1      | lymphocyte transmembrane adaptor 1 [Source:HGNC Symbol;Acc:HGNC:26005]                       |                            |
| BCLALLTP-019 | 3            | ENSG00000136161 | RCBTB2    | RCC1 and BTB domain containing protein 2 [Source:HGNC Symbol;Acc:HGNC:1914]                  |                            |
| BCLALLTP-020 | 2            | ENSG00000142731 | PLK4      | polo like kinase 4 [Source:HGNC Symbol;Acc:HGNC:11397]                                       |                            |
| BCLALLTP-020 | 2            | ENSG00000123473 | STIL      | SCL/TAL1 interrupting locus [Source:HGNC Symbol;Acc:HGNC:10879]                              |                            |
| BCLALLTP-021 | 5            | ENSG00000184432 | COPB2     | coatamer protein complex subunit beta 2 [Source:HGNC Symbol;Acc:HGNC:2232]                   |                            |
| BCLALLTP-021 | 5            | ENSG00000134153 | EMC7      | ER membrane protein complex subunit 7 [Source:HGNC Symbol;Acc:HGNC:24301]                    |                            |
| BCLALLTP-021 | 5            | ENSG00000102158 | MAGT1     | magnesium transporter 1 [Source:HGNC Symbol;Acc:HGNC:28880]                                  |                            |
| BCLALLTP-021 | 5            | ENSG00000004866 | ST7       | suppression of tumorigenicity 7 [Source:HGNC Symbol;Acc:HGNC:11351]                          |                            |
| BCLALLTP-021 | 5            | ENSG00000198900 | TOP1      | topoisomerase (DNA) I [Source:HGNC Symbol;Acc:HGNC:11986]                                    |                            |
| BCLALLTP-022 | 8            | ENSG00000066279 | ASPM      | abnormal spindle microtubule assembly [Source:HGNC Symbol;Acc:HGNC:19048]                    |                            |
| BCLALLTP-022 | 8            | ENSG00000094804 | CDC6      | cell division cycle 6 [Source:HGNC Symbol;Acc:HGNC:1744]                                     |                            |
| BCLALLTP-022 | 8            | ENSG00000117724 | CENPF     | centromere protein F [Source:HGNC Symbol;Acc:HGNC:1857]                                      |                            |
| BCLALLTP-022 | 8            | ENSG00000106462 | EZH2      | enhancer of zeste 2 polycomb repressive complex 2 subunit [Source:HGNC Symbol;Acc:HGNC:3527] |                            |
| BCLALLTP-022 | 8            | ENSG00000140525 | FANCI     | Fanconi anemia complementation group I [Source:HGNC Symbol;Acc:HGNC:25568]                   |                            |
| BCLALLTP-022 | 8            | ENSG00000168496 | FEN1      | flap structure-specific endonuclease 1 [Source:HGNC Symbol;Acc:HGNC:3650]                    |                            |
| BCLALLTP-022 | 8            | ENSG00000075218 | GTSE1     | G2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:HGNC:13698]                               |                            |
| BCLALLTP-022 | 8            | ENSG00000088325 | TPX2      | TPX2, microtubule nucleation factor [Source:HGNC Symbol;Acc:HGNC:1249]                       |                            |
| BCLALLTP-023 | 2            | ENSG00000242076 | IGKV1-33  | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                        |                            |
| BCLALLTP-023 | 2            | ENSG00000239975 | IGKV1D-33 | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                       |                            |
| BCLALLTP-024 | 3            | ENSG00000216775 |           |                                                                                              |                            |
| BCLALLTP-024 | 3            | ENSG00000178445 | GLDC      | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                     |                            |
| BCLALLTP-024 | 3            | ENSG00000198794 | SCAMP5    | secretory carrier membrane protein 5 [Source:HGNC Symbol;Acc:HGNC:30386]                     |                            |
| BCLALLTP-025 | 2            | ENSG00000211935 | IGHV1-3   | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                         |                            |
| BCLALLTP-025 | 2            | ENSG00000211644 | IGLV1-51  | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                       |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                             | Log <sub>2</sub> FC TIV |
|--------------|--------------|-----------------|-------------|----------------------------------------------------------------------------------------------|-------------------------|
| BCLALLTP-026 | 4            | ENSG00000095380 | NANS        | N-acetylneuraminate synthase [Source:HGNC Symbol;Acc:HGNC:19237]                             |                         |
| BCLALLTP-026 | 4            | ENSG00000083444 | PLOD1       | procollagen-lysine,2-oxoglutarate 5-dioxygenase 1 [Source:HGNC Symbol;Acc:HGNC:9081]         |                         |
| BCLALLTP-026 | 4            | ENSG00000136868 | SLC31A1     | solute carrier family 31 member 1 [Source:HGNC Symbol;Acc:HGNC:11016]                        |                         |
| BCLALLTP-026 | 4            | ENSG00000103257 | SLC7A5      | solute carrier family 7 member 5 [Source:HGNC Symbol;Acc:HGNC:11063]                         |                         |
| BCLALLTP-027 | 2            | ENSG00000242371 | IGKV1-39    | immunoglobulin kappa variable 1-39 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5740]      |                         |
| BCLALLTP-027 | 2            | ENSG00000251546 | IGKV1D-39   | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                       |                         |
| BCLALLTP-028 | 3            | ENSG00000157456 | CCNB2       | cyclin B2 [Source:HGNC Symbol;Acc:HGNC:1580]                                                 |                         |
| BCLALLTP-028 | 3            | ENSG00000111206 | FOXM1       | forkhead box M1 [Source:HGNC Symbol;Acc:HGNC:3818]                                           |                         |
| BCLALLTP-028 | 3            | ENSG00000166803 | KIAA0101    | KIAA0101 [Source:HGNC Symbol;Acc:HGNC:28961]                                                 |                         |
| BCLALLTP-029 | 2            | ENSG00000248571 |             |                                                                                              |                         |
| BCLALLTP-029 | 2            | ENSG00000137806 | NDUFAF1     | NADH:ubiquinone oxidoreductase complex assembly factor 1 [Source:HGNC Symbol;Acc:HGNC:18828] |                         |
| BCLALLTP-030 | 7            | ENSG00000012048 | BRCA1       | BRCA1, DNA repair associated [Source:HGNC Symbol;Acc:HGNC:1100]                              |                         |
| BCLALLTP-030 | 7            | ENSG00000134057 | CCNB1       | cyclin B1 [Source:HGNC Symbol;Acc:HGNC:1579]                                                 |                         |
| BCLALLTP-030 | 7            | ENSG00000024526 | DEPDC1      | DEP domain containing 1 [Source:HGNC Symbol;Acc:HGNC:22949]                                  |                         |
| BCLALLTP-030 | 7            | ENSG00000164109 | MAD2L1      | MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:HGNC:6763]              |                         |
| BCLALLTP-030 | 7            | ENSG00000109805 | NCAPG       | non-SMC condensin I complex subunit G [Source:HGNC Symbol;Acc:HGNC:24304]                    |                         |
| BCLALLTP-030 | 7            | ENSG00000137804 | NUSAP1      | nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:HGNC:18538]               |                         |
| BCLALLTP-030 | 7            | ENSG00000117632 | STMN1       | stathmin 1 [Source:HGNC Symbol;Acc:HGNC:6510]                                                |                         |
| BCLALLTP-031 | 2            | ENSG00000278857 | IGKV1D-12   | immunoglobulin kappa variable 1D-12 [Source:HGNC Symbol;Acc:HGNC:5746]                       |                         |
| BCLALLTP-031 | 2            | ENSG00000211645 | IGLV1-50    | immunoglobulin lambda variable 1-50 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5881]      |                         |
| BCLALLTP-032 | 7            | ENSG00000136010 | ALDH1L2     | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]                |                         |
| BCLALLTP-032 | 7            | ENSG00000143641 | GALNT2      | polypeptide N-acetylgalactosaminyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:4124]           |                         |
| BCLALLTP-032 | 7            | ENSG00000270472 | IGHV3OR16-9 | immunoglobulin heavy variable 3/OR16-9 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5644]   |                         |
| BCLALLTP-032 | 7            | ENSG00000211648 | IGLV1-47    | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                       |                         |
| BCLALLTP-032 | 7            | ENSG00000099337 | KCNK6       | potassium two pore domain channel subfamily K member 6 [Source:HGNC Symbol;Acc:HGNC:6281]    |                         |
| BCLALLTP-032 | 7            | ENSG00000092621 | PHGDH       | phosphoglycerate dehydrogenase [Source:HGNC Symbol;Acc:HGNC:8923]                            |                         |
| BCLALLTP-032 | 7            | ENSG00000109501 | WFS1        | wolframin ER transmembrane glycoprotein [Source:HGNC Symbol;Acc:HGNC:12762]                  |                         |
| BCLALLTP-033 | 3            | ENSG00000150967 | ABCB9       | ATP binding cassette subfamily B member 9 [Source:HGNC Symbol;Acc:HGNC:50]                   |                         |
| BCLALLTP-033 | 3            | ENSG00000107719 | PALD1       | phosphatase domain containing, paladin 1 [Source:HGNC Symbol;Acc:HGNC:23530]                 |                         |
| BCLALLTP-033 | 3            | ENSG00000198722 | UNC13B      | unc-13 homolog B [Source:HGNC Symbol;Acc:HGNC:12566]                                         |                         |
| BCLALLTP-034 | 2            | ENSG00000222041 | CYTOR       | cytoskeleton regulator RNA [Source:HGNC Symbol;Acc:HGNC:28717]                               |                         |
| BCLALLTP-034 | 2            | ENSG00000235587 | GAPDHP65    | glyceraldehyde 3 phosphate dehydrogenase pseudogene 65 [Source:HGNC Symbol;Acc:HGNC:4143]    |                         |
| BCLALLTP-035 | 2            | ENSG00000227155 |             |                                                                                              |                         |
| BCLALLTP-035 | 2            | ENSG00000280138 |             |                                                                                              |                         |
| BCLALLTP-036 | 4            | ENSG00000101003 | GIN51       | GIN5 complex subunit 1 [Source:HGNC Symbol;Acc:HGNC:28980]                                   |                         |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|----------------------------|
| BCLALLTP-036 | 4            | ENSG00000118193 | KIF14     | kinesin family member 14 [Source:HGNC Symbol;Acc:HGNC:19181]                              |                            |
| BCLALLTP-036 | 4            | ENSG00000137812 | KNL1      | kinetochore scaffold 1 [Source:HGNC Symbol;Acc:HGNC:24054]                                |                            |
| BCLALLTP-036 | 4            | ENSG00000164611 | PTTG1     | pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:HGNC:9690]                         |                            |
| BCLALLTP-037 | 4            | ENSG00000211952 | IGHV4-28  | immunoglobulin heavy variable 4-28 [Source:HGNC Symbol;Acc:HGNC:5645]                     |                            |
| BCLALLTP-037 | 4            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       |                            |
| BCLALLTP-037 | 4            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    |                            |
| BCLALLTP-037 | 4            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    |                            |
| BCLALLTP-038 | 2            | ENSG00000279759 |           |                                                                                           |                            |
| BCLALLTP-038 | 2            | ENSG00000279873 | LINC01126 | long intergenic non-protein coding RNA 1126 [Source:HGNC Symbol;Acc:HGNC:49275]           |                            |
| BCLALLTP-039 | 2            | ENSG00000254176 | IGHV3-75  | immunoglobulin heavy variable 3-75 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5625]        |                            |
| BCLALLTP-039 | 2            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]   |                            |
| BCLALLTP-040 | 5            | ENSG00000108641 | B9D1      | B9 domain containing 1 [Source:HGNC Symbol;Acc:HGNC:24123]                                |                            |
| BCLALLTP-040 | 5            | ENSG00000138709 | LARP1B    | La ribonucleoprotein domain family member 1B [Source:HGNC Symbol;Acc:HGNC:24704]          |                            |
| BCLALLTP-040 | 5            | ENSG00000069956 | MAPK6     | mitogen-activated protein kinase 6 [Source:HGNC Symbol;Acc:HGNC:6879]                     |                            |
| BCLALLTP-040 | 5            | ENSG00000102471 | NDFIP2    | Nedd4 family interacting protein 2 [Source:HGNC Symbol;Acc:HGNC:18537]                    |                            |
| BCLALLTP-040 | 5            | ENSG00000184232 | OAF       | out at first homolog [Source:HGNC Symbol;Acc:HGNC:28752]                                  |                            |
| BCLALLTP-041 | 6            | ENSG00000148468 | FAM171A1  | family with sequence similarity 171 member A1 [Source:HGNC Symbol;Acc:HGNC:23522]         |                            |
| BCLALLTP-041 | 6            | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     |                            |
| BCLALLTP-041 | 6            | ENSG00000242766 | IGKV1D-17 | immunoglobulin kappa variable 1D-17 [Source:HGNC Symbol;Acc:HGNC:5749]                    |                            |
| BCLALLTP-041 | 6            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                     |                            |
| BCLALLTP-041 | 6            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            |                            |
| BCLALLTP-041 | 6            | ENSG00000113140 | SPARC     | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]             |                            |
| BCLALLTP-042 | 3            | ENSG00000271533 |           |                                                                                           |                            |
| BCLALLTP-042 | 3            | ENSG00000274422 |           |                                                                                           |                            |
| BCLALLTP-042 | 3            | ENSG00000279278 |           |                                                                                           |                            |
| BCLALLTP-043 | 3            | ENSG00000187837 | HIST1H1C  | histone cluster 1 H1 family member c [Source:HGNC Symbol;Acc:HGNC:4716]                   |                            |
| BCLALLTP-043 | 3            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                     |                            |
| BCLALLTP-043 | 3            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                     |                            |
| BCLALLTP-044 | 4            | ENSG00000110848 | CD69      | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                          |                            |
| BCLALLTP-044 | 4            | ENSG00000161960 | EIF4A1    | eukaryotic translation initiation factor 4A1 [Source:HGNC Symbol;Acc:HGNC:3282]           |                            |
| BCLALLTP-044 | 4            | ENSG00000171223 | JUNB      | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205] |                            |
| BCLALLTP-044 | 4            | ENSG00000100906 | NFKBIA    | NFkB inhibitor alpha [Source:HGNC Symbol;Acc:HGNC:7797]                                   |                            |
| BCLALLTP-045 | 4            | ENSG00000143942 | CHAC2     | ChaC cation transport regulator homolog 2 [Source:HGNC Symbol;Acc:HGNC:32363]             |                            |
| BCLALLTP-045 | 4            | ENSG00000123975 | CKS2      | CDC28 protein kinase regulatory subunit 2 [Source:HGNC Symbol;Acc:HGNC:2000]              |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                       | Log <sub>2</sub> FC TIV |
|--------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------|-------------------------|
| BCLALLTP-045 | 4            | ENSG00000119326 | CTNNAL1   | catenin alpha like 1 [Source:HGNC Symbol;Acc:HGNC:2512]                                |                         |
| BCLALLTP-045 | 4            | ENSG00000239672 | NME1      | NME/NM23 nucleoside diphosphate kinase 1 [Source:HGNC Symbol;Acc:HGNC:7849]            |                         |
| BCLALLTP-046 | 2            | ENSG00000211962 | IGHV1-46  | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                  |                         |
| BCLALLTP-046 | 2            | ENSG00000211976 | IGHV3-73  | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                  |                         |
| BCLALLTP-047 | 2            | ENSG00000090104 | RGS1      | regulator of G-protein signaling 1 [Source:HGNC Symbol;Acc:HGNC:9991]                  |                         |
| BCLALLTP-047 | 2            | ENSG00000116741 | RGS2      | regulator of G-protein signaling 2 [Source:HGNC Symbol;Acc:HGNC:9998]                  |                         |
| BCLALLTP-048 | 4            | ENSG00000172339 | ALG14     | ALG14, UDP-N-acetylglucosaminyltransferase subunit [Source:HGNC Symbol;Acc:HGNC:28287] |                         |
| BCLALLTP-048 | 4            | ENSG00000113273 | ARSB      | arylsulfatase B [Source:HGNC Symbol;Acc:HGNC:714]                                      |                         |
| BCLALLTP-048 | 4            | ENSG00000182197 | EXT1      | exostosin glycosyltransferase 1 [Source:HGNC Symbol;Acc:HGNC:3512]                     |                         |
| BCLALLTP-048 | 4            | ENSG00000025039 | RRAGD     | Ras related GTP binding D [Source:HGNC Symbol;Acc:HGNC:19903]                          |                         |
| BCLALLTP-049 | 3            | ENSG00000163751 | CPA3      | carboxypeptidase A3 [Source:HGNC Symbol;Acc:HGNC:2298]                                 |                         |
| BCLALLTP-049 | 3            | ENSG00000134489 | HRH4      | histamine receptor H4 [Source:HGNC Symbol;Acc:HGNC:17383]                              |                         |
| BCLALLTP-049 | 3            | ENSG00000149516 | MS4A3     | membrane spanning 4-domains A3 [Source:HGNC Symbol;Acc:HGNC:7317]                      |                         |
| BCLALLTP-050 | 5            | ENSG00000282600 |           |                                                                                        |                         |
| BCLALLTP-050 | 5            | ENSG00000211943 | IGHV3-15  | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                  |                         |
| BCLALLTP-050 | 5            | ENSG00000254395 | IGHV4-55  | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]     |                         |
| BCLALLTP-050 | 5            | ENSG00000211679 | IGLC3     | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]  |                         |
| BCLALLTP-050 | 5            | ENSG00000211666 | IGLV2-14  | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                 |                         |
| BCLALLTP-051 | 3            | ENSG00000141753 | IGFBP4    | insulin like growth factor binding protein 4 [Source:HGNC Symbol;Acc:HGNC:5473]        |                         |
| BCLALLTP-051 | 3            | ENSG00000172548 | NIPAL4    | NIPA like domain containing 4 [Source:HGNC Symbol;Acc:HGNC:28018]                      |                         |
| BCLALLTP-051 | 3            | ENSG00000228903 | RASA4CP   | RAS p21 protein activator 4C, pseudogene [Source:HGNC Symbol;Acc:HGNC:44185]           |                         |
| BCLALLTP-052 | 4            | ENSG00000158578 | ALAS2     | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                        |                         |
| BCLALLTP-052 | 4            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                          |                         |
| BCLALLTP-052 | 4            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                          |                         |
| BCLALLTP-052 | 4            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                             |                         |

Table 37: Co-expressed gene clusters (B Cells, All post-treatment time points)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                       | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------|-------------------------|
| PMCTP1-001 | 2            | ENSG00000135604 | STX11     | syntaxin 11 [Source:HGNC Symbol;Acc:HGNC:11429]                        | 0.76                    |
| PMCTP1-001 | 2            | ENSG00000140105 | WARS      | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]       | 0.85                    |
| PMCTP1-002 | 2            | ENSG00000140749 | IGSF6     | immunoglobulin superfamily member 6 [Source:HGNC Symbol;Acc:HGNC:5953] | 0.61                    |
| PMCTP1-002 | 2            | ENSG00000188906 | LRRK2     | leucine rich repeat kinase 2 [Source:HGNC Symbol;Acc:HGNC:18618]       | 0.66                    |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                             | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|----------------------------------------------------------------------------------------------|----------------------------|
| PMCTP1-003 | 2            | ENSG00000103196 | CRISPLD2  | cysteine rich secretory protein LCCL domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25248] | 0.68                       |
| PMCTP1-003 | 2            | ENSG00000183019 | MCEMP1    | mast cell expressed membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:27291]                   | 0.63                       |
| PMCTP1-004 | 2            | ENSG00000114450 | GNB4      | G protein subunit beta 4 [Source:HGNC Symbol;Acc:HGNC:20731]                                 | 0.61                       |
| PMCTP1-004 | 2            | ENSG00000149573 | MPZL2     | myelin protein zero like 2 [Source:HGNC Symbol;Acc:HGNC:3496]                                | 0.63                       |
| PMCTP1-005 | 2            | ENSG00000115919 | KYNU      | kynureninase [Source:HGNC Symbol;Acc:HGNC:6469]                                              | 0.59                       |
| PMCTP1-005 | 2            | ENSG00000145685 | LHFPL2    | lipoma HMGIC fusion partner-like 2 [Source:HGNC Symbol;Acc:HGNC:6588]                        | 0.66                       |
| PMCTP1-006 | 3            | ENSG00000171049 | FPR2      | formyl peptide receptor 2 [Source:HGNC Symbol;Acc:HGNC:3827]                                 | 0.77                       |
| PMCTP1-006 | 3            | ENSG00000181631 | P2RY13    | purinergic receptor P2Y13 [Source:HGNC Symbol;Acc:HGNC:4537]                                 | 0.71                       |
| PMCTP1-006 | 3            | ENSG00000166002 | SMCO4     | single-pass membrane protein with coiled-coil domains 4 [Source:HGNC Symbol;Acc:HGNC:24810]  | 0.63                       |
| PMCTP1-007 | 2            | ENSG00000125347 | IRF1      | interferon regulatory factor 1 [Source:HGNC Symbol;Acc:HGNC:6116]                            | 0.70                       |
| PMCTP1-007 | 2            | ENSG00000138496 | PARP9     | poly(ADP-ribose) polymerase family member 9 [Source:HGNC Symbol;Acc:HGNC:24118]              | 0.66                       |
| PMCTP1-008 | 4            | ENSG00000149798 | CDC42EP2  | CDC42 effector protein 2 [Source:HGNC Symbol;Acc:HGNC:16263]                                 | 0.84                       |
| PMCTP1-008 | 4            | ENSG00000150337 | FCGR1A    | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                            | 1.35                       |
| PMCTP1-008 | 4            | ENSG00000111331 | OAS3      | 2'-5'-oligoadenylate synthetase 3 [Source:HGNC Symbol;Acc:HGNC:8088]                         | 0.62                       |
| PMCTP1-008 | 4            | ENSG00000149131 | SERPING1  | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                                  | 1.81                       |
| PMCTP1-009 | 4            | ENSG00000152766 | ANKRD22   | ankyrin repeat domain 22 [Source:HGNC Symbol;Acc:HGNC:28321]                                 | 1.75                       |
| PMCTP1-009 | 4            | ENSG00000121807 | CCR2      | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                            | 0.59                       |
| PMCTP1-009 | 4            | ENSG00000082397 | EPB41L3   | erythrocyte membrane protein band 4.1 like 3 [Source:HGNC Symbol;Acc:HGNC:3380]              | 0.61                       |
| PMCTP1-009 | 4            | ENSG00000002549 | LAP3      | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                                 | 0.90                       |
| PMCTP1-010 | 3            | ENSG00000136689 | IL1RN     | interleukin 1 receptor antagonist [Source:HGNC Symbol;Acc:HGNC:6000]                         | 0.61                       |
| PMCTP1-010 | 3            | ENSG00000038945 | MSR1      | macrophage scavenger receptor 1 [Source:HGNC Symbol;Acc:HGNC:7376]                           | 0.53                       |
| PMCTP1-010 | 3            | ENSG00000139832 | RAB20     | RAB20, member RAS oncogene family [Source:HGNC Symbol;Acc:HGNC:18260]                        | 0.70                       |
| PMCTP1-011 | 5            | ENSG00000168062 | BATF2     | basic leucine zipper ATF-like transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:25163]     | 1.34                       |
| PMCTP1-011 | 5            | ENSG00000133106 | EPSTI1    | epithelial stromal interaction 1 [Source:HGNC Symbol;Acc:HGNC:16465]                         | 0.61                       |
| PMCTP1-011 | 5            | ENSG00000116711 | PLA2G4A   | phospholipase A2 group IVA [Source:HGNC Symbol;Acc:HGNC:9035]                                | 0.66                       |
| PMCTP1-011 | 5            | ENSG00000115415 | STAT1     | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]       | 0.95                       |
| PMCTP1-011 | 5            | ENSG00000156587 | UBE2L6    | ubiquitin conjugating enzyme E2 L6 [Source:HGNC Symbol;Acc:HGNC:12490]                       | 0.69                       |
| PMCTP1-012 | 3            | ENSG00000168389 | MFSD2A    | major facilitator superfamily domain containing 2A [Source:HGNC Symbol;Acc:HGNC:25897]       | 0.74                       |
| PMCTP1-012 | 3            | ENSG00000141574 | SECTM1    | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                             | 0.93                       |
| PMCTP1-012 | 3            | ENSG00000180061 | TMEM150B  | transmembrane protein 150B [Source:HGNC Symbol;Acc:HGNC:34415]                               | 0.62                       |
| PMCTP1-013 | 2            | ENSG00000169136 | ATF5      | activating transcription factor 5 [Source:HGNC Symbol;Acc:HGNC:790]                          | 0.74                       |
| PMCTP1-013 | 2            | ENSG00000185339 | TCN2      | transcobalamin 2 [Source:HGNC Symbol;Acc:HGNC:11653]                                         | 0.93                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                      | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------|----------------------------|
| PMCTP1-014 | 2            | ENSG00000103569 | AQP9      | aquaporin 9 [Source:HGNC Symbol;Acc:HGNC:643]                                         | 0.58                       |
| PMCTP1-014 | 2            | ENSG00000204388 | HSPA1B    | heat shock protein family A (Hsp70) member 1B [Source:HGNC Symbol;Acc:HGNC:5233]      | 0.67                       |
| PMCTP1-015 | 2            | ENSG00000134326 | CMPK2     | cytidine/uridine monophosphate kinase 2 [Source:HGNC Symbol;Acc:HGNC:27015]           | 0.66                       |
| PMCTP1-015 | 2            | ENSG00000158714 | SLAMF8    | SLAM family member 8 [Source:HGNC Symbol;Acc:HGNC:21391]                              | 0.82                       |
| PMCTP1-016 | 3            | ENSG00000165092 | ALDH1A1   | aldehyde dehydrogenase 1 family member A1 [Source:HGNC Symbol;Acc:HGNC:402]           | 0.66                       |
| PMCTP1-016 | 3            | ENSG00000127951 | FGL2      | fibrinogen like 2 [Source:HGNC Symbol;Acc:HGNC:3696]                                  | 0.69                       |
| PMCTP1-016 | 3            | ENSG00000005381 | MPO       | myeloperoxidase [Source:HGNC Symbol;Acc:HGNC:7218]                                    | 0.40                       |
| PMCTP1-017 | 3            | ENSG00000143382 | ADAMTSL4  | ADAMTS like 4 [Source:HGNC Symbol;Acc:HGNC:19706]                                     | 0.58                       |
| PMCTP1-017 | 3            | ENSG00000170458 | CD14      | CD14 molecule [Source:HGNC Symbol;Acc:HGNC:1628]                                      | 0.62                       |
| PMCTP1-017 | 3            | ENSG00000226091 | LINC00937 | long intergenic non-protein coding RNA 937 [Source:HGNC Symbol;Acc:HGNC:48629]        | 0.62                       |
| PMCTP1-018 | 2            | ENSG00000134755 | DSC2      | desmocollin 2 [Source:HGNC Symbol;Acc:HGNC:3036]                                      | 0.74                       |
| PMCTP1-018 | 2            | ENSG00000113494 | PRLR      | prolactin receptor [Source:HGNC Symbol;Acc:HGNC:9446]                                 | 0.77                       |
| PMCTP1-019 | 4            | ENSG00000260401 |           |                                                                                       | 0.81                       |
| PMCTP1-019 | 4            | ENSG00000019169 | MARCO     | macrophage receptor with collagenous structure [Source:HGNC Symbol;Acc:HGNC:6895]     | 0.71                       |
| PMCTP1-019 | 4            | ENSG00000213694 | S1PR3     | sphingosine-1-phosphate receptor 3 [Source:HGNC Symbol;Acc:HGNC:3167]                 | 0.68                       |
| PMCTP1-019 | 4            | ENSG00000174705 | SH3PXD2B  | SH3 and PX domains 2B [Source:HGNC Symbol;Acc:HGNC:29242]                             | 1.23                       |
| PMCTP1-020 | 2            | ENSG00000165178 | NCF1C     | neutrophil cytosolic factor 1C pseudogene [Source:HGNC Symbol;Acc:HGNC:32523]         | 0.79                       |
| PMCTP1-020 | 2            | ENSG00000114853 | ZBTB47    | zinc finger and BTB domain containing 47 [Source:HGNC Symbol;Acc:HGNC:26955]          | 0.59                       |
| PMCTP1-021 | 2            | ENSG00000154146 | NRGN      | neurogranin [Source:HGNC Symbol;Acc:HGNC:8000]                                        | 0.39                       |
| PMCTP1-021 | 2            | ENSG00000088826 | SMOX      | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                  | 0.55                       |
| PMCTP1-022 | 3            | ENSG00000248996 |           |                                                                                       | 0.64                       |
| PMCTP1-022 | 3            | ENSG00000178445 | GLDC      | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                              | 0.49                       |
| PMCTP1-022 | 3            | ENSG00000157227 | MMP14     | matrix metalloproteinase 14 [Source:HGNC Symbol;Acc:HGNC:7160]                        | 0.76                       |
| PMCTP1-023 | 4            | ENSG00000177989 | ODF3B     | outer dense fiber of sperm tails 3B [Source:HGNC Symbol;Acc:HGNC:34388]               | 1.16                       |
| PMCTP1-023 | 4            | ENSG00000088827 | SIGLEC1   | sialic acid binding Ig like lectin 1 [Source:HGNC Symbol;Acc:HGNC:11127]              | 0.80                       |
| PMCTP1-023 | 4            | ENSG00000197208 | SLC22A4   | solute carrier family 22 member 4 [Source:HGNC Symbol;Acc:HGNC:10968]                 | 0.58                       |
| PMCTP1-023 | 4            | ENSG00000185215 | TNFAIP2   | TNF alpha induced protein 2 [Source:HGNC Symbol;Acc:HGNC:11895]                       | 0.63                       |
| PMCTP1-024 | 5            | ENSG00000136630 | HLX       | H2.0 like homeobox [Source:HGNC Symbol;Acc:HGNC:4978]                                 | 0.59                       |
| PMCTP1-024 | 5            | ENSG00000173110 | HSPA6     | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]       | 0.70                       |
| PMCTP1-024 | 5            | ENSG00000142089 | IFITM3    | interferon induced transmembrane protein 3 [Source:HGNC Symbol;Acc:HGNC:5414]         | 0.58                       |
| PMCTP1-024 | 5            | ENSG00000187608 | ISG15     | ISG15 ubiquitin-like modifier [Source:HGNC Symbol;Acc:HGNC:4053]                      | 0.68                       |
| PMCTP1-024 | 5            | ENSG00000197122 | SRC       | SRC proto-oncogene, non-receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:11283]  | 0.67                       |
| PMCTP1-025 | 3            | ENSG00000229754 | CXCR2P1   | C-X-C motif chemokine receptor 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:6028]      | 0.63                       |
| PMCTP1-025 | 3            | ENSG00000225492 | GBP1P1    | guanylate binding protein 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39561]          | 1.19                       |
| PMCTP1-025 | 3            | ENSG00000211679 | IGLC3     | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857] | 0.11                       |
| PMCTP1-026 | 6            | ENSG00000169245 | CXCL10    | C-X-C motif chemokine ligand 10 [Source:HGNC Symbol;Acc:HGNC:10637]                   | 1.31                       |
| PMCTP1-026 | 6            | ENSG00000117228 | GBP1      | guanylate binding protein 1 [Source:HGNC Symbol;Acc:HGNC:4182]                        | 0.93                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                     | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------------|----------------------------|
| PMCTP1-026 | 6            | ENSG00000185745 | IFIT1     | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407]       | 0.61                       |
| PMCTP1-026 | 6            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409]       | 0.91                       |
| PMCTP1-026 | 6            | ENSG00000119917 | IFIT3     | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411]       | 0.83                       |
| PMCTP1-026 | 6            | ENSG00000121858 | TNFSF10   | tumor necrosis factor superfamily member 10 [Source:HGNC Symbol;Acc:HGNC:11925]                      | 0.68                       |
| PMCTP1-027 | 2            | ENSG00000166527 | CLEC4D    | C-type lectin domain family 4 member D [Source:HGNC Symbol;Acc:HGNC:14554]                           | 0.65                       |
| PMCTP1-027 | 2            | ENSG00000164023 | SGMS2     | sphingomyelin synthase 2 [Source:HGNC Symbol;Acc:HGNC:28395]                                         | 0.63                       |
| PMCTP1-028 | 5            | ENSG00000128383 | APOBEC3A  | apolipoprotein B mRNA editing enzyme catalytic subunit 3A [Source:HGNC Symbol;Acc:HGNC:17343]        | 0.70                       |
| PMCTP1-028 | 5            | ENSG00000198814 | GK        | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                                   | 0.66                       |
| PMCTP1-028 | 5            | ENSG00000125538 | IL1B      | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                                | 0.93                       |
| PMCTP1-028 | 5            | ENSG00000020577 | SAMD4A    | sterile alpha motif domain containing 4A [Source:HGNC Symbol;Acc:HGNC:23023]                         | 0.80                       |
| PMCTP1-028 | 5            | ENSG00000254415 | SIGLEC14  | sialic acid binding Ig like lectin 14 [Source:HGNC Symbol;Acc:HGNC:32926]                            | 0.61                       |
| PMCTP1-029 | 2            | ENSG00000250138 |           |                                                                                                      | 0.73                       |
| PMCTP1-029 | 2            | ENSG00000211946 | IGHV3-20  | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                                | 0.70                       |
| PMCTP1-030 | 9            | ENSG00000272821 |           |                                                                                                      | 1.20                       |
| PMCTP1-030 | 9            | ENSG00000198019 | FCGR1B    | Fc fragment of IgG receptor 1b [Source:HGNC Symbol;Acc:HGNC:3614]                                    | 1.54                       |
| PMCTP1-030 | 9            | ENSG00000205730 | ITPRIPL2  | inositol 1,4,5-trisphosphate receptor interacting protein like 2 [Source:HGNC Symbol;Acc:HGNC:27257] | 0.61                       |
| PMCTP1-030 | 9            | ENSG00000183762 | KREMEN1   | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]                       | 1.41                       |
| PMCTP1-030 | 9            | ENSG00000198736 | MSRB1     | methionine sulfoxide reductase B1 [Source:HGNC Symbol;Acc:HGNC:14133]                                | 0.58                       |
| PMCTP1-030 | 9            | ENSG00000182487 | NCF1B     | neutrophil cytosolic factor 1B pseudogene [Source:HGNC Symbol;Acc:HGNC:32522]                        | 0.86                       |
| PMCTP1-030 | 9            | ENSG00000235568 | NFAM1     | NFAT activating protein with ITAM motif 1 [Source:HGNC Symbol;Acc:HGNC:29872]                        | 0.67                       |
| PMCTP1-030 | 9            | ENSG00000130489 | SCO2      | SCO2, cytochrome c oxidase assembly protein [Source:HGNC Symbol;Acc:HGNC:10604]                      | 1.02                       |
| PMCTP1-030 | 9            | ENSG00000025708 | TYMP      | thymidine phosphorylase [Source:HGNC Symbol;Acc:HGNC:3148]                                           | 1.01                       |
| PMCTP1-031 | 2            | ENSG00000188820 | FAM26F    | family with sequence similarity 26 member F [Source:HGNC Symbol;Acc:HGNC:33391]                      | 0.62                       |
| PMCTP1-031 | 2            | ENSG00000171241 | SHCBP1    | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                             | 0.16                       |
| PMCTP1-032 | 4            | ENSG00000100336 | APOL4     | apolipoprotein L4 [Source:HGNC Symbol;Acc:HGNC:14867]                                                | 2.03                       |
| PMCTP1-032 | 4            | ENSG00000158517 | NCF1      | neutrophil cytosolic factor 1 [Source:HGNC Symbol;Acc:HGNC:7660]                                     | 0.78                       |
| PMCTP1-032 | 4            | ENSG00000143878 | RHOB      | ras homolog family member B [Source:HGNC Symbol;Acc:HGNC:668]                                        | 0.26                       |
| PMCTP1-032 | 4            | ENSG00000232810 | TNF       | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                            | 0.77                       |
| PMCTP1-033 | 10           | ENSG00000163823 | CCR1      | C-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1602]                                    | 0.65                       |
| PMCTP1-033 | 10           | ENSG00000186407 | CD300E    | CD300e molecule [Source:HGNC Symbol;Acc:HGNC:28874]                                                  | 0.60                       |
| PMCTP1-033 | 10           | ENSG00000146592 | CREB5     | cAMP responsive element binding protein 5 [Source:HGNC Symbol;Acc:HGNC:16844]                        | 0.60                       |
| PMCTP1-033 | 10           | ENSG00000139318 | DUSP6     | dual specificity phosphatase 6 [Source:HGNC Symbol;Acc:HGNC:3072]                                    | 0.63                       |
| PMCTP1-033 | 10           | ENSG00000135636 | DYSF      | dysferlin [Source:HGNC Symbol;Acc:HGNC:3097]                                                         | 0.81                       |
| PMCTP1-033 | 10           | ENSG00000143226 | FCGR2A    | Fc fragment of IgG receptor 2a [Source:HGNC Symbol;Acc:HGNC:3616]                                    | 0.64                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP1-033 | 10           | ENSG00000171051 | FPR1        | formyl peptide receptor 1 [Source:HGNC Symbol;Acc:HGNC:3826]                                                              | 0.63                    |
| PMCTP1-033 | 10           | ENSG00000103313 | MEFV        | Mediterranean fever [Source:HGNC Symbol;Acc:HGNC:6998]                                                                    | 0.63                    |
| PMCTP1-033 | 10           | ENSG00000162512 | SDC3        | syndecan 3 [Source:HGNC Symbol;Acc:HGNC:10660]                                                                            | 0.96                    |
| PMCTP1-033 | 10           | ENSG00000105967 | TFEC        | transcription factor EC [Source:HGNC Symbol;Acc:HGNC:11754]                                                               | 0.64                    |
| PMCTP1-034 | 3            | ENSG00000275302 | CCL4        | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630]                                                          | -0.46                   |
| PMCTP1-034 | 3            | ENSG00000197057 | DTHD1       | death domain containing 1 [Source:HGNC Symbol;Acc:HGNC:37261]                                                             | -0.62                   |
| PMCTP1-034 | 3            | ENSG00000211892 | IGHG4       | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]                                     | -0.32                   |
| PMCTP1-035 | 2            | ENSG00000205846 | CLEC6A      | C-type lectin domain family 6 member A [Source:HGNC Symbol;Acc:HGNC:14556]                                                | 1.21                    |
| PMCTP1-035 | 2            | ENSG00000162614 | NEXN        | nexilin F-actin binding protein [Source:HGNC Symbol;Acc:HGNC:29557]                                                       | 0.78                    |
| PMCTP1-036 | 4            | ENSG00000120885 | CLU         | clusterin [Source:HGNC Symbol;Acc:HGNC:2095]                                                                              | 0.34                    |
| PMCTP1-036 | 4            | ENSG00000149564 | ESAM        | endothelial cell adhesion molecule [Source:HGNC Symbol;Acc:HGNC:17474]                                                    | 0.20                    |
| PMCTP1-036 | 4            | ENSG00000101335 | MYL9        | myosin light chain 9 [Source:HGNC Symbol;Acc:HGNC:15754]                                                                  | 0.57                    |
| PMCTP1-036 | 4            | ENSG00000163737 | PF4         | platelet factor 4 [Source:HGNC Symbol;Acc:HGNC:8861]                                                                      | 0.39                    |
| PMCTP1-037 | 6            | ENSG00000110318 | CEP126      | centrosomal protein 126 [Source:HGNC Symbol;Acc:HGNC:29264]                                                               | -0.62                   |
| PMCTP1-037 | 6            | ENSG00000187118 | CMC1        | C-X9-C motif containing 1 [Source:HGNC Symbol;Acc:HGNC:28783]                                                             | -0.58                   |
| PMCTP1-037 | 6            | ENSG00000168209 | DDIT4       | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                                                     | -0.50                   |
| PMCTP1-037 | 6            | ENSG00000171451 | DSEL        | dermatan sulfate epimerase-like [Source:HGNC Symbol;Acc:HGNC:18144]                                                       | -0.79                   |
| PMCTP1-037 | 6            | ENSG00000167633 | KIR3DL1     | killer cell immunoglobulin like receptor, three Ig domains and long cytoplasmic tail 1 [Source:HGNC Symbol;Acc:HGNC:6338] | -0.62                   |
| PMCTP1-037 | 6            | ENSG00000255819 | KLRC4-KLRK1 | KLRC4-KLRK1 readthrough [Source:HGNC Symbol;Acc:HGNC:48357]                                                               | -0.73                   |
| PMCTP1-038 | 4            | ENSG00000128283 | CDC42EP1    | CDC42 effector protein 1 [Source:HGNC Symbol;Acc:HGNC:17014]                                                              | 0.61                    |
| PMCTP1-038 | 4            | ENSG00000180340 | FZD2        | frizzled class receptor 2 [Source:HGNC Symbol;Acc:HGNC:4040]                                                              | 0.67                    |
| PMCTP1-038 | 4            | ENSG00000101057 | MYBL2       | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                                              | 0.24                    |
| PMCTP1-038 | 4            | ENSG00000242732 | RGAG4       | retrotransposon gag domain containing 4 [Source:HGNC Symbol;Acc:HGNC:29430]                                               | 0.65                    |
| PMCTP1-039 | 3            | ENSG00000271109 |             |                                                                                                                           | -0.65                   |
| PMCTP1-039 | 3            | ENSG00000280411 | IGHV1-69-2  | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                                                   | -0.56                   |
| PMCTP1-039 | 3            | ENSG00000197705 | KLHL14      | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                                                           | -0.31                   |
| PMCTP1-040 | 6            | ENSG00000197561 | ELANE       | elastase, neutrophil expressed [Source:HGNC Symbol;Acc:HGNC:3309]                                                         | 0.45                    |
| PMCTP1-040 | 6            | ENSG00000211967 | IGHV3-53    | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                                                     | 0.40                    |
| PMCTP1-040 | 6            | ENSG00000242076 | IGKV1-33    | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                                                     | 0.86                    |
| PMCTP1-040 | 6            | ENSG00000253818 | IGLV1-41    | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]                                       | 0.84                    |
| PMCTP1-040 | 6            | ENSG00000211659 | IGLV3-25    | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                                                    | 0.44                    |
| PMCTP1-040 | 6            | ENSG00000268849 | SIGLEC22P   | sialic acid binding Ig like lectin 22, pseudogene [Source:HGNC Symbol;Acc:HGNC:15611]                                     | 0.78                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                  | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP1-041 | 5            | ENSG00000276070 | CCL4L2    | C-C motif chemokine ligand 4 like 2 [Source:HGNC Symbol;Acc:HGNC:24066]                           | -0.76                   |
| PMCTP1-041 | 5            | ENSG00000117281 | CD160     | CD160 molecule [Source:HGNC Symbol;Acc:HGNC:17013]                                                | -0.61                   |
| PMCTP1-041 | 5            | ENSG00000149557 | FEZ1      | fasciculation and elongation protein zeta 1 [Source:HGNC Symbol;Acc:HGNC:3659]                    | -0.93                   |
| PMCTP1-041 | 5            | ENSG00000137441 | FGFBP2    | fibroblast growth factor binding protein 2 [Source:HGNC Symbol;Acc:HGNC:29451]                    | -0.66                   |
| PMCTP1-041 | 5            | ENSG00000150687 | PRSS23    | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]                                           | -0.62                   |
| PMCTP1-042 | 3            | ENSG00000133048 | CHI3L1    | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                             | -0.16                   |
| PMCTP1-042 | 3            | ENSG00000123689 | G0S2      | G0/G1 switch 2 [Source:HGNC Symbol;Acc:HGNC:30229]                                                | -1.65                   |
| PMCTP1-042 | 3            | ENSG00000186049 | KRT73     | keratin 73 [Source:HGNC Symbol;Acc:HGNC:28928]                                                    | -0.69                   |
| PMCTP1-043 | 4            | ENSG00000177191 | B3GNT8    | UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase 8 [Source:HGNC Symbol;Acc:HGNC:24139] | 0.42                    |
| PMCTP1-043 | 4            | ENSG00000187840 | EIF4EBP1  | eukaryotic translation initiation factor 4E binding protein 1 [Source:HGNC Symbol;Acc:HGNC:3288]  | 0.63                    |
| PMCTP1-043 | 4            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                             | 0.35                    |
| PMCTP1-043 | 4            | ENSG00000177301 | KCNA2     | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220]           | 0.40                    |

Table 38: Co-expressed gene clusters (PBMC, Day 1)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP2-001 | 2            | ENSG00000156265 | MAP3K7CL  | MAP3K7 C-terminal like [Source:HGNC Symbol;Acc:HGNC:16457]                                     | 0.89                    |
| PMCTP2-001 | 2            | ENSG00000187800 | PEAR1     | platelet endothelial aggregation receptor 1 [Source:HGNC Symbol;Acc:HGNC:33631]                | 0.71                    |
| PMCTP2-002 | 2            | ENSG00000151023 | ENKUR     | enkurin, TRPC channel interacting protein [Source:HGNC Symbol;Acc:HGNC:28388]                  | 0.83                    |
| PMCTP2-002 | 2            | ENSG00000082781 | ITGB5     | integrin subunit beta 5 [Source:HGNC Symbol;Acc:HGNC:6160]                                     | 0.88                    |
| PMCTP2-003 | 2            | ENSG00000005381 | MPO       | myeloperoxidase [Source:HGNC Symbol;Acc:HGNC:7218]                                             | 0.53                    |
| PMCTP2-003 | 2            | ENSG00000171611 | PTCRA     | pre T-cell antigen receptor alpha [Source:HGNC Symbol;Acc:HGNC:21290]                          | 0.99                    |
| PMCTP2-004 | 2            | ENSG00000180573 | HIST1H2AC | histone cluster 1 H2A family member c [Source:HGNC Symbol;Acc:HGNC:4733]                       | 0.86                    |
| PMCTP2-004 | 2            | ENSG00000108960 | MMD       | monocyte to macrophage differentiation associated [Source:HGNC Symbol;Acc:HGNC:7153]           | 0.62                    |
| PMCTP2-005 | 3            | ENSG00000185745 | IFIT1     | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407] | 0.63                    |
| PMCTP2-005 | 3            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | 0.80                    |
| PMCTP2-005 | 3            | ENSG00000119917 | IFIT3     | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411] | 0.69                    |
| PMCTP2-006 | 2            | ENSG00000173210 | ABLM3     | actin binding LIM protein family member 3 [Source:HGNC Symbol;Acc:HGNC:29132]                  | 0.82                    |
| PMCTP2-006 | 2            | ENSG00000163735 | CXCL5     | C-X-C motif chemokine ligand 5 [Source:HGNC Symbol;Acc:HGNC:10642]                             | 0.91                    |
| PMCTP2-007 | 2            | ENSG00000177324 | BEND2     | BEN domain containing 2 [Source:HGNC Symbol;Acc:HGNC:28509]                                    | 1.27                    |
| PMCTP2-007 | 2            | ENSG00000085733 | CTTN      | cortactin [Source:HGNC Symbol;Acc:HGNC:3338]                                                   | 0.93                    |
| PMCTP2-008 | 2            | ENSG00000205309 | NT5M      | 5',3'-nucleotidase, mitochondrial [Source:HGNC Symbol;Acc:HGNC:15769]                          | 0.85                    |
| PMCTP2-008 | 2            | ENSG00000011105 | TSPAN9    | tetraspanin 9 [Source:HGNC Symbol;Acc:HGNC:21640]                                              | 0.62                    |
| PMCTP2-009 | 2            | ENSG00000150337 | FCGR1A    | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                              | 0.73                    |
| PMCTP2-009 | 2            | ENSG00000173868 | PHOSPHO1  | phosphoethanolamine/phosphocholine phosphatase [Source:HGNC Symbol;Acc:HGNC:16815]             | 0.54                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                 | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------------|----------------------------|
| PMCTP2-010 | 2            | ENSG00000187699 | C2orf88   | chromosome 2 open reading frame 88 [Source:HGNC Symbol;Acc:HGNC:28191]                           | 0.71                       |
| PMCTP2-010 | 2            | ENSG00000065534 | MYLK      | myosin light chain kinase [Source:HGNC Symbol;Acc:HGNC:7590]                                     | 0.68                       |
| PMCTP2-011 | 2            | ENSG00000278828 | HIST1H3H  | histone cluster 1 H3 family member h [Source:HGNC Symbol;Acc:HGNC:4775]                          | 0.88                       |
| PMCTP2-011 | 2            | ENSG00000184678 | HIST2H2BE | histone cluster 2 H2B family member e [Source:HGNC Symbol;Acc:HGNC:4760]                         | 0.82                       |
| PMCTP2-012 | 3            | ENSG00000173110 | HSPA6     | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]                  | 0.59                       |
| PMCTP2-012 | 3            | ENSG00000142089 | IFITM3    | interferon induced transmembrane protein 3 [Source:HGNC Symbol;Acc:HGNC:5414]                    | 0.62                       |
| PMCTP2-012 | 3            | ENSG00000125538 | IL1B      | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                            | 0.57                       |
| PMCTP2-013 | 7            | ENSG00000254614 |           |                                                                                                  | 0.63                       |
| PMCTP2-013 | 7            | ENSG00000111644 | ACRBP     | acrosin binding protein [Source:HGNC Symbol;Acc:HGNC:17195]                                      | 0.68                       |
| PMCTP2-013 | 7            | ENSG00000120885 | CLU       | clusterin [Source:HGNC Symbol;Acc:HGNC:2095]                                                     | 0.94                       |
| PMCTP2-013 | 7            | ENSG00000166091 | CMTM5     | CKLF like MARVEL transmembrane domain containing 5 [Source:HGNC Symbol;Acc:HGNC:19176]           | 0.76                       |
| PMCTP2-013 | 7            | ENSG00000163737 | PF4       | platelet factor 4 [Source:HGNC Symbol;Acc:HGNC:8861]                                             | 0.94                       |
| PMCTP2-013 | 7            | ENSG00000113140 | SPARC     | secreted protein acidic and cysteine rich [Source:HGNC Symbol;Acc:HGNC:11219]                    | 0.89                       |
| PMCTP2-013 | 7            | ENSG00000101162 | TUBB1     | tubulin beta 1 class VI [Source:HGNC Symbol;Acc:HGNC:16257]                                      | 0.92                       |
| PMCTP2-014 | 2            | ENSG00000272821 |           |                                                                                                  | 0.72                       |
| PMCTP2-014 | 2            | ENSG00000004799 | PKD4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                               | 1.19                       |
| PMCTP2-015 | 4            | ENSG00000127920 | GNG11     | G protein subunit gamma 11 [Source:HGNC Symbol;Acc:HGNC:4403]                                    | 0.73                       |
| PMCTP2-015 | 4            | ENSG00000198948 | MFAP3L    | microfibrillar associated protein 3 like [Source:HGNC Symbol;Acc:HGNC:29083]                     | 0.59                       |
| PMCTP2-015 | 4            | ENSG00000163736 | PPBP      | pro-platelet basic protein [Source:HGNC Symbol;Acc:HGNC:9240]                                    | 0.86                       |
| PMCTP2-015 | 4            | ENSG00000005249 | PRKAR2B   | protein kinase cAMP-dependent type II regulatory subunit beta [Source:HGNC Symbol;Acc:HGNC:9392] | 0.70                       |
| PMCTP2-016 | 2            | ENSG00000170458 | CD14      | CD14 molecule [Source:HGNC Symbol;Acc:HGNC:1628]                                                 | 0.29                       |
| PMCTP2-016 | 2            | ENSG00000177989 | ODF3B     | outer dense fiber of sperm tails 3B [Source:HGNC Symbol;Acc:HGNC:34388]                          | 0.69                       |
| PMCTP2-017 | 2            | ENSG00000229754 | CXCR2P1   | C-X-C motif chemokine receptor 2 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:6028]                 | 0.72                       |
| PMCTP2-017 | 2            | ENSG00000143878 | RHOB      | ras homolog family member B [Source:HGNC Symbol;Acc:HGNC:668]                                    | 0.65                       |
| PMCTP2-018 | 3            | ENSG00000198814 | GK        | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                               | 0.31                       |
| PMCTP2-018 | 3            | ENSG00000149131 | SERPINC1  | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                                      | 1.06                       |
| PMCTP2-018 | 3            | ENSG00000156587 | UBE2L6    | ubiquitin conjugating enzyme E2 L6 [Source:HGNC Symbol;Acc:HGNC:12490]                           | 0.30                       |
| PMCTP2-019 | 3            | ENSG00000005961 | ITGA2B    | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]                                     | 0.91                       |
| PMCTP2-019 | 3            | ENSG00000101335 | MYL9      | myosin light chain 9 [Source:HGNC Symbol;Acc:HGNC:15754]                                         | 1.17                       |
| PMCTP2-019 | 3            | ENSG00000161911 | TREML1    | triggering receptor expressed on myeloid cells like 1 [Source:HGNC Symbol;Acc:HGNC:20434]        | 0.94                       |
| PMCTP2-020 | 5            | ENSG00000165092 | ALDH1A1   | aldehyde dehydrogenase 1 family member A1 [Source:HGNC Symbol;Acc:HGNC:402]                      | 0.35                       |
| PMCTP2-020 | 5            | ENSG00000127951 | FGL2      | fibrinogen like 2 [Source:HGNC Symbol;Acc:HGNC:3696]                                             | 0.34                       |
| PMCTP2-020 | 5            | ENSG00000188906 | LRRK2     | leucine rich repeat kinase 2 [Source:HGNC Symbol;Acc:HGNC:18618]                                 | 0.40                       |
| PMCTP2-020 | 5            | ENSG00000125148 | MT2A      | metallothionein 2A [Source:HGNC Symbol;Acc:HGNC:7406]                                            | 0.63                       |
| PMCTP2-020 | 5            | ENSG00000115415 | STAT1     | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]           | 0.37                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                 | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP2-021 | 2            | ENSG00000140479 | PCSK6     | proprotein convertase subtilisin/kexin type 6 [Source:HGNC Symbol;Acc:HGNC:8569]                 | 0.76                    |
| PMCTP2-021 | 2            | ENSG00000130489 | SCO2      | SCO2, cytochrome c oxidase assembly protein [Source:HGNC Symbol;Acc:HGNC:10604]                  | 0.73                    |
| PMCTP2-022 | 3            | ENSG00000100336 | APOL4     | apolipoprotein L4 [Source:HGNC Symbol;Acc:HGNC:14867]                                            | 1.03                    |
| PMCTP2-022 | 3            | ENSG00000169245 | CXCL10    | C-X-C motif chemokine ligand 10 [Source:HGNC Symbol;Acc:HGNC:10637]                              | 0.82                    |
| PMCTP2-022 | 3            | ENSG00000143226 | FCGR2A    | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3616]                                | 0.48                    |
| PMCTP2-023 | 3            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                           | 0.20                    |
| PMCTP2-023 | 3            | ENSG00000154447 | SH3RF1    | SH3 domain containing ring finger 1 [Source:HGNC Symbol;Acc:HGNC:17650]                          | 0.62                    |
| PMCTP2-023 | 3            | ENSG00000183779 | ZNF703    | zinc finger protein 703 [Source:HGNC Symbol;Acc:HGNC:25883]                                      | 0.65                    |
| PMCTP2-024 | 3            | ENSG00000196787 | HIST1H2AG | histone cluster 1 H2A family member g [Source:HGNC Symbol;Acc:HGNC:4737]                         | 0.89                    |
| PMCTP2-024 | 3            | ENSG00000154146 | NRGN      | neurogranin [Source:HGNC Symbol;Acc:HGNC:8000]                                                   | 0.84                    |
| PMCTP2-024 | 3            | ENSG00000184792 | OSBP2     | oxysterol binding protein 2 [Source:HGNC Symbol;Acc:HGNC:8504]                                   | 0.51                    |
| PMCTP2-025 | 2            | ENSG00000236304 |           |                                                                                                  | 1.07                    |
| PMCTP2-025 | 2            | ENSG00000198478 | SH3BGR2   | SH3 domain binding glutamate rich protein like 2 [Source:HGNC Symbol;Acc:HGNC:15567]             | 0.73                    |
| PMCTP2-026 | 3            | ENSG00000168062 | BATF2     | basic leucine zipper ATF-like transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:25163]         | 0.88                    |
| PMCTP2-026 | 3            | ENSG00000133106 | EPSTI1    | epithelial stromal interaction 1 [Source:HGNC Symbol;Acc:HGNC:16465]                             | 0.26                    |
| PMCTP2-026 | 3            | ENSG00000138496 | PARP9     | poly(ADP-ribose) polymerase family member 9 [Source:HGNC Symbol;Acc:HGNC:24118]                  | 0.28                    |
| PMCTP2-027 | 5            | ENSG00000188305 | C19orf35  | chromosome 19 open reading frame 35 [Source:HGNC Symbol;Acc:HGNC:24793]                          | 0.59                    |
| PMCTP2-027 | 5            | ENSG00000103313 | MEFV      | Mediterranean fever [Source:HGNC Symbol;Acc:HGNC:6998]                                           | 0.45                    |
| PMCTP2-027 | 5            | ENSG00000135604 | STX11     | syntaxin 11 [Source:HGNC Symbol;Acc:HGNC:11429]                                                  | 0.42                    |
| PMCTP2-027 | 5            | ENSG00000165914 | TTC7B     | tetratricopeptide repeat domain 7B [Source:HGNC Symbol;Acc:HGNC:19858]                           | 0.68                    |
| PMCTP2-027 | 5            | ENSG00000140105 | WARS      | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                                 | 0.41                    |
| PMCTP2-028 | 3            | ENSG00000204420 | C6orf25   | chromosome 6 open reading frame 25 [Source:HGNC Symbol;Acc:HGNC:13937]                           | 0.52                    |
| PMCTP2-028 | 3            | ENSG00000123689 | G0S2      | G0/G1 switch 2 [Source:HGNC Symbol;Acc:HGNC:30229]                                               | 0.51                    |
| PMCTP2-028 | 3            | ENSG00000250334 | LINC00989 | long intergenic non-protein coding RNA 989 [Source:HGNC Symbol;Acc:HGNC:48918]                   | 0.74                    |
| PMCTP2-029 | 2            | ENSG00000164181 | ELOVL7    | ELOVL fatty acid elongase 7 [Source:HGNC Symbol;Acc:HGNC:26292]                                  | 0.71                    |
| PMCTP2-029 | 2            | ENSG00000105967 | TFEC      | transcription factor EC [Source:HGNC Symbol;Acc:HGNC:11754]                                      | 0.25                    |
| PMCTP2-030 | 3            | ENSG00000137198 | GMPT      | guanosine monophosphate reductase [Source:HGNC Symbol;Acc:HGNC:4376]                             | 0.83                    |
| PMCTP2-030 | 3            | ENSG00000259207 | ITGB3     | integrin subunit beta 3 [Source:HGNC Symbol;Acc:HGNC:6156]                                       | 0.67                    |
| PMCTP2-030 | 3            | ENSG00000168497 | SDPR      | serum deprivation response [Source:HGNC Symbol;Acc:HGNC:10690]                                   | 0.86                    |
| PMCTP2-031 | 3            | ENSG00000187840 | EIF4EBP1  | eukaryotic translation initiation factor 4E binding protein 1 [Source:HGNC Symbol;Acc:HGNC:3288] | 0.51                    |
| PMCTP2-031 | 3            | ENSG00000185340 | GAS2L1    | growth arrest specific 2 like 1 [Source:HGNC Symbol;Acc:HGNC:16955]                              | 0.63                    |
| PMCTP2-031 | 3            | ENSG00000101057 | MYBL2     | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                     | 0.37                    |
| PMCTP2-032 | 3            | ENSG00000073737 | DHRS9     | dehydrogenase/reductase 9 [Source:HGNC Symbol;Acc:HGNC:16888]                                    | 0.63                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                                  | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP2-032 | 3            | ENSG00000171223 | JUNB      | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205]         | 0.63                    |
| PMCTP2-032 | 3            | ENSG00000074416 | MGLL      | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                          | 0.62                    |
| PMCTP2-033 | 4            | ENSG00000163430 | FSTL1     | folliculin like 1 [Source:HGNC Symbol;Acc:HGNC:3972]                                              | 1.15                    |
| PMCTP2-033 | 4            | ENSG00000137959 | IFI44L    | interferon induced protein 44 like [Source:HGNC Symbol;Acc:HGNC:17817]                            | 0.44                    |
| PMCTP2-033 | 4            | ENSG00000143995 | MEIS1     | Meis homeobox 1 [Source:HGNC Symbol;Acc:HGNC:7000]                                                | 0.67                    |
| PMCTP2-033 | 4            | ENSG00000162614 | NEXN      | nexilin F-actin binding protein [Source:HGNC Symbol;Acc:HGNC:29557]                               | 0.33                    |
| PMCTP2-034 | 7            | ENSG00000260401 |           |                                                                                                   | 0.48                    |
| PMCTP2-034 | 7            | ENSG00000143382 | ADAMTSL4  | ADAMTS like 4 [Source:HGNC Symbol;Acc:HGNC:19706]                                                 | 0.46                    |
| PMCTP2-034 | 7            | ENSG00000186407 | CD300E    | CD300e molecule [Source:HGNC Symbol;Acc:HGNC:28874]                                               | 0.45                    |
| PMCTP2-034 | 7            | ENSG00000019169 | MARCO     | macrophage receptor with collagenous structure [Source:HGNC Symbol;Acc:HGNC:6895]                 | 0.56                    |
| PMCTP2-034 | 7            | ENSG00000020577 | SAMD4A    | sterile alpha motif domain containing 4A [Source:HGNC Symbol;Acc:HGNC:23023]                      | 0.50                    |
| PMCTP2-034 | 7            | ENSG00000088827 | SIGLEC1   | sialic acid binding Ig like lectin 1 [Source:HGNC Symbol;Acc:HGNC:11127]                          | 0.49                    |
| PMCTP2-034 | 7            | ENSG00000254415 | SIGLEC14  | sialic acid binding Ig like lectin 14 [Source:HGNC Symbol;Acc:HGNC:32926]                         | 0.42                    |
| PMCTP2-035 | 5            | ENSG00000187608 | ISG15     | ISG15 ubiquitin-like modifier [Source:HGNC Symbol;Acc:HGNC:4053]                                  | 0.48                    |
| PMCTP2-035 | 5            | ENSG00000158517 | NCF1      | neutrophil cytosolic factor 1 [Source:HGNC Symbol;Acc:HGNC:7660]                                  | 0.51                    |
| PMCTP2-035 | 5            | ENSG00000182487 | NCF1B     | neutrophil cytosolic factor 1B pseudogene [Source:HGNC Symbol;Acc:HGNC:32522]                     | 0.63                    |
| PMCTP2-035 | 5            | ENSG00000235568 | NFAM1     | NFAT activating protein with ITAM motif 1 [Source:HGNC Symbol;Acc:HGNC:29872]                     | 0.42                    |
| PMCTP2-035 | 5            | ENSG00000141574 | SECTM1    | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                                  | 0.66                    |
| PMCTP2-036 | 5            | ENSG00000177191 | B3GNT8    | UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase 8 [Source:HGNC Symbol;Acc:HGNC:24139] | 0.65                    |
| PMCTP2-036 | 5            | ENSG00000149564 | ESAM      | endothelial cell adhesion molecule [Source:HGNC Symbol;Acc:HGNC:17474]                            | 0.58                    |
| PMCTP2-036 | 5            | ENSG00000165702 | GFI1B     | growth factor independent 1B transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4238]         | 0.75                    |
| PMCTP2-036 | 5            | ENSG00000128266 | GNAZ      | G protein subunit alpha z [Source:HGNC Symbol;Acc:HGNC:4395]                                      | 0.70                    |
| PMCTP2-036 | 5            | ENSG00000184702 | SEPT5     | septin 5 [Source:HGNC Symbol;Acc:HGNC:9164]                                                       | 0.92                    |
| PMCTP2-037 | 4            | ENSG00000250138 |           |                                                                                                   | 0.54                    |
| PMCTP2-037 | 4            | ENSG00000149573 | MPZL2     | myelin protein zero like 2 [Source:HGNC Symbol;Acc:HGNC:3496]                                     | 0.29                    |
| PMCTP2-037 | 4            | ENSG00000162366 | PDZK1IP1  | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                                   | 0.86                    |
| PMCTP2-037 | 4            | ENSG00000146070 | PLA2G7    | phospholipase A2 group VII [Source:HGNC Symbol;Acc:HGNC:9040]                                     | 0.21                    |

Table 39: Co-expressed gene clusters (PBM, Day 2)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP3-001 | 2            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | 0.63                    |
| PMCTP3-001 | 2            | ENSG00000101162 | TUBB1     | tubulin beta 1 class VI [Source:HGNC Symbol;Acc:HGNC:16257]                                    | 0.43                    |
| PMCTP3-002 | 2            | ENSG00000125347 | IRF1      | interferon regulatory factor 1 [Source:HGNC Symbol;Acc:HGNC:6116]                              | 0.23                    |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|-------------------------|
| PMCTP3-002 | 2            | ENSG00000005961 | ITGA2B    | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]                             | 0.59                    |
| PMCTP3-003 | 2            | ENSG00000260401 |           |                                                                                          | 0.75                    |
| PMCTP3-003 | 2            | ENSG00000141574 | SECTM1    | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                         | 0.53                    |
| PMCTP3-004 | 2            | ENSG00000150337 | FCGR1A    | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                        | 0.35                    |
| PMCTP3-004 | 2            | ENSG00000005381 | MPO       | myeloperoxidase [Source:HGNC Symbol;Acc:HGNC:7218]                                       | 0.59                    |
| PMCTP3-005 | 2            | ENSG00000169136 | ATF5      | activating transcription factor 5 [Source:HGNC Symbol;Acc:HGNC:790]                      | 0.40                    |
| PMCTP3-005 | 2            | ENSG00000149131 | SERPING1  | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                              | 0.59                    |
| PMCTP3-006 | 4            | ENSG00000082397 | EPB41L3   | erythrocyte membrane protein band 4.1 like 3 [Source:HGNC Symbol;Acc:HGNC:3380]          | 0.32                    |
| PMCTP3-006 | 4            | ENSG00000188906 | LRRK2     | leucine rich repeat kinase 2 [Source:HGNC Symbol;Acc:HGNC:18618]                         | 0.21                    |
| PMCTP3-006 | 4            | ENSG00000113494 | PRLR      | prolactin receptor [Source:HGNC Symbol;Acc:HGNC:9446]                                    | 0.44                    |
| PMCTP3-006 | 4            | ENSG00000154447 | SH3RF1    | SH3 domain containing ring finger 1 [Source:HGNC Symbol;Acc:HGNC:17650]                  | 0.59                    |
| PMCTP3-007 | 2            | ENSG00000162551 | ALPL      | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]                | 0.58                    |
| PMCTP3-007 | 2            | ENSG00000163993 | S100P     | S100 calcium binding protein P [Source:HGNC Symbol;Acc:HGNC:10504]                       | 0.43                    |
| PMCTP3-008 | 2            | ENSG00000143226 | FCGR2A    | Fc fragment of IgG receptor 2a [Source:HGNC Symbol;Acc:HGNC:3616]                        | 0.36                    |
| PMCTP3-008 | 2            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                       | 0.99                    |
| PMCTP3-009 | 4            | ENSG00000062282 | DGAT2     | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                   | 0.38                    |
| PMCTP3-009 | 4            | ENSG00000197561 | ELANE     | elastase, neutrophil expressed [Source:HGNC Symbol;Acc:HGNC:3309]                        | 0.98                    |
| PMCTP3-009 | 4            | ENSG00000183762 | KREMEN1   | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]           | 0.79                    |
| PMCTP3-009 | 4            | ENSG00000198736 | MSRB1     | methionine sulfoxide reductase B1 [Source:HGNC Symbol;Acc:HGNC:14133]                    | 0.40                    |
| PMCTP3-010 | 4            | ENSG00000111644 | ACRBP     | acrosin binding protein [Source:HGNC Symbol;Acc:HGNC:17195]                              | 0.29                    |
| PMCTP3-010 | 4            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                    | 0.15                    |
| PMCTP3-010 | 4            | ENSG00000157551 | KCNJ15    | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261] | 0.52                    |
| PMCTP3-010 | 4            | ENSG00000123700 | KCNJ2     | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]  | 0.69                    |
| PMCTP3-011 | 4            | ENSG00000126262 | FFAR2     | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                            | 0.73                    |
| PMCTP3-011 | 4            | ENSG00000182782 | HCAR2     | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                    | 0.78                    |
| PMCTP3-011 | 4            | ENSG00000173868 | PHOSPHO1  | phosphoethanolamine/phosphocholine phosphatase [Source:HGNC Symbol;Acc:HGNC:16815]       | 0.40                    |
| PMCTP3-011 | 4            | ENSG00000173535 | TNFRSF10C | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                  | 0.71                    |
| PMCTP3-012 | 6            | ENSG00000248996 |           |                                                                                          | 0.41                    |
| PMCTP3-012 | 6            | ENSG00000135636 | DYSF      | dysferlin [Source:HGNC Symbol;Acc:HGNC:3097]                                             | 0.29                    |
| PMCTP3-012 | 6            | ENSG00000136689 | IL1RN     | interleukin 1 receptor antagonist [Source:HGNC Symbol;Acc:HGNC:6000]                     | 0.30                    |
| PMCTP3-012 | 6            | ENSG00000088827 | SIGLEC1   | sialic acid binding Ig like lectin 1 [Source:HGNC Symbol;Acc:HGNC:11127]                 | 0.62                    |
| PMCTP3-012 | 6            | ENSG00000197122 | SRC       | SRC proto-oncogene, non-receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:11283]     | 0.38                    |
| PMCTP3-012 | 6            | ENSG00000183779 | ZNF703    | zinc finger protein 703 [Source:HGNC Symbol;Acc:HGNC:25883]                              | 0.57                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                            | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|--------------|---------------------------------------------------------------------------------------------|-------------------------|
| PMCTP3-013 | 5            | ENSG00000204388 | HSPA1B       | heat shock protein family A (Hsp70) member 1B [Source:HGNC Symbol;Acc:HGNC:5233]            | 0.65                    |
| PMCTP3-013 | 5            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | 1.05                    |
| PMCTP3-013 | 5            | ENSG00000125538 | IL1B         | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                       | 0.73                    |
| PMCTP3-013 | 5            | ENSG00000143878 | RHOB         | ras homolog family member B [Source:HGNC Symbol;Acc:HGNC:668]                               | 0.39                    |
| PMCTP3-013 | 5            | ENSG00000232810 | TNF          | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                   | 0.66                    |
| PMCTP3-014 | 4            | ENSG00000267481 |              |                                                                                             | -0.58                   |
| PMCTP3-014 | 4            | ENSG00000110848 | CD69         | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                            | -0.43                   |
| PMCTP3-014 | 4            | ENSG00000187118 | CMC1         | C-X9-C motif containing 1 [Source:HGNC Symbol;Acc:HGNC:28783]                               | -0.49                   |
| PMCTP3-014 | 4            | ENSG00000255819 | KLRC4-KLRK1  | KLRC4-KLRK1 readthrough [Source:HGNC Symbol;Acc:HGNC:48357]                                 | -0.44                   |

**Table 40:** Co-expressed gene clusters (PBMC, Day 3)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                      | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------------------------------|-------------------------|
| PMCTP4-001 | 4            | ENSG00000275302 | CCL4      | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630]                      | -0.68                   |
| PMCTP4-001 | 4            | ENSG00000137441 | FGFBP2    | fibroblast growth factor binding protein 2 [Source:HGNC Symbol;Acc:HGNC:29451]        | -0.57                   |
| PMCTP4-001 | 4            | ENSG00000150687 | PRSS23    | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]                               | -0.73                   |
| PMCTP4-001 | 4            | ENSG00000171101 | SIGLEC17P | sialic acid binding lg like lectin 17, pseudogene [Source:HGNC Symbol;Acc:HGNC:15604] | -0.41                   |

**Table 41:** Co-expressed gene clusters (PBMC, Day 4)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                        | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------|-------------------------|
| PMCTP5-001 | 2            | ENSG00000254709 | IGLL5     | immunoglobulin lambda like polypeptide 5 [Source:HGNC Symbol;Acc:HGNC:38476]            | 1.14                    |
| PMCTP5-001 | 2            | ENSG00000177301 | KCNA2     | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220] | 0.61                    |
| PMCTP5-002 | 2            | ENSG00000282639 |           |                                                                                         | 0.92                    |
| PMCTP5-002 | 2            | ENSG00000171848 | RRM2      | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]      | 1.18                    |
| PMCTP5-003 | 4            | ENSG00000243238 | IGKV2-30  | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                   | 1.49                    |
| PMCTP5-003 | 4            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                   | 1.03                    |
| PMCTP5-003 | 4            | ENSG00000170476 | MZB1      | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]        | 1.19                    |
| PMCTP5-003 | 4            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                  | 1.48                    |
| PMCTP5-004 | 3            | ENSG00000211946 | IGHV3-20  | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                   | 1.88                    |
| PMCTP5-004 | 3            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                  | 1.71                    |
| PMCTP5-004 | 3            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                  | 1.27                    |
| PMCTP5-005 | 4            | ENSG00000123989 | CHPF      | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                     | 0.93                    |
| PMCTP5-005 | 4            | ENSG00000099958 | DERL3     | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                            | 0.68                    |
| PMCTP5-005 | 4            | ENSG00000211893 | IGHG2     | immunoglobulin heavy constant gamma 2 (G2m marker) [Source:HGNC Symbol;Acc:HGNC:5526]   | 0.70                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|----------------------------|
| PMCTP5-005 | 4            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                                 | 1.93                       |
| PMCTP5-006 | 4            | ENSG00000124772 | CPNE5     | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                                    | 0.65                       |
| PMCTP5-006 | 4            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]          | 2.32                       |
| PMCTP5-006 | 4            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]      | 2.02                       |
| PMCTP5-006 | 4            | ENSG00000244437 | IGKV3-15  | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                          | 0.87                       |
| PMCTP5-007 | 2            | ENSG00000162551 | ALPL      | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]                      | 0.75                       |
| PMCTP5-007 | 2            | ENSG00000108244 | KRT23     | keratin 23 [Source:HGNC Symbol;Acc:HGNC:6438]                                                  | 0.48                       |
| PMCTP5-008 | 4            | ENSG00000163464 | CXCR1     | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                            | 0.59                       |
| PMCTP5-008 | 4            | ENSG00000180871 | CXCR2     | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                            | 0.55                       |
| PMCTP5-008 | 4            | ENSG00000162747 | FCGR3B    | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                            | 0.61                       |
| PMCTP5-008 | 4            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | 0.28                       |
| PMCTP5-009 | 3            | ENSG00000211945 | IGHV1-18  | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                          | 1.13                       |
| PMCTP5-009 | 3            | ENSG00000211976 | IGHV3-73  | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                          | 1.40                       |
| PMCTP5-009 | 3            | ENSG00000138160 | KIF11     | kinesin family member 11 [Source:HGNC Symbol;Acc:HGNC:6388]                                    | 0.70                       |
| PMCTP5-010 | 2            | ENSG00000186529 | CYP4F3    | cytochrome P450 family 4 subfamily F member 3 [Source:HGNC Symbol;Acc:HGNC:2646]               | 0.61                       |
| PMCTP5-010 | 2            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                          | 1.19                       |
| PMCTP5-011 | 2            | ENSG00000133048 | CHI3L1    | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                          | 0.62                       |
| PMCTP5-011 | 2            | ENSG00000125148 | MT2A      | metallothionein 2A [Source:HGNC Symbol;Acc:HGNC:7406]                                          | 0.18                       |
| PMCTP5-012 | 3            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                          | 0.97                       |
| PMCTP5-012 | 3            | ENSG00000211660 | IGLV2-23  | immunoglobulin lambda variable 2-23 [Source:HGNC Symbol;Acc:HGNC:5890]                         | 1.25                       |
| PMCTP5-012 | 3            | ENSG00000278196 | IGLV2-8   | immunoglobulin lambda variable 2-8 [Source:HGNC Symbol;Acc:HGNC:5895]                          | 0.84                       |
| PMCTP5-013 | 3            | ENSG00000182885 | ADGRG3    | adhesion G protein-coupled receptor G3 [Source:HGNC Symbol;Acc:HGNC:13728]                     | 0.52                       |
| PMCTP5-013 | 3            | ENSG00000211950 | IGHV1-24  | immunoglobulin heavy variable 1-24 [Source:HGNC Symbol;Acc:HGNC:5551]                          | 1.19                       |
| PMCTP5-013 | 3            | ENSG00000173535 | TNFRSF10C | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                        | 0.75                       |
| PMCTP5-014 | 4            | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                          | 1.27                       |
| PMCTP5-014 | 4            | ENSG00000242076 | IGKV1-33  | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                          | 1.53                       |
| PMCTP5-014 | 4            | ENSG00000239951 | IGKV3-20  | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                          | 0.82                       |
| PMCTP5-014 | 4            | ENSG00000211669 | IGLV3-10  | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                         | 1.50                       |
| PMCTP5-015 | 2            | ENSG00000239839 | DEFA3     | defensin alpha 3 [Source:HGNC Symbol;Acc:HGNC:2762]                                            | 0.63                       |
| PMCTP5-015 | 2            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                             | 0.61                       |
| PMCTP5-016 | 3            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                                  | 0.80                       |
| PMCTP5-016 | 3            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                                  | 0.88                       |
| PMCTP5-016 | 3            | ENSG00000124102 | PI3       | peptidase inhibitor 3 [Source:HGNC Symbol;Acc:HGNC:8947]                                       | 0.82                       |
| PMCTP5-017 | 3            | ENSG00000211934 | IGHV1-2   | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]                           | 0.72                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                     | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|--------------------------------------------------------------------------------------|-------------------------|
| PMCTP5-017 | 3            | ENSG00000211652 | IGLV7-43  | immunoglobulin lambda variable 7-43 [Source:HGNC Symbol;Acc:HGNC:5929]               | 1.43                    |
| PMCTP5-017 | 3            | ENSG00000162366 | PDZK1IP1  | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                      | 0.56                    |
| PMCTP5-018 | 2            | ENSG00000158578 | ALAS2     | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                      | 0.89                    |
| PMCTP5-018 | 2            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                           | 0.63                    |
| PMCTP5-019 | 6            | ENSG00000211943 | IGHV3-15  | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                | 0.73                    |
| PMCTP5-019 | 6            | ENSG00000211933 | IGHV6-1   | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                 | 1.37                    |
| PMCTP5-019 | 6            | ENSG00000253818 | IGLV1-41  | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]  | 1.20                    |
| PMCTP5-019 | 6            | ENSG00000197705 | KLHL14    | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                      | 0.63                    |
| PMCTP5-019 | 6            | ENSG00000135862 | LAMC1     | laminin subunit gamma 1 [Source:HGNC Symbol;Acc:HGNC:6492]                           | 0.45                    |
| PMCTP5-019 | 6            | ENSG00000169116 | PARM1     | prostate androgen-regulated mucin-like protein 1 [Source:HGNC Symbol;Acc:HGNC:24536] | 0.40                    |

Table 42: Co-expressed gene clusters (PBMC, Day 5)

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                            | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|--------------|---------------------------------------------------------------------------------------------|-------------------------|
| PMCTP6-001 | 3            | ENSG00000211947 | IGHV3-21     | immunoglobulin heavy variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5586]                       | 1.21                    |
| PMCTP6-001 | 3            | ENSG00000211592 | IGKC         | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                            | 1.20                    |
| PMCTP6-001 | 3            | ENSG00000211679 | IGLC3        | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]       | 1.50                    |
| PMCTP6-002 | 2            | ENSG00000270550 | IGHV3-30     | immunoglobulin heavy variable 3-30 [Source:HGNC Symbol;Acc:HGNC:5591]                       | 0.78                    |
| PMCTP6-002 | 2            | ENSG00000239264 | TXNDC5       | thioredoxin domain containing 5 [Source:HGNC Symbol;Acc:HGNC:21073]                         | 1.49                    |
| PMCTP6-003 | 2            | ENSG00000243238 | IGKV2-30     | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                       | 2.08                    |
| PMCTP6-003 | 2            | ENSG00000211668 | IGLV2-11     | immunoglobulin lambda variable 2-11 [Source:HGNC Symbol;Acc:HGNC:5887]                      | 1.38                    |
| PMCTP6-004 | 3            | ENSG00000197476 |              |                                                                                             | 1.59                    |
| PMCTP6-004 | 3            | ENSG00000170476 | MZB1         | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]            | 1.48                    |
| PMCTP6-004 | 3            | ENSG00000240505 | TNFRSF13B    | TNF receptor superfamily member 13B [Source:HGNC Symbol;Acc:HGNC:18153]                     | 0.87                    |
| PMCTP6-005 | 2            | ENSG00000211673 | IGLV3-1      | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                       | 1.56                    |
| PMCTP6-005 | 2            | ENSG00000197705 | KLHL14       | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                             | 0.91                    |
| PMCTP6-006 | 2            | ENSG00000170456 | DENND5B      | DENN domain containing 5B [Source:HGNC Symbol;Acc:HGNC:28338]                               | 0.85                    |
| PMCTP6-006 | 2            | ENSG00000211677 | IGLC2        | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                         | 1.89                    |
| PMCTP6-007 | 3            | ENSG00000211893 | IGHG2        | immunoglobulin heavy constant gamma 2 (G2m marker) [Source:HGNC Symbol;Acc:HGNC:5526]       | 0.63                    |
| PMCTP6-007 | 3            | ENSG00000211955 | IGHV3-33     | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                       | 1.52                    |
| PMCTP6-007 | 3            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | 2.06                    |
| PMCTP6-008 | 3            | ENSG00000124772 | CPNE5        | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                                 | 0.72                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|----------------------------|
| PMCTP6-008 | 3            | ENSG00000211669 | IGLV3-10  | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                    | 1.53                       |
| PMCTP6-008 | 3            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    | 2.07                       |
| PMCTP6-009 | 2            | ENSG00000211945 | IGHV1-18  | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                     | 1.10                       |
| PMCTP6-009 | 2            | ENSG00000110777 | POU2AF1   | POU class 2 associating factor 1 [Source:HGNC Symbol;Acc:HGNC:9211]                       | 0.73                       |
| PMCTP6-010 | 4            | ENSG00000105974 | CAV1      | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                             | 2.25                       |
| PMCTP6-010 | 4            | ENSG00000118985 | ELL2      | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]             | 0.78                       |
| PMCTP6-010 | 4            | ENSG00000211938 | IGHV3-7   | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                      | 3.02                       |
| PMCTP6-010 | 4            | ENSG00000132465 | JCHAIN    | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                | 1.45                       |
| PMCTP6-011 | 5            | ENSG00000099958 | DERL3     | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                              | 0.75                       |
| PMCTP6-011 | 5            | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                     | 1.62                       |
| PMCTP6-011 | 5            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                     | 1.45                       |
| PMCTP6-011 | 5            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                            | 2.42                       |
| PMCTP6-011 | 5            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                    | 1.84                       |
| PMCTP6-012 | 2            | ENSG00000282639 |           |                                                                                           | 1.05                       |
| PMCTP6-012 | 2            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | 2.63                       |
| PMCTP6-013 | 2            | ENSG00000138772 | ANXA3     | annexin A3 [Source:HGNC Symbol;Acc:HGNC:541]                                              | 0.37                       |
| PMCTP6-013 | 2            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                     | 1.19                       |
| PMCTP6-014 | 3            | ENSG00000239975 | IGKV1D-33 | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                    | 2.24                       |
| PMCTP6-014 | 3            | ENSG00000211648 | IGLV1-47  | immunoglobulin lambda variable 1-47 [Source:HGNC Symbol;Acc:HGNC:5880]                    | 1.96                       |
| PMCTP6-014 | 3            | ENSG00000211666 | IGLV2-14  | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                    | 1.07                       |
| PMCTP6-015 | 5            | ENSG00000239839 | DEFA3     | defensin alpha 3 [Source:HGNC Symbol;Acc:HGNC:2762]                                       | 0.59                       |
| PMCTP6-015 | 5            | ENSG00000123700 | KCNJ2     | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]   | 0.43                       |
| PMCTP6-015 | 5            | ENSG00000135862 | LAMC1     | laminin subunit gamma 1 [Source:HGNC Symbol;Acc:HGNC:6492]                                | 0.59                       |
| PMCTP6-015 | 5            | ENSG00000012223 | LTF       | lactotransferrin [Source:HGNC Symbol;Acc:HGNC:6720]                                       | 0.37                       |
| PMCTP6-015 | 5            | ENSG00000232810 | TNF       | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                 | 0.39                       |
| PMCTP6-016 | 2            | ENSG00000211966 | IGHV5-51  | immunoglobulin heavy variable 5-51 [Source:HGNC Symbol;Acc:HGNC:5659]                     | 0.80                       |
| PMCTP6-016 | 2            | ENSG00000243466 | IGKV1-5   | immunoglobulin kappa variable 1-5 [Source:HGNC Symbol;Acc:HGNC:5741]                      | 1.17                       |
| PMCTP6-017 | 3            | ENSG00000100336 | APOL4     | apolipoprotein L4 [Source:HGNC Symbol;Acc:HGNC:14867]                                     | 0.93                       |
| PMCTP6-017 | 3            | ENSG00000123989 | CHPF      | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                       | 0.84                       |
| PMCTP6-017 | 3            | ENSG00000242076 | IGKV1-33  | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                     | 2.06                       |
| PMCTP6-018 | 6            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | 2.96                       |
| PMCTP6-018 | 6            | ENSG00000211897 | IGHG3     | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]     | 1.72                       |
| PMCTP6-018 | 6            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | 2.61                       |
| PMCTP6-018 | 6            | ENSG00000244437 | IGKV3-15  | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                     | 1.04                       |
| PMCTP6-018 | 6            | ENSG00000148773 | MKI67     | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                          | 0.60                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                        | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|------------|-----------------------------------------------------------------------------------------|-------------------------|
| PMCTP6-018 | 6            | ENSG00000101057 | MYBL2      | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                            | 1.46                    |
| PMCTP6-019 | 4            | ENSG00000211976 | IGHV3-73   | immunoglobulin heavy variable 3-73 [Source:HGNC Symbol;Acc:HGNC:5623]                   | 1.50                    |
| PMCTP6-019 | 4            | ENSG00000251546 | IGKV1D-39  | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                  | 1.32                    |
| PMCTP6-019 | 4            | ENSG00000239951 | IGKV3-20   | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                   | 1.05                    |
| PMCTP6-019 | 4            | ENSG00000211660 | IGLV2-23   | immunoglobulin lambda variable 2-23 [Source:HGNC Symbol;Acc:HGNC:5890]                  | 1.17                    |
| PMCTP6-020 | 5            | ENSG00000137959 | IFI44L     | interferon induced protein 44 like [Source:HGNC Symbol;Acc:HGNC:17817]                  | 0.25                    |
| PMCTP6-020 | 5            | ENSG00000211899 | IGHM       | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                     | 1.22                    |
| PMCTP6-020 | 5            | ENSG00000211935 | IGHV1-3    | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                    | 1.08                    |
| PMCTP6-020 | 5            | ENSG00000253451 | IGLV2-28   | immunoglobulin lambda variable 2-28 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5891]     | 1.78                    |
| PMCTP6-020 | 5            | ENSG00000156587 | UBE2L6     | ubiquitin conjugating enzyme E2 L6 [Source:HGNC Symbol;Acc:HGNC:12490]                  | 0.23                    |
| PMCTP6-021 | 5            | ENSG00000136010 | ALDH1L2    | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]           | 1.26                    |
| PMCTP6-021 | 5            | ENSG00000211972 | IGHV3-66   | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                   | 1.70                    |
| PMCTP6-021 | 5            | ENSG00000242371 | IGKV1-39   | immunoglobulin kappa variable 1-39 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5740] | 1.33                    |
| PMCTP6-021 | 5            | ENSG00000125538 | IL1B       | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                   | 0.54                    |
| PMCTP6-021 | 5            | ENSG00000177301 | KCNA2      | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220] | 0.74                    |
| PMCTP6-022 | 3            | ENSG00000211892 | IGHG4      | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]   | 1.37                    |
| PMCTP6-022 | 3            | ENSG00000280411 | IGHV1-69-2 | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                 | 2.02                    |
| PMCTP6-022 | 3            | ENSG00000171241 | SHCBP1     | SHC binding and spindle associated 1 [Source:HGNC Symbol;Acc:HGNC:29547]                | 0.79                    |
| PMCTP6-023 | 2            | ENSG00000211949 | IGHV3-23   | immunoglobulin heavy variable 3-23 [Source:HGNC Symbol;Acc:HGNC:5588]                   | 0.66                    |
| PMCTP6-023 | 2            | ENSG00000088726 | TMEM40     | transmembrane protein 40 [Source:HGNC Symbol;Acc:HGNC:25620]                            | 0.17                    |
| PMCTP6-024 | 4            | ENSG00000224650 | IGHV3-74   | immunoglobulin heavy variable 3-74 [Source:HGNC Symbol;Acc:HGNC:5624]                   | 1.64                    |
| PMCTP6-024 | 4            | ENSG00000254395 | IGHV4-55   | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]      | 1.55                    |
| PMCTP6-024 | 4            | ENSG00000211651 | IGLV1-44   | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                  | 2.58                    |
| PMCTP6-024 | 4            | ENSG00000211644 | IGLV1-51   | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                  | 2.04                    |
| PMCTP6-025 | 5            | ENSG00000198814 | GK         | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                      | 0.12                    |
| PMCTP6-025 | 5            | ENSG00000182782 | HCAR2      | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                   | 0.61                    |
| PMCTP6-025 | 5            | ENSG00000211943 | IGHV3-15   | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                   | 1.25                    |
| PMCTP6-025 | 5            | ENSG00000241294 | IGKV2-24   | immunoglobulin kappa variable 2-24 [Source:HGNC Symbol;Acc:HGNC:5781]                   | 1.52                    |
| PMCTP6-025 | 5            | ENSG00000253818 | IGLV1-41   | immunoglobulin lambda variable 1-41 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5878]     | 1.82                    |
| PMCTP6-026 | 6            | ENSG00000232176 |            |                                                                                         | 0.42                    |
| PMCTP6-026 | 6            | ENSG00000183508 | FAM46C     | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]         | 1.07                    |
| PMCTP6-026 | 6            | ENSG00000211946 | IGHV3-20   | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                   | 1.43                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|-------------------------|
| PMCTP6-026 | 6            | ENSG00000241755 | IGKV1-9   | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                     | 1.57                    |
| PMCTP6-026 | 6            | ENSG00000211598 | IGKV4-1   | immunoglobulin kappa variable 4-1 [Source:HGNC Symbol;Acc:HGNC:5834]                     | 0.69                    |
| PMCTP6-026 | 6            | ENSG00000171848 | RRM2      | ribonucleotide reductase regulatory subunit M2 [Source:HGNC Symbol;Acc:HGNC:10452]       | 0.72                    |
| PMCTP6-027 | 2            | ENSG00000211649 | IGLV7-46  | immunoglobulin lambda variable 7-46 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5930] | 1.55                    |
| PMCTP6-027 | 2            | ENSG00000197208 | SLC22A4   | solute carrier family 22 member 4 [Source:HGNC Symbol;Acc:HGNC:10968]                    | 0.27                    |
| PMCTP6-028 | 7            | ENSG00000282651 |           |                                                                                          | 0.83                    |
| PMCTP6-028 | 7            | ENSG00000211934 | IGHV1-2   | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]                     | 0.84                    |
| PMCTP6-028 | 7            | ENSG00000211962 | IGHV1-46  | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                    | 0.98                    |
| PMCTP6-028 | 7            | ENSG00000232216 | IGHV3-43  | immunoglobulin heavy variable 3-43 [Source:HGNC Symbol;Acc:HGNC:5604]                    | 1.22                    |
| PMCTP6-028 | 7            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                    | 1.88                    |
| PMCTP6-028 | 7            | ENSG00000211659 | IGLV3-25  | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                   | 2.12                    |
| PMCTP6-028 | 7            | ENSG00000167900 | TK1       | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                   | 0.81                    |
| PMCTP6-029 | 3            | ENSG00000197561 | ELANE     | elastase, neutrophil expressed [Source:HGNC Symbol;Acc:HGNC:3309]                        | 0.70                    |
| PMCTP6-029 | 3            | ENSG00000278196 | IGLV2-8   | immunoglobulin lambda variable 2-8 [Source:HGNC Symbol;Acc:HGNC:5895]                    | 0.90                    |
| PMCTP6-029 | 3            | ENSG00000169116 | PARM1     | prostate androgen-regulated mucin-like protein 1 [Source:HGNC Symbol;Acc:HGNC:24536]     | 0.65                    |
| PMCTP6-030 | 4            | ENSG00000278828 | HIST1H3H  | histone cluster 1 H3 family member h [Source:HGNC Symbol;Acc:HGNC:4775]                  | 0.09                    |
| PMCTP6-030 | 4            | ENSG00000184678 | HIST2H2BE | histone cluster 2 H2B family member e [Source:HGNC Symbol;Acc:HGNC:4760]                 | 0.10                    |
| PMCTP6-030 | 4            | ENSG00000253822 | IGLV3-24  | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]      | 1.94                    |
| PMCTP6-030 | 4            | ENSG00000156265 | MAP3K7CL  | MAP3K7 C-terminal like [Source:HGNC Symbol;Acc:HGNC:16457]                               | 0.10                    |
| PMCTP6-031 | 6            | ENSG00000062282 | DGAT2     | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                   | 0.27                    |
| PMCTP6-031 | 6            | ENSG00000211950 | IGHV1-24  | immunoglobulin heavy variable 1-24 [Source:HGNC Symbol;Acc:HGNC:5551]                    | 1.39                    |
| PMCTP6-031 | 6            | ENSG00000211685 | IGLC7     | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                      | 1.87                    |
| PMCTP6-031 | 6            | ENSG00000254709 | IGLL5     | immunoglobulin lambda like polypeptide 5 [Source:HGNC Symbol;Acc:HGNC:38476]             | 1.23                    |
| PMCTP6-031 | 6            | ENSG00000183762 | KREMEN1   | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]           | 0.64                    |
| PMCTP6-031 | 6            | ENSG00000128438 | TBC1D27   | TBC1 domain family member 27 [Source:HGNC Symbol;Acc:HGNC:28104]                         | 0.89                    |
| PMCTP6-032 | 4            | ENSG00000122786 | CALD1     | caldesmon 1 [Source:HGNC Symbol;Acc:HGNC:1441]                                           | 0.62                    |
| PMCTP6-032 | 4            | ENSG00000211933 | IGHV6-1   | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                     | 1.59                    |
| PMCTP6-032 | 4            | ENSG00000244575 | IGKV1-27  | immunoglobulin kappa variable 1-27 [Source:HGNC Symbol;Acc:HGNC:5735]                    | 1.00                    |
| PMCTP6-032 | 4            | ENSG00000211652 | IGLV7-43  | immunoglobulin lambda variable 7-43 [Source:HGNC Symbol;Acc:HGNC:5929]                   | 1.59                    |
| PMCTP6-033 | 4            | ENSG00000146592 | CREB5     | cAMP responsive element binding protein 5 [Source:HGNC Symbol;Acc:HGNC:16844]            | -0.03                   |
| PMCTP6-033 | 4            | ENSG00000168209 | DDIT4     | DNA damage inducible transcript 4 [Source:HGNC Symbol;Acc:HGNC:24944]                    | -0.61                   |
| PMCTP6-033 | 4            | ENSG00000183019 | MCEMP1    | mast cell expressed membrane protein 1 [Source:HGNC Symbol;Acc:HGNC:27291]               | -0.24                   |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                              | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|---------------------------------------------------------------|-------------------------|
| PMCTP6-033 | 4            | ENSG00000149573 | MPZL2     | myelin protein zero like 2 [Source:HGNC Symbol;Acc:HGNC:3496] | -0.07                   |

**Table 43:** Co-expressed gene clusters (PBMC, Day 6)

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                            | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|--------------|---------------------------------------------------------------------------------------------|-------------------------|
| PMCTP7-001 | 2            | ENSG00000211896 | IGHG1        | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]       | 2.57                    |
| PMCTP7-001 | 2            | ENSG00000253755 | IGHGP        | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]   | 2.25                    |
| PMCTP7-002 | 2            | ENSG00000270550 | IGHV3-30     | immunoglobulin heavy variable 3-30 [Source:HGNC Symbol;Acc:HGNC:5591]                       | 0.38                    |
| PMCTP7-002 | 2            | ENSG00000187608 | ISG15        | ISG15 ubiquitin-like modifier [Source:HGNC Symbol;Acc:HGNC:4053]                            | 0.68                    |
| PMCTP7-003 | 3            | ENSG00000178445 | GLDC         | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                    | 1.50                    |
| PMCTP7-003 | 3            | ENSG00000211938 | IGHV3-7      | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                        | 2.35                    |
| PMCTP7-003 | 3            | ENSG00000132465 | JCHAIN       | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                  | 1.16                    |
| PMCTP7-004 | 3            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637] | 1.94                    |
| PMCTP7-004 | 3            | ENSG00000211679 | IGLC3        | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]       | 1.19                    |
| PMCTP7-004 | 3            | ENSG00000101057 | MYBL2        | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                | 1.20                    |
| PMCTP7-005 | 2            | ENSG00000211935 | IGHV1-3      | immunoglobulin heavy variable 1-3 [Source:HGNC Symbol;Acc:HGNC:5552]                        | 0.85                    |
| PMCTP7-005 | 2            | ENSG00000224373 | IGHV4-59     | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                       | 1.67                    |
| PMCTP7-006 | 3            | ENSG00000211893 | IGHG2        | immunoglobulin heavy constant gamma 2 (G2m marker) [Source:HGNC Symbol;Acc:HGNC:5526]       | 0.47                    |
| PMCTP7-006 | 3            | ENSG00000211897 | IGHG3        | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]       | 1.37                    |
| PMCTP7-006 | 3            | ENSG00000211592 | IGKC         | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                            | 0.80                    |
| PMCTP7-007 | 6            | ENSG00000124772 | CPNE5        | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                                 | 0.70                    |
| PMCTP7-007 | 6            | ENSG00000241351 | IGKV3-11     | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                       | 1.14                    |
| PMCTP7-007 | 6            | ENSG00000170476 | MZB1         | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]            | 1.26                    |
| PMCTP7-007 | 6            | ENSG00000110777 | POU2AF1      | POU class 2 associating factor 1 [Source:HGNC Symbol;Acc:HGNC:9211]                         | 0.64                    |
| PMCTP7-007 | 6            | ENSG00000115884 | SDC1         | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                              | 2.30                    |
| PMCTP7-007 | 6            | ENSG00000167900 | TK1          | thymidine kinase 1 [Source:HGNC Symbol;Acc:HGNC:11830]                                      | 0.58                    |
| PMCTP7-008 | 2            | ENSG00000224650 | IGHV3-74     | immunoglobulin heavy variable 3-74 [Source:HGNC Symbol;Acc:HGNC:5624]                       | 0.82                    |
| PMCTP7-008 | 2            | ENSG00000211685 | IGLC7        | immunoglobulin lambda constant 7 [Source:HGNC Symbol;Acc:HGNC:5861]                         | 1.09                    |
| PMCTP7-009 | 3            | ENSG00000211947 | IGHV3-21     | immunoglobulin heavy variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5586]                       | 0.82                    |
| PMCTP7-009 | 3            | ENSG00000239951 | IGKV3-20     | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                       | 0.76                    |
| PMCTP7-009 | 3            | ENSG00000148773 | MKI67        | marker of proliferation Ki-67 [Source:HGNC Symbol;Acc:HGNC:7107]                            | 0.28                    |
| PMCTP7-010 | 3            | ENSG00000123989 | CHPF         | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                         | 0.81                    |
| PMCTP7-010 | 3            | ENSG00000240505 | TNFRSF13B    | TNF receptor superfamily member 13B [Source:HGNC Symbol;Acc:HGNC:18153]                     | 0.64                    |



| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|----------------------------|
| PMCTP7-010 | 3            | ENSG00000048462 | TNFRSF17  | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                   | 1.33                       |
| PMCTP7-011 | 3            | ENSG00000272821 |           |                                                                                          | 0.64                       |
| PMCTP7-011 | 3            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                   | 2.75                       |
| PMCTP7-011 | 3            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                   | 2.35                       |
| PMCTP7-012 | 5            | ENSG00000211945 | IGHV1-18  | immunoglobulin heavy variable 1-18 [Source:HGNC Symbol;Acc:HGNC:5549]                    | 1.03                       |
| PMCTP7-012 | 5            | ENSG00000211955 | IGHV3-33  | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                    | 1.13                       |
| PMCTP7-012 | 5            | ENSG00000211972 | IGHV3-66  | immunoglobulin heavy variable 3-66 [Source:HGNC Symbol;Acc:HGNC:5619]                    | 1.86                       |
| PMCTP7-012 | 5            | ENSG00000244437 | IGKV3-15  | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                    | 1.05                       |
| PMCTP7-012 | 5            | ENSG00000177606 | JUN       | Jun proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6204] | 0.75                       |
| PMCTP7-013 | 2            | ENSG00000177301 | KCNA2     | potassium voltage-gated channel subfamily A member 2 [Source:HGNC Symbol;Acc:HGNC:6220]  | 0.68                       |
| PMCTP7-013 | 2            | ENSG00000128438 | TBC1D27   | TBC1 domain family member 27 [Source:HGNC Symbol;Acc:HGNC:28104]                         | 0.74                       |
| PMCTP7-014 | 2            | ENSG00000137198 | GMPR      | guanosine monophosphate reductase [Source:HGNC Symbol;Acc:HGNC:4376]                     | 0.64                       |
| PMCTP7-014 | 2            | ENSG00000184792 | OSBP2     | oxysterol binding protein 2 [Source:HGNC Symbol;Acc:HGNC:8504]                           | 0.77                       |
| PMCTP7-015 | 3            | ENSG00000196787 | HIST1H2AG | histone cluster 1 H2A family member g [Source:HGNC Symbol;Acc:HGNC:4737]                 | 0.70                       |
| PMCTP7-015 | 3            | ENSG00000211644 | IGLV1-51  | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                   | 1.16                       |
| PMCTP7-015 | 3            | ENSG00000011105 | TSPAN9    | tetraspanin 9 [Source:HGNC Symbol;Acc:HGNC:21640]                                        | 0.44                       |
| PMCTP7-016 | 3            | ENSG00000211933 | IGHV6-1   | immunoglobulin heavy variable 6-1 [Source:HGNC Symbol;Acc:HGNC:5662]                     | 1.35                       |
| PMCTP7-016 | 3            | ENSG00000211673 | IGLV3-1   | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                    | 1.75                       |
| PMCTP7-016 | 3            | ENSG00000205309 | NT5M      | 5',3'-nucleotidase, mitochondrial [Source:HGNC Symbol;Acc:HGNC:15769]                    | 0.55                       |
| PMCTP7-017 | 4            | ENSG00000282651 |           |                                                                                          | 0.52                       |
| PMCTP7-017 | 4            | ENSG00000099958 | DERL3     | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                             | 0.63                       |
| PMCTP7-017 | 4            | ENSG00000211950 | IGHV1-24  | immunoglobulin heavy variable 1-24 [Source:HGNC Symbol;Acc:HGNC:5551]                    | 1.60                       |
| PMCTP7-017 | 4            | ENSG00000211669 | IGLV3-10  | immunoglobulin lambda variable 3-10 [Source:HGNC Symbol;Acc:HGNC:5897]                   | 0.87                       |
| PMCTP7-018 | 2            | ENSG00000223609 | HBD       | hemoglobin subunit delta [Source:HGNC Symbol;Acc:HGNC:4829]                              | 0.93                       |
| PMCTP7-018 | 2            | ENSG00000211934 | IGHV1-2   | immunoglobulin heavy variable 1-2 [Source:HGNC Symbol;Acc:HGNC:5550]                     | 0.74                       |
| PMCTP7-019 | 3            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                    | 1.28                       |
| PMCTP7-019 | 3            | ENSG00000197705 | KLHL14    | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                          | 0.76                       |
| PMCTP7-019 | 3            | ENSG00000135862 | LAMC1     | laminin subunit gamma 1 [Source:HGNC Symbol;Acc:HGNC:6492]                               | 0.47                       |
| PMCTP7-020 | 2            | ENSG00000211651 | IGLV1-44  | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                   | 2.03                       |
| PMCTP7-020 | 2            | ENSG00000211666 | IGLV2-14  | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                   | 0.53                       |
| PMCTP7-021 | 3            | ENSG00000232216 | IGHV3-43  | immunoglobulin heavy variable 3-43 [Source:HGNC Symbol;Acc:HGNC:5604]                    | 0.75                       |
| PMCTP7-021 | 3            | ENSG00000211659 | IGLV3-25  | immunoglobulin lambda variable 3-25 [Source:HGNC Symbol;Acc:HGNC:5908]                   | 1.87                       |
| PMCTP7-021 | 3            | ENSG00000012223 | LTF       | lactotransferrin [Source:HGNC Symbol;Acc:HGNC:6720]                                      | 0.59                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                          | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|------------|-------------------------------------------------------------------------------------------|----------------------------|
| PMCTP7-022 | 3            | ENSG00000165702 | GFI1B      | growth factor independent 1B transcriptional repressor [Source:HGNC Symbol;Acc:HGNC:4238] | 0.46                       |
| PMCTP7-022 | 3            | ENSG00000005961 | ITGA2B     | integrin subunit alpha 2b [Source:HGNC Symbol;Acc:HGNC:6138]                              | 0.65                       |
| PMCTP7-022 | 3            | ENSG00000088826 | SMOX       | spermine oxidase [Source:HGNC Symbol;Acc:HGNC:15862]                                      | 0.65                       |
| PMCTP7-023 | 4            | ENSG00000138772 | ANXA3      | annexin A3 [Source:HGNC Symbol;Acc:HGNC:541]                                              | 0.55                       |
| PMCTP7-023 | 4            | ENSG00000133048 | CHI3L1     | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                     | 0.30                       |
| PMCTP7-023 | 4            | ENSG00000211943 | IGHV3-15   | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                     | 1.01                       |
| PMCTP7-023 | 4            | ENSG00000143878 | RHOB       | ras homolog family member B [Source:HGNC Symbol;Acc:HGNC:668]                             | 0.40                       |
| PMCTP7-024 | 3            | ENSG00000211966 | IGHV5-51   | immunoglobulin heavy variable 5-51 [Source:HGNC Symbol;Acc:HGNC:5659]                     | 0.45                       |
| PMCTP7-024 | 3            | ENSG00000243238 | IGKV2-30   | immunoglobulin kappa variable 2-30 [Source:HGNC Symbol;Acc:HGNC:5785]                     | 1.47                       |
| PMCTP7-024 | 3            | ENSG00000171223 | JUNB       | JunB proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6205] | 0.57                       |
| PMCTP7-025 | 2            | ENSG00000211962 | IGHV1-46   | immunoglobulin heavy variable 1-46 [Source:HGNC Symbol;Acc:HGNC:5554]                     | 0.67                       |
| PMCTP7-025 | 2            | ENSG00000211967 | IGHV3-53   | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                     | 1.59                       |
| PMCTP7-026 | 4            | ENSG00000170345 | FOS        | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796]  | 0.59                       |
| PMCTP7-026 | 4            | ENSG00000211892 | IGHG4      | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]     | 1.10                       |
| PMCTP7-026 | 4            | ENSG00000280411 | IGHV1-69-2 | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                   | 1.51                       |
| PMCTP7-026 | 4            | ENSG00000211959 | IGHV4-39   | immunoglobulin heavy variable 4-39 [Source:HGNC Symbol;Acc:HGNC:5651]                     | 1.10                       |
| PMCTP7-027 | 3            | ENSG00000100336 | APOL4      | apolipoprotein L4 [Source:HGNC Symbol;Acc:HGNC:14867]                                     | 0.56                       |
| PMCTP7-027 | 3            | ENSG00000105974 | CAV1       | caveolin 1 [Source:HGNC Symbol;Acc:HGNC:1527]                                             | 1.93                       |
| PMCTP7-027 | 3            | ENSG00000169116 | PARM1      | prostate androgen-regulated mucin-like protein 1 [Source:HGNC Symbol;Acc:HGNC:24536]      | 0.49                       |
| PMCTP7-028 | 5            | ENSG00000136010 | ALDH1L2    | aldehyde dehydrogenase 1 family member L2 [Source:HGNC Symbol;Acc:HGNC:26777]             | 0.77                       |
| PMCTP7-028 | 5            | ENSG00000170456 | DENND5B    | DENN domain containing 5B [Source:HGNC Symbol;Acc:HGNC:28338]                             | 0.62                       |
| PMCTP7-028 | 5            | ENSG00000118985 | ELL2       | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]             | 0.54                       |
| PMCTP7-028 | 5            | ENSG00000211677 | IGLC2      | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | 1.84                       |
| PMCTP7-028 | 5            | ENSG00000135916 | ITM2C      | integral membrane protein 2C [Source:HGNC Symbol;Acc:HGNC:6175]                           | 0.72                       |
| PMCTP7-029 | 3            | ENSG00000254395 | IGHV4-55   | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]        | 1.28                       |
| PMCTP7-029 | 3            | ENSG00000211670 | IGLV3-9    | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]   | 1.63                       |
| PMCTP7-029 | 3            | ENSG00000004799 | PDK4       | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                        | 0.57                       |
| PMCTP7-030 | 3            | ENSG00000253822 | IGLV3-24   | immunoglobulin lambda variable 3-24 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5907]       | 1.44                       |
| PMCTP7-030 | 3            | ENSG00000113494 | PRLR       | prolactin receptor [Source:HGNC Symbol;Acc:HGNC:9446]                                     | 0.03                       |
| PMCTP7-030 | 3            | ENSG00000180113 | TDRD6      | tudor domain containing 6 [Source:HGNC Symbol;Acc:HGNC:21339]                             | 0.05                       |

Table 44: Co-expressed gene clusters (PBMC, Day 7)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|-------------------------|
| PMCTP8-001 | 2            | ENSG00000171051 | FPR1      | formyl peptide receptor 1 [Source:HGNC Symbol;Acc:HGNC:3826]                             | 0.38                    |
| PMCTP8-001 | 2            | ENSG00000157551 | KCNJ15    | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261] | 1.18                    |
| PMCTP8-002 | 2            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                      | 1.91                    |
| PMCTP8-002 | 2            | ENSG00000211673 | IGLV3-1   | immunoglobulin lambda variable 3-1 [Source:HGNC Symbol;Acc:HGNC:5896]                    | 1.18                    |
| PMCTP8-003 | 2            | ENSG00000211899 | IGHM      | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                      | 0.73                    |
| PMCTP8-003 | 2            | ENSG00000244437 | IGKV3-15  | immunoglobulin kappa variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5816]                    | 0.70                    |
| PMCTP8-004 | 2            | ENSG00000143226 | FCGR2A    | Fc fragment of IgG receptor IIa [Source:HGNC Symbol;Acc:HGNC:3616]                       | 0.41                    |
| PMCTP8-004 | 2            | ENSG00000101057 | MYBL2     | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                             | 1.01                    |
| PMCTP8-005 | 2            | ENSG00000224373 | IGHV4-59  | immunoglobulin heavy variable 4-59 [Source:HGNC Symbol;Acc:HGNC:5654]                    | 1.83                    |
| PMCTP8-005 | 2            | ENSG00000121858 | TNFSF10   | tumor necrosis factor superfamily member 10 [Source:HGNC Symbol;Acc:HGNC:11925]          | 0.17                    |
| PMCTP8-006 | 3            | ENSG00000171049 | FPR2      | formyl peptide receptor 2 [Source:HGNC Symbol;Acc:HGNC:3827]                             | 0.59                    |
| PMCTP8-006 | 3            | ENSG00000196549 | MME       | membrane metalloendopeptidase [Source:HGNC Symbol;Acc:HGNC:7154]                         | 0.93                    |
| PMCTP8-006 | 3            | ENSG00000163993 | S100P     | S100 calcium binding protein P [Source:HGNC Symbol;Acc:HGNC:10504]                       | 0.88                    |
| PMCTP8-007 | 4            | ENSG00000163464 | CXCR1     | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                      | 1.24                    |
| PMCTP8-007 | 4            | ENSG00000180871 | CXCR2     | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                      | 1.03                    |
| PMCTP8-007 | 4            | ENSG00000162747 | FCGR3B    | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                      | 1.24                    |
| PMCTP8-007 | 4            | ENSG00000128438 | TBC1D27   | TBC1 domain family member 27 [Source:HGNC Symbol;Acc:HGNC:28104]                         | 0.64                    |
| PMCTP8-008 | 2            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]    | 2.45                    |
| PMCTP8-008 | 2            | ENSG00000211955 | IGHV3-33  | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                    | 1.11                    |
| PMCTP8-009 | 4            | ENSG00000133048 | CHI3L1    | chitinase 3 like 1 [Source:HGNC Symbol;Acc:HGNC:1932]                                    | 0.86                    |
| PMCTP8-009 | 4            | ENSG00000062282 | DGAT2     | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                   | 0.71                    |
| PMCTP8-009 | 4            | ENSG00000182782 | HCAR2     | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                    | 1.36                    |
| PMCTP8-009 | 4            | ENSG00000211666 | IGLV2-14  | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                   | 0.63                    |
| PMCTP8-010 | 2            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                    | 1.17                    |
| PMCTP8-010 | 2            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]  | 2.26                    |
| PMCTP8-011 | 2            | ENSG00000232176 |           |                                                                                          | 0.96                    |
| PMCTP8-011 | 2            | ENSG00000135862 | LAMC1     | laminin subunit gamma 1 [Source:HGNC Symbol;Acc:HGNC:6492]                               | 0.42                    |
| PMCTP8-012 | 2            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                   | 2.86                    |
| PMCTP8-012 | 2            | ENSG00000170476 | MZB1      | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]         | 1.09                    |
| PMCTP8-013 | 2            | ENSG00000241755 | IGKV1-9   | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                     | 1.63                    |
| PMCTP8-013 | 2            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                   | 2.94                    |
| PMCTP8-014 | 2            | ENSG00000248996 |           |                                                                                          | 0.37                    |

| Cluster ID | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                              | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|--------------|-----------------------------------------------------------------------------------------------|----------------------------|
| PMCTP8-014 | 2            | ENSG00000142089 | IFITM3       | interferon induced transmembrane protein 3 [Source:HGNC Symbol;Acc:HGNC:5414]                 | 0.59                       |
| PMCTP8-015 | 4            | ENSG00000244734 | HBB          | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                    | 0.56                       |
| PMCTP8-015 | 4            | ENSG00000173110 | HSPA6        | heat shock protein family A (Hsp70) member 6 [Source:HGNC Symbol;Acc:HGNC:5239]               | 0.72                       |
| PMCTP8-015 | 4            | ENSG00000173868 | PHOSPHO1     | phosphoethanolamine/phosphocholine phosphatase [Source:HGNC Symbol;Acc:HGNC:16815]            | 0.65                       |
| PMCTP8-015 | 4            | ENSG00000173535 | TNFRSF10C    | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                       | 1.30                       |
| PMCTP8-016 | 2            | ENSG00000253755 | IGHGP        | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]     | 1.95                       |
| PMCTP8-016 | 2            | ENSG00000270550 | IGHV3-30     | immunoglobulin heavy variable 3-30 [Source:HGNC Symbol;Acc:HGNC:5591]                         | 0.46                       |
| PMCTP8-017 | 4            | ENSG00000103569 | AQP9         | aquaporin 9 [Source:HGNC Symbol;Acc:HGNC:643]                                                 | 0.81                       |
| PMCTP8-017 | 4            | ENSG00000198814 | GK           | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                            | 0.32                       |
| PMCTP8-017 | 4            | ENSG00000204388 | HSPA1B       | heat shock protein family A (Hsp70) member 1B [Source:HGNC Symbol;Acc:HGNC:5233]              | 0.55                       |
| PMCTP8-017 | 4            | ENSG00000162366 | PDZK1IP1     | PDZK1 interacting protein 1 [Source:HGNC Symbol;Acc:HGNC:16887]                               | 0.90                       |
| PMCTP8-018 | 4            | ENSG00000128383 | APOBEC3A     | apolipoprotein B mRNA editing enzyme catalytic subunit 3A [Source:HGNC Symbol;Acc:HGNC:17343] | 0.48                       |
| PMCTP8-018 | 4            | ENSG00000211897 | IGHG3        | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]         | 1.28                       |
| PMCTP8-018 | 4            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637]   | 1.04                       |
| PMCTP8-018 | 4            | ENSG00000048462 | TNFRSF17     | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                        | 1.06                       |
| PMCTP8-019 | 2            | ENSG00000211946 | IGHV3-20     | immunoglobulin heavy variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5585]                         | 0.77                       |
| PMCTP8-019 | 2            | ENSG00000211959 | IGHV4-39     | immunoglobulin heavy variable 4-39 [Source:HGNC Symbol;Acc:HGNC:5651]                         | 1.43                       |
| PMCTP8-020 | 5            | ENSG00000198019 | FCGR1B       | Fc fragment of IgG receptor 1b [Source:HGNC Symbol;Acc:HGNC:3614]                             | 0.57                       |
| PMCTP8-020 | 5            | ENSG00000211938 | IGHV3-7      | immunoglobulin heavy variable 3-7 [Source:HGNC Symbol;Acc:HGNC:5620]                          | 1.78                       |
| PMCTP8-020 | 5            | ENSG00000211598 | IGKV4-1      | immunoglobulin kappa variable 4-1 [Source:HGNC Symbol;Acc:HGNC:5834]                          | 0.34                       |
| PMCTP8-020 | 5            | ENSG00000132465 | JCHAIN       | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                    | 0.99                       |
| PMCTP8-020 | 5            | ENSG00000197705 | KLHL14       | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                               | 0.59                       |
| PMCTP8-021 | 3            | ENSG00000146592 | CREB5        | cAMP responsive element binding protein 5 [Source:HGNC Symbol;Acc:HGNC:16844]                 | 0.36                       |
| PMCTP8-021 | 3            | ENSG00000211943 | IGHV3-15     | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                         | 1.05                       |
| PMCTP8-021 | 3            | ENSG00000073756 | PTGS2        | prostaglandin-endoperoxide synthase 2 [Source:HGNC Symbol;Acc:HGNC:9605]                      | 0.48                       |
| PMCTP8-022 | 5            | ENSG00000111644 | ACRBP        | acrosin binding protein [Source:HGNC Symbol;Acc:HGNC:17195]                                   | 0.26                       |
| PMCTP8-022 | 5            | ENSG00000125347 | IRF1         | interferon regulatory factor 1 [Source:HGNC Symbol;Acc:HGNC:6116]                             | 0.18                       |
| PMCTP8-022 | 5            | ENSG00000074416 | MGLL         | monoglyceride lipase [Source:HGNC Symbol;Acc:HGNC:17038]                                      | 0.29                       |
| PMCTP8-022 | 5            | ENSG00000171611 | PTCRA        | pre T-cell antigen receptor alpha [Source:HGNC Symbol;Acc:HGNC:21290]                         | 0.68                       |
| PMCTP8-022 | 5            | ENSG00000149131 | SERPING1     | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                                   | 0.97                       |
| PMCTP8-023 | 4            | ENSG00000169679 | BUB1         | BUB1 mitotic checkpoint serine/threonine kinase [Source:HGNC Symbol;Acc:HGNC:1148]            | 0.23                       |
| PMCTP8-023 | 4            | ENSG00000211592 | IGKC         | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                              | 0.63                       |

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC<br>TIV |
|------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|----------------------------|
| PMCTP8-023 | 4            | ENSG00000239951 | IGKV3-20  | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                          | 0.78                       |
| PMCTP8-023 | 4            | ENSG00000183762 | KREMEN1   | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]                 | 1.17                       |
| PMCTP8-024 | 6            | ENSG00000163823 | CCR1      | C-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1602]                              | 0.23                       |
| PMCTP8-024 | 6            | ENSG00000124772 | CPNE5     | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                                    | 0.71                       |
| PMCTP8-024 | 6            | ENSG00000241351 | IGKV3-11  | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                          | 1.16                       |
| PMCTP8-024 | 6            | ENSG00000136689 | IL1RN     | interleukin 1 receptor antagonist [Source:HGNC Symbol;Acc:HGNC:6000]                           | 0.54                       |
| PMCTP8-024 | 6            | ENSG00000110777 | POU2AF1   | POU class 2 associating factor 1 [Source:HGNC Symbol;Acc:HGNC:9211]                            | 0.54                       |
| PMCTP8-024 | 6            | ENSG00000115884 | SDC1      | syndecan 1 [Source:HGNC Symbol;Acc:HGNC:10658]                                                 | 2.17                       |
| PMCTP8-025 | 2            | ENSG00000168298 | HIST1H1E  | histone cluster 1 H1 family member e [Source:HGNC Symbol;Acc:HGNC:4718]                        | 2.07                       |
| PMCTP8-025 | 2            | ENSG00000242371 | IGKV1-39  | immunoglobulin kappa variable 1-39 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5740]        | 0.39                       |
| PMCTP8-026 | 5            | ENSG00000196787 | HIST1H2AG | histone cluster 1 H2A family member g [Source:HGNC Symbol;Acc:HGNC:4737]                       | 0.60                       |
| PMCTP8-026 | 5            | ENSG00000185745 | IFIT1     | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407] | 0.98                       |
| PMCTP8-026 | 5            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | 1.07                       |
| PMCTP8-026 | 5            | ENSG00000119917 | IFIT3     | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411] | 0.82                       |
| PMCTP8-026 | 5            | ENSG00000239975 | IGKV1D-33 | immunoglobulin kappa variable 1D-33 [Source:HGNC Symbol;Acc:HGNC:5753]                         | 1.51                       |
| PMCTP8-027 | 3            | ENSG00000211679 | IGLC3     | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]          | 1.15                       |
| PMCTP8-027 | 3            | ENSG00000211651 | IGLV1-44  | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                         | 2.01                       |
| PMCTP8-027 | 3            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                             | 0.88                       |
| PMCTP8-028 | 6            | ENSG00000138772 | ANXA3     | annexin A3 [Source:HGNC Symbol;Acc:HGNC:541]                                                   | 0.98                       |
| PMCTP8-028 | 6            | ENSG00000134755 | DSC2      | desmocollin 2 [Source:HGNC Symbol;Acc:HGNC:3036]                                               | 0.34                       |
| PMCTP8-028 | 6            | ENSG00000254395 | IGHV4-55  | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]             | 1.25                       |
| PMCTP8-028 | 6            | ENSG00000140749 | IGSF6     | immunoglobulin superfamily member 6 [Source:HGNC Symbol;Acc:HGNC:5953]                         | 0.21                       |
| PMCTP8-028 | 6            | ENSG00000125538 | IL1B      | interleukin 1 beta [Source:HGNC Symbol;Acc:HGNC:5992]                                          | 0.71                       |
| PMCTP8-028 | 6            | ENSG00000232810 | TNF       | tumor necrosis factor [Source:HGNC Symbol;Acc:HGNC:11892]                                      | 0.72                       |
| PMCTP8-029 | 3            | ENSG00000280800 |           |                                                                                                | 2.60                       |
| PMCTP8-029 | 3            | ENSG00000121807 | CCR2      | C-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:1603]                              | 0.04                       |
| PMCTP8-029 | 3            | ENSG00000211644 | IGLV1-51  | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                         | 0.36                       |
| PMCTP8-030 | 15           | ENSG00000234389 |           |                                                                                                | -0.53                      |
| PMCTP8-030 | 15           | ENSG00000275302 | CCL4      | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630]                               | -0.64                      |
| PMCTP8-030 | 15           | ENSG00000276070 | CCL4L2    | C-C motif chemokine ligand 4 like 2 [Source:HGNC Symbol;Acc:HGNC:24066]                        | -0.55                      |
| PMCTP8-030 | 15           | ENSG00000117281 | CD160     | CD160 molecule [Source:HGNC Symbol;Acc:HGNC:17013]                                             | -0.53                      |
| PMCTP8-030 | 15           | ENSG00000110848 | CD69      | CD69 molecule [Source:HGNC Symbol;Acc:HGNC:1694]                                               | -0.58                      |
| PMCTP8-030 | 15           | ENSG00000110318 | CEP126    | centrosomal protein 126 [Source:HGNC Symbol;Acc:HGNC:29264]                                    | -0.52                      |
| PMCTP8-030 | 15           | ENSG00000187118 | CMC1      | C-X9-C motif containing 1 [Source:HGNC Symbol;Acc:HGNC:28783]                                  | -0.52                      |
| PMCTP8-030 | 15           | ENSG00000171451 | DSEL      | dermatan sulfate epimerase-like [Source:HGNC Symbol;Acc:HGNC:18144]                            | -0.70                      |

| Cluster ID | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP8-030 | 15           | ENSG00000197057 | DTHD1       | death domain containing 1 [Source:HGNC Symbol;Acc:HGNC:37261]                                                             | -0.47                   |
| PMCTP8-030 | 15           | ENSG00000137441 | FGFBP2      | fibroblast growth factor binding protein 2 [Source:HGNC Symbol;Acc:HGNC:29451]                                            | -0.49                   |
| PMCTP8-030 | 15           | ENSG00000167633 | KIR3DL1     | killer cell immunoglobulin like receptor, three Ig domains and long cytoplasmic tail 1 [Source:HGNC Symbol;Acc:HGNC:6338] | -0.69                   |
| PMCTP8-030 | 15           | ENSG00000255819 | KLRC4-KLRK1 | KLRC4-KLRK1 readthrough [Source:HGNC Symbol;Acc:HGNC:48357]                                                               | -0.56                   |
| PMCTP8-030 | 15           | ENSG00000170962 | PDGFD       | platelet derived growth factor D [Source:HGNC Symbol;Acc:HGNC:30620]                                                      | -0.68                   |
| PMCTP8-030 | 15           | ENSG00000150687 | PRSS23      | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]                                                                   | -0.53                   |
| PMCTP8-030 | 15           | ENSG00000171101 | SIGLEC17P   | sialic acid binding Ig like lectin 17, pseudogene [Source:HGNC Symbol;Acc:HGNC:15604]                                     | -0.65                   |

Table 45: Co-expressed gene clusters (PBMC, Day 8)

| Cluster ID | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                          | Log <sub>2</sub> FC TIV |
|------------|--------------|-----------------|-----------|-------------------------------------------------------------------------------------------|-------------------------|
| PMCTP9-001 | 2            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]     | 1.55                    |
| PMCTP9-001 | 2            | ENSG00000253755 | IGHGP     | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529] | 1.12                    |
| PMCTP9-002 | 3            | ENSG00000158578 | ALAS2     | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                           | 1.24                    |
| PMCTP9-002 | 3            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                             | 0.91                    |
| PMCTP9-002 | 3            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                             | 1.00                    |
| PMCTP9-003 | 2            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                | 0.75                    |
| PMCTP9-003 | 2            | ENSG00000169116 | PARM1     | prostate androgen-regulated mucin-like protein 1 [Source:HGNC Symbol;Acc:HGNC:24536]      | 0.31                    |
| PMCTP9-004 | 2            | ENSG00000211677 | IGLC2     | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                       | 1.21                    |
| PMCTP9-004 | 2            | ENSG00000211662 | IGLV3-21  | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                    | 1.76                    |
| PMCTP9-005 | 7            | ENSG00000118985 | ELL2      | elongation factor for RNA polymerase II 2 [Source:HGNC Symbol;Acc:HGNC:17064]             | 0.17                    |
| PMCTP9-005 | 7            | ENSG00000183508 | FAM46C    | family with sequence similarity 46 member C [Source:HGNC Symbol;Acc:HGNC:24712]           | 0.43                    |
| PMCTP9-005 | 7            | ENSG00000211964 | IGHV3-48  | immunoglobulin heavy variable 3-48 [Source:HGNC Symbol;Acc:HGNC:5606]                     | 0.94                    |
| PMCTP9-005 | 7            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                    | 1.83                    |
| PMCTP9-005 | 7            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918]   | 1.31                    |
| PMCTP9-005 | 7            | ENSG00000132465 | JCHAIN    | joining chain of multimeric IgA and IgM [Source:HGNC Symbol;Acc:HGNC:5713]                | 0.61                    |
| PMCTP9-005 | 7            | ENSG00000197705 | KLHL14    | kelch like family member 14 [Source:HGNC Symbol;Acc:HGNC:29266]                           | 0.35                    |
| PMCTP9-006 | 4            | ENSG00000197561 | ELANE     | elastase, neutrophil expressed [Source:HGNC Symbol;Acc:HGNC:3309]                         | 0.72                    |
| PMCTP9-006 | 4            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                     | 0.97                    |
| PMCTP9-006 | 4            | ENSG00000251546 | IGKV1D-39 | immunoglobulin kappa variable 1D-39 [Source:HGNC Symbol;Acc:HGNC:5756]                    | 0.76                    |
| PMCTP9-006 | 4            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                        | 0.93                    |

Table 46: Co-expressed gene clusters (PBMC, Day 9)

| Cluster ID  | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC TIV |
|-------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|-------------------------|
| PMCTP10-001 | 2            | ENSG00000180871 | CXCR2     | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                            | 0.97                    |
| PMCTP10-001 | 2            | ENSG00000162747 | FCGR3B    | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                            | 1.15                    |
| PMCTP10-002 | 2            | ENSG00000163464 | CXCR1     | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                            | 1.08                    |
| PMCTP10-002 | 2            | ENSG00000171236 | LRG1      | leucine rich alpha-2-glycoprotein 1 [Source:HGNC Symbol;Acc:HGNC:29480]                        | 0.93                    |
| PMCTP10-003 | 2            | ENSG00000062282 | DGAT2     | diacylglycerol O-acyltransferase 2 [Source:HGNC Symbol;Acc:HGNC:16940]                         | 0.64                    |
| PMCTP10-003 | 2            | ENSG00000008516 | MMP25     | matrix metalloproteinase 25 [Source:HGNC Symbol;Acc:HGNC:14246]                                | 0.80                    |
| PMCTP10-004 | 4            | ENSG00000158578 | ALAS2     | 5'-aminolevulinic acid synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                            | 1.29                    |
| PMCTP10-004 | 4            | ENSG00000206172 | HBA1      | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                                  | 1.25                    |
| PMCTP10-004 | 4            | ENSG00000188536 | HBA2      | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                                  | 1.29                    |
| PMCTP10-004 | 4            | ENSG00000223609 | HBD       | hemoglobin subunit delta [Source:HGNC Symbol;Acc:HGNC:4829]                                    | 1.11                    |
| PMCTP10-005 | 2            | ENSG00000124772 | CPNE5     | copine 5 [Source:HGNC Symbol;Acc:HGNC:2318]                                                    | 0.31                    |
| PMCTP10-005 | 2            | ENSG00000211653 | IGLV1-40  | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                         | 1.57                    |
| PMCTP10-006 | 2            | ENSG00000181409 | AATK      | apoptosis associated tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:21]                          | 0.68                    |
| PMCTP10-006 | 2            | ENSG00000183762 | KREMEN1   | kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:HGNC:17550]                 | 1.10                    |
| PMCTP10-007 | 2            | ENSG00000173868 | PHOSPHO1  | phosphoethanolamine/phosphocholine phosphatase [Source:HGNC Symbol;Acc:HGNC:16815]             | 0.76                    |
| PMCTP10-007 | 2            | ENSG00000004939 | SLC4A1    | solute carrier family 4 member 1 (Diego blood group) [Source:HGNC Symbol;Acc:HGNC:11027]       | 1.09                    |
| PMCTP10-008 | 6            | ENSG00000182885 | ADGRG3    | adhesion G protein-coupled receptor G3 [Source:HGNC Symbol;Acc:HGNC:13728]                     | 0.91                    |
| PMCTP10-008 | 6            | ENSG00000162551 | ALPL      | alkaline phosphatase, liver/bone/kidney [Source:HGNC Symbol;Acc:HGNC:438]                      | 1.37                    |
| PMCTP10-008 | 6            | ENSG00000126262 | FFAR2     | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                                  | 1.08                    |
| PMCTP10-008 | 6            | ENSG00000244734 | HBB       | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                     | 1.07                    |
| PMCTP10-008 | 6            | ENSG00000182782 | HCAR2     | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                          | 1.08                    |
| PMCTP10-008 | 6            | ENSG00000173535 | TNFRSF10C | TNF receptor superfamily member 10c [Source:HGNC Symbol;Acc:HGNC:11906]                        | 1.16                    |
| PMCTP10-009 | 4            | ENSG00000186529 | CYP4F3    | cytochrome P450 family 4 subfamily F member 3 [Source:HGNC Symbol;Acc:HGNC:2646]               | 0.78                    |
| PMCTP10-009 | 4            | ENSG00000278196 | IGLV2-8   | immunoglobulin lambda variable 2-8 [Source:HGNC Symbol;Acc:HGNC:5895]                          | 0.68                    |
| PMCTP10-009 | 4            | ENSG00000257335 | MGAM      | maltase-glucoamylase [Source:HGNC Symbol;Acc:HGNC:7043]                                        | 0.63                    |
| PMCTP10-009 | 4            | ENSG00000196549 | MME       | membrane metalloendopeptidase [Source:HGNC Symbol;Acc:HGNC:7154]                               | 0.87                    |
| PMCTP10-010 | 4            | ENSG00000148926 | ADM       | adrenomedullin [Source:HGNC Symbol;Acc:HGNC:259]                                               | 0.75                    |
| PMCTP10-010 | 4            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] | 0.64                    |
| PMCTP10-010 | 4            | ENSG00000157551 | KCNJ15    | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261]       | 0.81                    |
| PMCTP10-010 | 4            | ENSG00000123700 | KCNJ2     | potassium voltage-gated channel subfamily J member 2 [Source:HGNC Symbol;Acc:HGNC:6263]        | 0.58                    |
| PMCTP10-011 | 2            | ENSG00000103569 | AQP9      | aquaporin 9 [Source:HGNC Symbol;Acc:HGNC:643]                                                  | 0.58                    |
| PMCTP10-011 | 2            | ENSG00000140932 | CMTM2     | CKLF like MARVEL transmembrane domain containing 2 [Source:HGNC Symbol;Acc:HGNC:19173]         | 0.94                    |
| PMCTP10-012 | 3            | ENSG00000239839 | DEFA3     | defensin alpha 3 [Source:HGNC Symbol;Acc:HGNC:2762]                                            | 0.48                    |

| Cluster ID  | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                        | Log <sub>2</sub> FC<br>TIV |
|-------------|--------------|-----------------|-----------|-----------------------------------------------------------------------------------------|----------------------------|
| PMCTP10-012 | 3            | ENSG00000198814 | GK        | glycerol kinase [Source:HGNC Symbol;Acc:HGNC:4289]                                      | 0.12                       |
| PMCTP10-012 | 3            | ENSG00000211670 | IGLV3-9   | immunoglobulin lambda variable 3-9 (gene/pseudogene) [Source:HGNC Symbol;Acc:HGNC:5918] | 1.14                       |
| PMCTP10-013 | 4            | ENSG00000123689 | G0S2      | G0/G1 switch 2 [Source:HGNC Symbol;Acc:HGNC:30229]                                      | 1.13                       |
| PMCTP10-013 | 4            | ENSG00000211967 | IGHV3-53  | immunoglobulin heavy variable 3-53 [Source:HGNC Symbol;Acc:HGNC:5610]                   | 0.63                       |
| PMCTP10-013 | 4            | ENSG00000004799 | PDK4      | pyruvate dehydrogenase kinase 4 [Source:HGNC Symbol;Acc:HGNC:8812]                      | 0.81                       |
| PMCTP10-013 | 4            | ENSG00000073756 | PTGS2     | prostaglandin-endoperoxide synthase 2 [Source:HGNC Symbol;Acc:HGNC:9605]                | 0.73                       |

**Table 47:** Co-expressed gene clusters (PBMC, Day 10)

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                               | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------------|----------------------------|
| PMCALLTP-001 | 3            | ENSG00000163464 | CXCR1     | C-X-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:6026]                            |                            |
| PMCALLTP-001 | 3            | ENSG00000180871 | CXCR2     | C-X-C motif chemokine receptor 2 [Source:HGNC Symbol;Acc:HGNC:6027]                            |                            |
| PMCALLTP-001 | 3            | ENSG00000162747 | FCGR3B    | Fc fragment of IgG receptor IIIb [Source:HGNC Symbol;Acc:HGNC:3620]                            |                            |
| PMCALLTP-002 | 2            | ENSG00000158517 | NCF1      | neutrophil cytosolic factor 1 [Source:HGNC Symbol;Acc:HGNC:7660]                               |                            |
| PMCALLTP-002 | 2            | ENSG00000182487 | NCF1B     | neutrophil cytosolic factor 1B pseudogene [Source:HGNC Symbol;Acc:HGNC:32522]                  |                            |
| PMCALLTP-003 | 3            | ENSG00000185745 | IFIT1     | interferon induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:HGNC:5407] |                            |
| PMCALLTP-003 | 3            | ENSG00000119922 | IFIT2     | interferon induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:HGNC:5409] |                            |
| PMCALLTP-003 | 3            | ENSG00000119917 | IFIT3     | interferon induced protein with tetratricopeptide repeats 3 [Source:HGNC Symbol;Acc:HGNC:5411] |                            |
| PMCALLTP-004 | 2            | ENSG00000272821 | SCO2      | SCO2, cytochrome c oxidase assembly protein [Source:HGNC Symbol;Acc:HGNC:10604]                |                            |
| PMCALLTP-005 | 2            | ENSG00000140932 | CMTM2     | CKLF like MARVEL transmembrane domain containing 2 [Source:HGNC Symbol;Acc:HGNC:19173]         |                            |
| PMCALLTP-005 | 2            | ENSG00000196549 | MME       | membrane metalloendopeptidase [Source:HGNC Symbol;Acc:HGNC:7154]                               |                            |
| PMCALLTP-006 | 2            | ENSG00000278828 | HIST1H3H  | histone cluster 1 H3 family member h [Source:HGNC Symbol;Acc:HGNC:4775]                        |                            |
| PMCALLTP-006 | 2            | ENSG00000184678 | HIST2H2BE | histone cluster 2 H2B family member e [Source:HGNC Symbol;Acc:HGNC:4760]                       |                            |
| PMCALLTP-007 | 4            | ENSG00000275302 | CCL4      | C-C motif chemokine ligand 4 [Source:HGNC Symbol;Acc:HGNC:10630]                               |                            |
| PMCALLTP-007 | 4            | ENSG00000117281 | CD160     | CD160 molecule [Source:HGNC Symbol;Acc:HGNC:17013]                                             |                            |
| PMCALLTP-007 | 4            | ENSG00000137441 | FGFBP2    | fibroblast growth factor binding protein 2 [Source:HGNC Symbol;Acc:HGNC:29451]                 |                            |
| PMCALLTP-007 | 4            | ENSG00000150687 | PRSS23    | protease, serine 23 [Source:HGNC Symbol;Acc:HGNC:14370]                                        |                            |
| PMCALLTP-008 | 2            | ENSG00000211947 | IGHV3-21  | immunoglobulin heavy variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5586]                          |                            |
| PMCALLTP-008 | 2            | ENSG00000239951 | IGKV3-20  | immunoglobulin kappa variable 3-20 [Source:HGNC Symbol;Acc:HGNC:5817]                          |                            |
| PMCALLTP-009 | 3            | ENSG00000186407 | CD300E    | CD300e molecule [Source:HGNC Symbol;Acc:HGNC:28874]                                            |                            |
| PMCALLTP-009 | 3            | ENSG00000139318 | DUSP6     | dual specificity phosphatase 6 [Source:HGNC Symbol;Acc:HGNC:3072]                              |                            |
| PMCALLTP-009 | 3            | ENSG00000019169 | MARCO     | macrophage receptor with collagenous structure [Source:HGNC Symbol;Acc:HGNC:6895]              |                            |
| PMCALLTP-010 | 7            | ENSG00000211896 | IGHG1     | immunoglobulin heavy constant gamma 1 (G1m marker) [Source:HGNC Symbol;Acc:HGNC:5525]          |                            |



| Cluster ID   | Cluster Size | Gene ID         | Gene Name   | Gene Description                                                                                 | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-------------|--------------------------------------------------------------------------------------------------|----------------------------|
| PMCALLTP-010 | 7            | ENSG00000211897 | IGHG3       | immunoglobulin heavy constant gamma 3 (G3m marker) [Source:HGNC Symbol;Acc:HGNC:5527]            |                            |
| PMCALLTP-010 | 7            | ENSG00000253755 | IGHGP       | immunoglobulin heavy constant gamma P (non-functional) [Source:HGNC Symbol;Acc:HGNC:5529]        |                            |
| PMCALLTP-010 | 7            | ENSG00000211592 | IGKC        | immunoglobulin kappa constant [Source:HGNC Symbol;Acc:HGNC:5716]                                 |                            |
| PMCALLTP-010 | 7            | ENSG00000241351 | IGKV3-11    | immunoglobulin kappa variable 3-11 [Source:HGNC Symbol;Acc:HGNC:5815]                            |                            |
| PMCALLTP-010 | 7            | ENSG00000170476 | MZB1        | marginal zone B and B1 cell specific protein [Source:HGNC Symbol;Acc:HGNC:30125]                 |                            |
| PMCALLTP-010 | 7            | ENSG00000048462 | TNFRSF17    | TNF receptor superfamily member 17 [Source:HGNC Symbol;Acc:HGNC:11913]                           |                            |
| PMCALLTP-011 | 2            | ENSG00000170345 | FOS         | Fos proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:3796]         |                            |
| PMCALLTP-011 | 2            | ENSG00000177606 | JUN         | Jun proto-oncogene, AP-1 transcription factor subunit [Source:HGNC Symbol;Acc:HGNC:6204]         |                            |
| PMCALLTP-012 | 2            | ENSG00000224650 | IGHV3-74    | immunoglobulin heavy variable 3-74 [Source:HGNC Symbol;Acc:HGNC:5624]                            |                            |
| PMCALLTP-012 | 2            | ENSG00000211644 | IGLV1-51    | immunoglobulin lambda variable 1-51 [Source:HGNC Symbol;Acc:HGNC:5882]                           |                            |
| PMCALLTP-013 | 3            | ENSG00000123989 | CHPF        | chondroitin polymerizing factor [Source:HGNC Symbol;Acc:HGNC:24291]                              |                            |
| PMCALLTP-013 | 3            | ENSG00000099958 | DERL3       | derlin 3 [Source:HGNC Symbol;Acc:HGNC:14236]                                                     |                            |
| PMCALLTP-013 | 3            | ENSG00000242076 | IGKV1-33    | immunoglobulin kappa variable 1-33 [Source:HGNC Symbol;Acc:HGNC:5737]                            |                            |
| PMCALLTP-014 | 8            | ENSG00000173210 | ABLIM3      | actin binding LIM protein family member 3 [Source:HGNC Symbol;Acc:HGNC:29132]                    |                            |
| PMCALLTP-014 | 8            | ENSG00000163735 | CXCL5       | C-X-C motif chemokine ligand 5 [Source:HGNC Symbol;Acc:HGNC:10642]                               |                            |
| PMCALLTP-014 | 8            | ENSG00000259207 | ITGB3       | integrin subunit beta 3 [Source:HGNC Symbol;Acc:HGNC:6156]                                       |                            |
| PMCALLTP-014 | 8            | ENSG00000156265 | MAP3K7CL    | MAP3K7 C-terminal like [Source:HGNC Symbol;Acc:HGNC:16457]                                       |                            |
| PMCALLTP-014 | 8            | ENSG00000163736 | PPBP        | pro-platelet basic protein [Source:HGNC Symbol;Acc:HGNC:9240]                                    |                            |
| PMCALLTP-014 | 8            | ENSG00000005249 | PRKAR2B     | protein kinase cAMP-dependent type II regulatory subunit beta [Source:HGNC Symbol;Acc:HGNC:9392] |                            |
| PMCALLTP-014 | 8            | ENSG00000168497 | SDPR        | serum deprivation response [Source:HGNC Symbol;Acc:HGNC:10690]                                   |                            |
| PMCALLTP-014 | 8            | ENSG00000198478 | SH3BGR12    | SH3 domain binding glutamate rich protein like 2 [Source:HGNC Symbol;Acc:HGNC:15567]             |                            |
| PMCALLTP-015 | 2            | ENSG00000110318 | CEP126      | centrosomal protein 126 [Source:HGNC Symbol;Acc:HGNC:29264]                                      |                            |
| PMCALLTP-015 | 2            | ENSG00000255819 | KLRC4-KLRK1 | KLRC4-KLRK1 readthrough [Source:HGNC Symbol;Acc:HGNC:48357]                                      |                            |
| PMCALLTP-016 | 7            | ENSG00000103313 | MEFV        | Mediterranean fever [Source:HGNC Symbol;Acc:HGNC:6998]                                           |                            |
| PMCALLTP-016 | 7            | ENSG00000020577 | SAMD4A      | sterile alpha motif domain containing 4A [Source:HGNC Symbol;Acc:HGNC:23023]                     |                            |
| PMCALLTP-016 | 7            | ENSG00000162512 | SDC3        | syndecan 3 [Source:HGNC Symbol;Acc:HGNC:10660]                                                   |                            |
| PMCALLTP-016 | 7            | ENSG00000254415 | SIGLEC14    | sialic acid binding Ig like lectin 14 [Source:HGNC Symbol;Acc:HGNC:32926]                        |                            |
| PMCALLTP-016 | 7            | ENSG00000166002 | SMCO4       | single-pass membrane protein with coiled-coil domains 4 [Source:HGNC Symbol;Acc:HGNC:24810]      |                            |
| PMCALLTP-016 | 7            | ENSG00000135604 | STX11       | syntaxin 11 [Source:HGNC Symbol;Acc:HGNC:11429]                                                  |                            |
| PMCALLTP-016 | 7            | ENSG00000140105 | WARS        | tryptophanyl-tRNA synthetase [Source:HGNC Symbol;Acc:HGNC:12729]                                 |                            |
| PMCALLTP-017 | 3            | ENSG00000146592 | CREB5       | cAMP responsive element binding protein 5 [Source:HGNC Symbol;Acc:HGNC:16844]                    |                            |
| PMCALLTP-017 | 3            | ENSG00000103196 | CRISPLD2    | cysteine rich secretory protein LCCL domain containing 2 [Source:HGNC Symbol;Acc:HGNC:25248]     |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name    | Gene Description                                                                              | Log <sub>2</sub> FC TIV |
|--------------|--------------|-----------------|--------------|-----------------------------------------------------------------------------------------------|-------------------------|
| PMCALLTP-017 | 3            | ENSG00000188906 | LRRK2        | leucine rich repeat kinase 2 [Source:HGNC Symbol;Acc:HGNC:18618]                              |                         |
| PMCALLTP-018 | 6            | ENSG00000248996 |              |                                                                                               |                         |
| PMCALLTP-018 | 6            | ENSG00000128383 | APOBEC3A     | apolipoprotein B mRNA editing enzyme catalytic subunit 3A [Source:HGNC Symbol;Acc:HGNC:17343] |                         |
| PMCALLTP-018 | 6            | ENSG00000135636 | DYSF         | dysferlin [Source:HGNC Symbol;Acc:HGNC:3097]                                                  |                         |
| PMCALLTP-018 | 6            | ENSG00000143226 | FCGR2A       | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3616]                             |                         |
| PMCALLTP-018 | 6            | ENSG00000136689 | IL1RN        | interleukin 1 receptor antagonist [Source:HGNC Symbol;Acc:HGNC:6000]                          |                         |
| PMCALLTP-018 | 6            | ENSG00000141574 | SECTM1       | secreted and transmembrane 1 [Source:HGNC Symbol;Acc:HGNC:10707]                              |                         |
| PMCALLTP-019 | 5            | ENSG00000158578 | ALAS2        | 5'-aminolevulinate synthase 2 [Source:HGNC Symbol;Acc:HGNC:397]                               |                         |
| PMCALLTP-019 | 5            | ENSG00000206172 | HBA1         | hemoglobin subunit alpha 1 [Source:HGNC Symbol;Acc:HGNC:4823]                                 |                         |
| PMCALLTP-019 | 5            | ENSG00000188536 | HBA2         | hemoglobin subunit alpha 2 [Source:HGNC Symbol;Acc:HGNC:4824]                                 |                         |
| PMCALLTP-019 | 5            | ENSG00000244734 | HBB          | hemoglobin subunit beta [Source:HGNC Symbol;Acc:HGNC:4827]                                    |                         |
| PMCALLTP-019 | 5            | ENSG00000004939 | SLC4A1       | solute carrier family 4 member 1 (Diego blood group) [Source:HGNC Symbol;Acc:HGNC:11027]      |                         |
| PMCALLTP-020 | 4            | ENSG00000241755 | IGKV1-9      | immunoglobulin kappa variable 1-9 [Source:HGNC Symbol;Acc:HGNC:5744]                          |                         |
| PMCALLTP-020 | 4            | ENSG00000211677 | IGLC2        | immunoglobulin lambda constant 2 [Source:HGNC Symbol;Acc:HGNC:5856]                           |                         |
| PMCALLTP-020 | 4            | ENSG00000211653 | IGLV1-40     | immunoglobulin lambda variable 1-40 [Source:HGNC Symbol;Acc:HGNC:5877]                        |                         |
| PMCALLTP-020 | 4            | ENSG00000211662 | IGLV3-21     | immunoglobulin lambda variable 3-21 [Source:HGNC Symbol;Acc:HGNC:5905]                        |                         |
| PMCALLTP-021 | 9            | ENSG00000178445 | GLDC         | glycine decarboxylase [Source:HGNC Symbol;Acc:HGNC:4313]                                      |                         |
| PMCALLTP-021 | 9            | ENSG00000211899 | IGHM         | immunoglobulin heavy constant mu [Source:HGNC Symbol;Acc:HGNC:5541]                           |                         |
| PMCALLTP-021 | 9            | ENSG00000211955 | IGHV3-33     | immunoglobulin heavy variable 3-33 [Source:HGNC Symbol;Acc:HGNC:5596]                         |                         |
| PMCALLTP-021 | 9            | ENSG00000271178 | IGHV3OR16-13 | immunoglobulin heavy variable 3/OR16-13 (non-functional) [Source:HGNC Symbol;Acc:HGNC:5637]   |                         |
| PMCALLTP-021 | 9            | ENSG00000211679 | IGLC3        | immunoglobulin lambda constant 3 (Kern-Oz+ marker) [Source:HGNC Symbol;Acc:HGNC:5857]         |                         |
| PMCALLTP-021 | 9            | ENSG00000211651 | IGLV1-44     | immunoglobulin lambda variable 1-44 [Source:HGNC Symbol;Acc:HGNC:5879]                        |                         |
| PMCALLTP-021 | 9            | ENSG00000211666 | IGLV2-14     | immunoglobulin lambda variable 2-14 [Source:HGNC Symbol;Acc:HGNC:5888]                        |                         |
| PMCALLTP-021 | 9            | ENSG00000253451 | IGLV2-28     | immunoglobulin lambda variable 2-28 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5891]           |                         |
| PMCALLTP-021 | 9            | ENSG00000101057 | MYBL2        | MYB proto-oncogene like 2 [Source:HGNC Symbol;Acc:HGNC:7548]                                  |                         |
| PMCALLTP-022 | 12           | ENSG00000143382 | ADAMTSL4     | ADAMTS like 4 [Source:HGNC Symbol;Acc:HGNC:19706]                                             |                         |
| PMCALLTP-022 | 12           | ENSG00000170458 | CD14         | CD14 molecule [Source:HGNC Symbol;Acc:HGNC:1628]                                              |                         |
| PMCALLTP-022 | 12           | ENSG00000180340 | FZD2         | frizzled class receptor 2 [Source:HGNC Symbol;Acc:HGNC:4040]                                  |                         |
| PMCALLTP-022 | 12           | ENSG00000185340 | GAS2L1       | growth arrest specific 2 like 1 [Source:HGNC Symbol;Acc:HGNC:16955]                           |                         |
| PMCALLTP-022 | 12           | ENSG00000226091 | LINC00937    | long intergenic non-protein coding RNA 937 [Source:HGNC Symbol;Acc:HGNC:48629]                |                         |
| PMCALLTP-022 | 12           | ENSG00000157227 | MMP14        | matrix metalloproteinase 14 [Source:HGNC Symbol;Acc:HGNC:7160]                                |                         |
| PMCALLTP-022 | 12           | ENSG00000235568 | NFAM1        | NFAT activating protein with ITAM motif 1 [Source:HGNC Symbol;Acc:HGNC:29872]                 |                         |
| PMCALLTP-022 | 12           | ENSG00000177989 | ODF3B        | outer dense fiber of sperm tails 3B [Source:HGNC Symbol;Acc:HGNC:34388]                       |                         |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name  | Gene Description                                                                         | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|------------|------------------------------------------------------------------------------------------|----------------------------|
| PMCALLTP-022 | 12           | ENSG00000197122 | SRC        | SRC proto-oncogene, non-receptor tyrosine kinase [Source:HGNC Symbol;Acc:HGNC:11283]     |                            |
| PMCALLTP-022 | 12           | ENSG00000185215 | TNFAIP2    | TNF alpha induced protein 2 [Source:HGNC Symbol;Acc:HGNC:11895]                          |                            |
| PMCALLTP-022 | 12           | ENSG00000025708 | TYMP       | thymidine phosphorylase [Source:HGNC Symbol;Acc:HGNC:3148]                               |                            |
| PMCALLTP-022 | 12           | ENSG00000114853 | ZBTB47     | zinc finger and BTB domain containing 47 [Source:HGNC Symbol;Acc:HGNC:26955]             |                            |
| PMCALLTP-023 | 6            | ENSG00000163823 | CCR1       | C-C motif chemokine receptor 1 [Source:HGNC Symbol;Acc:HGNC:1602]                        |                            |
| PMCALLTP-023 | 6            | ENSG00000150337 | FCGR1A     | Fc fragment of IgG receptor 1a [Source:HGNC Symbol;Acc:HGNC:3613]                        |                            |
| PMCALLTP-023 | 6            | ENSG00000198019 | FCGR1B     | Fc fragment of IgG receptor 1b [Source:HGNC Symbol;Acc:HGNC:3614]                        |                            |
| PMCALLTP-023 | 6            | ENSG00000140749 | IGSF6      | immunoglobulin superfamily member 6 [Source:HGNC Symbol;Acc:HGNC:5953]                   |                            |
| PMCALLTP-023 | 6            | ENSG00000181631 | P2RY13     | purinergic receptor P2Y13 [Source:HGNC Symbol;Acc:HGNC:4537]                             |                            |
| PMCALLTP-023 | 6            | ENSG00000121858 | TNFSF10    | tumor necrosis factor superfamily member 10 [Source:HGNC Symbol;Acc:HGNC:11925]          |                            |
| PMCALLTP-024 | 14           | ENSG00000169136 | ATF5       | activating transcription factor 5 [Source:HGNC Symbol;Acc:HGNC:790]                      |                            |
| PMCALLTP-024 | 14           | ENSG00000168062 | BATF2      | basic leucine zipper ATF-like transcription factor 2 [Source:HGNC Symbol;Acc:HGNC:25163] |                            |
| PMCALLTP-024 | 14           | ENSG00000134326 | CMPK2      | cytidine/uridine monophosphate kinase 2 [Source:HGNC Symbol;Acc:HGNC:27015]              |                            |
| PMCALLTP-024 | 14           | ENSG00000169245 | CXCL10     | C-X-C motif chemokine ligand 10 [Source:HGNC Symbol;Acc:HGNC:10637]                      |                            |
| PMCALLTP-024 | 14           | ENSG00000133106 | EPSTI1     | epithelial stromal interaction 1 [Source:HGNC Symbol;Acc:HGNC:16465]                     |                            |
| PMCALLTP-024 | 14           | ENSG00000137959 | IFI44L     | interferon induced protein 44 like [Source:HGNC Symbol;Acc:HGNC:17817]                   |                            |
| PMCALLTP-024 | 14           | ENSG00000125347 | IRF1       | interferon regulatory factor 1 [Source:HGNC Symbol;Acc:HGNC:6116]                        |                            |
| PMCALLTP-024 | 14           | ENSG00000002549 | LAP3       | leucine aminopeptidase 3 [Source:HGNC Symbol;Acc:HGNC:18449]                             |                            |
| PMCALLTP-024 | 14           | ENSG00000125148 | MT2A       | metallothionein 2A [Source:HGNC Symbol;Acc:HGNC:7406]                                    |                            |
| PMCALLTP-024 | 14           | ENSG00000111331 | OAS3       | 2'-5'-oligoadenylate synthetase 3 [Source:HGNC Symbol;Acc:HGNC:8088]                     |                            |
| PMCALLTP-024 | 14           | ENSG00000138496 | PARP9      | poly(ADP-ribose) polymerase family member 9 [Source:HGNC Symbol;Acc:HGNC:24118]          |                            |
| PMCALLTP-024 | 14           | ENSG00000149131 | SERPING1   | serpin family G member 1 [Source:HGNC Symbol;Acc:HGNC:1228]                              |                            |
| PMCALLTP-024 | 14           | ENSG00000115415 | STAT1      | signal transducer and activator of transcription 1 [Source:HGNC Symbol;Acc:HGNC:11362]   |                            |
| PMCALLTP-024 | 14           | ENSG00000156587 | UBE2L6     | ubiquitin conjugating enzyme E2 L6 [Source:HGNC Symbol;Acc:HGNC:12490]                   |                            |
| PMCALLTP-025 | 2            | ENSG00000205846 | CLEC6A     | C-type lectin domain family 6 member A [Source:HGNC Symbol;Acc:HGNC:14556]               |                            |
| PMCALLTP-025 | 2            | ENSG00000225492 | GBP1P1     | guanylate binding protein 1 pseudogene 1 [Source:HGNC Symbol;Acc:HGNC:39561]             |                            |
| PMCALLTP-026 | 4            | ENSG00000211892 | IGHG4      | immunoglobulin heavy constant gamma 4 (G4m marker) [Source:HGNC Symbol;Acc:HGNC:5528]    |                            |
| PMCALLTP-026 | 4            | ENSG00000280411 | IGHV1-69-2 | immunoglobulin heavy variable 1-69-2 [Source:HGNC Symbol;Acc:HGNC:5562]                  |                            |
| PMCALLTP-026 | 4            | ENSG00000211943 | IGHV3-15   | immunoglobulin heavy variable 3-15 [Source:HGNC Symbol;Acc:HGNC:5582]                    |                            |
| PMCALLTP-026 | 4            | ENSG00000254395 | IGHV4-55   | immunoglobulin heavy variable 4-55 (pseudogene) [Source:HGNC Symbol;Acc:HGNC:5653]       |                            |
| PMCALLTP-027 | 8            | ENSG00000148926 | ADM        | adrenomedullin [Source:HGNC Symbol;Acc:HGNC:259]                                         |                            |
| PMCALLTP-027 | 8            | ENSG00000138772 | ANXA3      | annexin A3 [Source:HGNC Symbol;Acc:HGNC:541]                                             |                            |
| PMCALLTP-027 | 8            | ENSG00000103569 | AQP9       | aquaporin 9 [Source:HGNC Symbol;Acc:HGNC:643]                                            |                            |

| Cluster ID   | Cluster Size | Gene ID         | Gene Name | Gene Description                                                                         | Log <sub>2</sub> FC<br>TIV |
|--------------|--------------|-----------------|-----------|------------------------------------------------------------------------------------------|----------------------------|
| PMCALLTP-027 | 8            | ENSG00000126262 | FFAR2     | free fatty acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:4501]                            |                            |
| PMCALLTP-027 | 8            | ENSG00000182782 | HCAR2     | hydroxycarboxylic acid receptor 2 [Source:HGNC Symbol;Acc:HGNC:24827]                    |                            |
| PMCALLTP-027 | 8            | ENSG00000157551 | KCNJ15    | potassium voltage-gated channel subfamily J member 15 [Source:HGNC Symbol;Acc:HGNC:6261] |                            |
| PMCALLTP-027 | 8            | ENSG00000171236 | LRG1      | leucine rich alpha-2-glycoprotein 1 [Source:HGNC Symbol;Acc:HGNC:29480]                  |                            |
| PMCALLTP-027 | 8            | ENSG00000163993 | S100P     | S100 calcium binding protein P [Source:HGNC Symbol;Acc:HGNC:10504]                       |                            |

Table 48: Co-expressed gene clusters (PBMC, All post-treatment time points)

| Category Type                   | Categories | Distinct<br>#Genes<br>In Sets | Median<br>#Genes<br>Per Set |
|---------------------------------|------------|-------------------------------|-----------------------------|
| Blood Transcription Modules     | 346        | 2819                          | 12                          |
| MSigDB Biological Processes     | 4653       | 15371                         | 34                          |
| MSigDB Cellular Components      | 584        | 12118                         | 43                          |
| MSigDB Immunological Signatures | 4872       | 19090                         | 199                         |
| MSigDB KEGG Pathways            | 186        | 5227                          | 54                          |
| MSigDB Molecular Functions      | 929        | 14346                         | 30                          |
| MSigDB Reactome Pathways        | 674        | 5792                          | 27                          |

Table 49: Overview of gene sets used for the enrichment analysis (RNA-Seq). Genes within gene sets are filtered to reflect only those that exist in filtered Ensembl version 87 anotations obtained using biomaRt.

| Gene Set Name                                  | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO INTERFERON GAMMA MEDIATED SIGNALING PATHWAY | 67                  | 3 (4.5)           | 3 (4.5)                      | 0 (0)                          | 0.045            | <0.0001 | 0.0931                     |
| GO CELLULAR RESPONSE TO INTERFERON GAMMA       | 118                 | 3 (2.5)           | 3 (2.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0931                     |
| GO RESPONSE TO INTERFERON GAMMA                | 140                 | 3 (2.1)           | 3 (2.1)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0931                     |
| GO CYTOKINE MEDIATED SIGNALING PATHWAY         | 448                 | 3 (0.7)           | 3 (0.7)                      | 0 (0)                          | 0.007            | <0.0001 | 0.0931                     |
| GO CELLULAR RESPONSE TO CYTOKINE STIMULUS      | 602                 | 3 (0.5)           | 3 (0.5)                      | 0 (0)                          | 0.005            | <0.0001 | 0.0931                     |

**Table 50:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE1740 MCSF VS MCSF AND IFNG DAY2 DERIVED MACROPH... | 181                 | 3 (1.7)           | 3 (1.7)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0253                     |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 18H DN          | 184                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0253                     |
| GSE2770 IL12 AND TGFB VS IL4 TREATED ACT CD4 TCELL... | 184                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0253                     |
| GSE3400 UNTREATED VS IFNB TREATED MEF DN              | 184                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0253                     |
| GSE1112 HY CD8AB VS HY CD8AA THYMOCYTE RTOC CULTUR... | 189                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0253                     |
| GSE14000 UNSTIM VS 4H LPS DC TRANSLATED RNA DN        | 198                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY3 ... | 198                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE1432 CTRL VS IFNG 24H MICROGLIA DN                 | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE41978 ID2 KO VS BIM KO KLRG1 LOW EFFECTOR CD8 T... | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY10... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE37533 PPARG1 FOXP3 VS FOXP3 TRANSDUCED CD4 TCEL... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE42021 TREG PLN VS CD24INT TREG THYMUS DN           | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE42021 TREG VS TCONV PLN UP                         | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE1432 1H VS 24H IFNG MICROGLIA DN                   | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE1432 1H VS 6H IFNG MICROGLIA DN                    | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE1432 CTRL VS IFNG 6H MICROGLIA DN                  | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE37533 PPARG1 FOXP3 VS PPARG2 FOXP3 TRANSDUCED C... | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0253                     |
| GSE6269 FLU VS STREP PNEUMO INF PBMC UP               | 169                 | 2 (1.2)           | 2 (1.2)                      | 0 (0)                          | 0.012            | <0.0001 | 0.0253                     |
| GSE1791 CTRL VS NEUROMEDINU IN T CELL LINE 12H DN     | 172                 | 2 (1.2)           | 2 (1.2)                      | 0 (0)                          | 0.012            | 0.0003  | 0.0253                     |
| GSE34156 UNTREATED VS 6H NOD2 LIGAND TREATED MONOC... | 173                 | 2 (1.2)           | 2 (1.2)                      | 0 (0)                          | 0.011            | 0.0002  | 0.0253                     |
| GSE43863 NAIVE VS MEMORY TH1 CD4 TCELL D150 LCMV U... | 180                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0003  | 0.0253                     |
| GSE2706 R848 VS LPS 2H STIM DC DN                     | 184                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0003  | 0.0253                     |
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 UP    | 186                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0003  | 0.0253                     |
| GSE1740 UNSTIM VS IFNA STIMULATED MCSF DERIVED MAC... | 186                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0004  | 0.0253                     |
| GSE9988 LOW LPS VS CTRL TREATED MONOCYTE UP           | 187                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0003  | 0.0253                     |
| GSE9988 LPS VS CTRL TREATED MONOCYTE UP               | 189                 | 2 (1.1)           | 2 (1.1)                      | 0 (0)                          | 0.011            | 0.0002  | 0.0253                     |
| GSE24081 CONTROLLER VS PROGRESSOR HIV SPECIFIC CD8... | 192                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE3982 EOSINOPHIL VS NEUTROPHIL DN                   | 192                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE42724 NAIVE BCELL VS PLASMABLAST UP                | 192                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE9960 GRAM NEG VS GRAM POS SEPSIS PBMC UP           | 192                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE17974 IL4 AND ANTI IL12 VS UNTREATED 48H ACT CD... | 191                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0004  | 0.0253                     |
| GSE2706 UNSTIM VS 8H R848 DC DN                       | 194                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE2706 2H VS 8H R848 STIM DC DN                      | 196                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0004  | 0.0253                     |
| GSE14000 UNSTIM VS 4H LPS DC DN                       | 197                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 6H DN             | 197                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE22886 CD4 TCELL VS BCELL NAIVE UP                  | 197                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE22886 TCELL VS BCELL NAIVE UP                      | 198                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 6H DN           | 198                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0004  | 0.0253                     |
| GSE10325 MYELOID VS LUPUS MYELOID DN                  | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE13484 12H VS 3H YF17D VACCINE STIM PBMC DN         | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE1460 INTRATHYMIC T PROGENITOR VS CD4 THYMOCYTE ... | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE17721 LPS VS CPG 24H BMDC UP                       | 200                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE19888 ADENOSINE A3R INH VS TCELL MEMBRANES ACT ... | 200                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY7 ... | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0002  | 0.0253                     |
| GSE18281 CORTICAL VS MEDULLARY THYMOCYTE UP           | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE21360 PRIMARY VS TERTIARY MEMORY CD8 TCELL DN      | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE22140 GERMFREE VS SPF ARTHRITIC MOUSE CD4 TCELL... | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE22196 HEALTHY VS OBESE MOUSE SKIN GAMMADelta TC... | 199                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE22886 CTRL VS LPS 24H DC DN                        | 200                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |
| GSE339 CD4POS VS CD4CD8DN DC UP                       | 200                 | 2 (1)             | 2 (1)                        | 0 (0)                          | 0.010            | 0.0003  | 0.0253                     |

**Table 51:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME INTERFERON GAMMA SIGNALING          | 59                  | 3 (5.1)           | 3 (5.1)                      | 0 (0)                          | 0.051            | 0.0002  | 0.0505                     |
| REACTOME INTERFERON ALPHA BETA SIGNALING     | 62                  | 2 (3.2)           | 2 (3.2)                      | 0 (0)                          | 0.032            | 0.0003  | 0.0505                     |
| REACTOME INTERFERON SIGNALING                | 153                 | 3 (2)             | 3 (2)                        | 0 (0)                          | 0.020            | 0.0002  | 0.0505                     |
| REACTOME CYTOKINE SIGNALING IN IMMUNE SYSTEM | 265                 | 3 (1.1)           | 3 (1.1)                      | 0 (0)                          | 0.011            | 0.0003  | 0.0505                     |

**Table 52:** Enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                          | 15                  | 2 (13.3)          | 0 (0)                        | 2 (13.3)                       | 0.071            | <0.0001 | 0.0931                     |
| GO GAS TRANSPORT                             | 19                  | 2 (10.5)          | 0 (0)                        | 2 (10.5)                       | 0.062            | <0.0001 | 0.0931                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS       | 20                  | 2 (10)            | 0 (0)                        | 2 (10)                         | 0.061            | <0.0001 | 0.0931                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS       | 30                  | 2 (6.7)           | 0 (0)                        | 2 (6.7)                        | 0.046            | <0.0001 | 0.0931                     |
| GO REACTIVE OXYGEN SPECIES METABOLIC PROCESS | 96                  | 3 (3.1)           | 0 (0)                        | 3 (3.1)                        | 0.028            | <0.0001 | 0.0931                     |

**Table 53:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| Gene Set Name              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
| GO HEMOGLOBIN COMPLEX      | 12                  | 2 (16.7)          | 0 (0)                        | 2 (16.7)                       | 0.080            | <0.0001 | 0.0584                     |
| GO ENDOCYTIC VESICLE LUMEN | 17                  | 2 (11.8)          | 0 (0)                        | 2 (11.8)                       | 0.067            | 0.0002  | 0.0584                     |

**Table 54:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29949 MICROGLIA VS DC BRAIN UP                     | 199                 | 4 (2)             | 1 (0.5)                      | 3 (1.5)                        | 0.019            | <0.0001 | 0.0886                     |
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC 4MONTH POS... | 200                 | 4 (2)             | 0 (0)                        | 4 (2)                          | 0.019            | <0.0001 | 0.0886                     |
| GSE4590 SMALL VS LARGE PRE BCELL DN                   | 155                 | 3 (1.9)           | 1 (0.6)                      | 2 (1.3)                        | 0.018            | <0.0001 | 0.0886                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL OLD... | 194                 | 3 (1.5)           | 1 (0.5)                      | 2 (1)                          | 0.015            | 0.0002  | 0.0886                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL OLD... | 195                 | 3 (1.5)           | 1 (0.5)                      | 2 (1)                          | 0.015            | 0.0002  | 0.0886                     |
| GSE13306 TREG VS TCONV UP                             | 199                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |
| GSE17721 LPS VS CPG 1H BMDC DN                        | 199                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |
| GSE14769 UNSTIM VS 40MIN LPS BMDM DN                  | 201                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |
| GSE32986 CURDLAN HIGHDOSE VS GMCSF AND CURDLAN HIG... | 201                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |
| GSE9006 TYPE 1 DIABETES AT DX VS 4MONTH POST DX PB... | 201                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |
| GSE19401 NAIVE VS IMMUNIZED MOUSE PLN FOLLICULAR D... | 202                 | 3 (1.5)           | 0 (0)                        | 3 (1.5)                        | 0.014            | 0.0002  | 0.0886                     |

**Table 55:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 2 (14.3)          | 0 (0)                        | 2 (14.3)                       | 0.074            | <0.0001 | 0.0929                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 2 (4.9)           | 0 (0)                        | 2 (4.9)                        | 0.037            | 0.0002  | 0.0929                     |

**Table 56:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                    | 15                  | 2 (13.3)          | 0 (0)                        | 2 (13.3)                       | 0.111            | <0.0001 | 0.0665                     |
| GO GAS TRANSPORT                       | 19                  | 2 (10.5)          | 0 (0)                        | 2 (10.5)                       | 0.091            | <0.0001 | 0.0665                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS | 20                  | 2 (10)            | 0 (0)                        | 2 (10)                         | 0.087            | <0.0001 | 0.0665                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS | 30                  | 2 (6.7)           | 0 (0)                        | 2 (6.7)                        | 0.061            | <0.0001 | 0.0665                     |
| GO BICARBONATE TRANSPORT               | 44                  | 2 (4.5)           | 0 (0)                        | 2 (4.5)                        | 0.043            | <0.0001 | 0.0665                     |
| GO RESPONSE TO TOXIC SUBSTANCE         | 241                 | 3 (1.2)           | 1 (0.4)                      | 2 (0.8)                        | 0.012            | <0.0001 | 0.0665                     |

| Gene Set Name                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RESPONSE TO INORGANIC SUBSTANCE     | 484                 | 3 (0.6)           | 1 (0.2)                      | 2 (0.4)                        | 0.006            | <0.0001 | 0.0665                     |
| GO PROTEIN HETEROOLIGOMERIZATION       | 113                 | 2 (1.8)           | 0 (0)                        | 2 (1.8)                        | 0.017            | 0.0002  | 0.0931                     |
| GO RESPONSE TO REACTIVE OXYGEN SPECIES | 191                 | 3 (1.6)           | 1 (0.5)                      | 2 (1)                          | 0.015            | 0.0002  | 0.0931                     |
| GO RESPONSE TO OXIDATIVE STRESS        | 352                 | 3 (0.9)           | 1 (0.3)                      | 2 (0.6)                        | 0.009            | 0.0002  | 0.0931                     |

**Table 57:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 4). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HEMOGLOBIN COMPLEX      | 12                  | 2 (16.7)          | 0 (0)                        | 2 (16.7)                       | 0.133            | <0.0001 | 0.0584                     |
| GO ENDOCYTIC VESICLE LUMEN | 17                  | 2 (11.8)          | 0 (0)                        | 2 (11.8)                       | 0.100            | 0.0002  | 0.0584                     |

**Table 58:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 4). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 2 (14.3)          | 0 (0)                        | 2 (14.3)                       | 0.118            | <0.0001 | 0.0464                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 2 (4.9)           | 0 (0)                        | 2 (4.9)                        | 0.045            | <0.0001 | 0.0464                     |
| GO OXYGEN BINDING                                     | 47                  | 2 (4.3)           | 0 (0)                        | 2 (4.3)                        | 0.040            | 0.0002  | 0.0619                     |
| GO ANTIOXIDANT ACTIVITY                               | 69                  | 2 (2.9)           | 0 (0)                        | 2 (2.9)                        | 0.028            | 0.0003  | 0.0697                     |

**Table 59:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 4). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| cell cycle (I) (M4.1)                                 | 139                 | 57 (41)           | 57 (41)                      | 0 (0)                          | 0.277            | <0.0001 | 0.0019                     |
| cell cycle and transcription (M4.0)                   | 318                 | 70 (22)           | 70 (22)                      | 0 (0)                          | 0.188            | <0.0001 | 0.0019                     |
| PLK1 signaling events (M4.2)                          | 32                  | 19 (59.4)         | 19 (59.4)                    | 0 (0)                          | 0.139            | <0.0001 | 0.0019                     |
| cell cycle (III) (M103)                               | 51                  | 17 (33.3)         | 17 (33.3)                    | 0 (0)                          | 0.108            | <0.0001 | 0.0019                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.5... | 33                  | 14 (42.4)         | 14 (42.4)                    | 0 (0)                          | 0.098            | <0.0001 | 0.0019                     |
| mitotic cell division (M6)                            | 27                  | 12 (44.4)         | 12 (44.4)                    | 0 (0)                          | 0.086            | <0.0001 | 0.0019                     |
| cell division (stimulated CD4+ T cells) (M46)         | 27                  | 10 (37)           | 10 (37)                      | 0 (0)                          | 0.071            | <0.0001 | 0.0019                     |
| Ran mediated mitosis (M15)                            | 13                  | 9 (69.2)          | 9 (69.2)                     | 0 (0)                          | 0.070            | <0.0001 | 0.0019                     |
| mitotic cell cycle (M4.7)                             | 20                  | 9 (45)            | 9 (45)                       | 0 (0)                          | 0.067            | <0.0001 | 0.0019                     |
| cell division in stimulated CD4 T cells (M4.6)        | 19                  | 8 (42.1)          | 8 (42.1)                     | 0 (0)                          | 0.059            | <0.0001 | 0.0019                     |
| mitotic cell cycle - DNA replication (M4.4)           | 28                  | 8 (28.6)          | 8 (28.6)                     | 0 (0)                          | 0.056            | <0.0001 | 0.0019                     |
| C-MYC transcriptional network (M4.12)                 | 12                  | 7 (58.3)          | 7 (58.3)                     | 0 (0)                          | 0.054            | <0.0001 | 0.0019                     |
| cell cycle (II) (M4.10)                               | 14                  | 7 (50)            | 7 (50)                       | 0 (0)                          | 0.053            | <0.0001 | 0.0019                     |
| E2F transcription factor network (M8)                 | 14                  | 7 (50)            | 7 (50)                       | 0 (0)                          | 0.053            | <0.0001 | 0.0019                     |
| transcription regulation in cell development (M49)    | 45                  | 8 (17.8)          | 8 (17.8)                     | 0 (0)                          | 0.050            | <0.0001 | 0.0019                     |



| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| cell division - E2F transcription network (M4.8)      | 19                  | 6 (31.6)          | 6 (31.6)                     | 0 (0)                          | 0.044            | <0.0001 | 0.0019                     |
| E2F1 targets (Q3) (M10.0)                             | 31                  | 6 (19.4)          | 6 (19.4)                     | 0 (0)                          | 0.040            | <0.0001 | 0.0019                     |
| E2F1 targets (Q4) (M10.1)                             | 20                  | 5 (25)            | 5 (25)                       | 0 (0)                          | 0.036            | <0.0001 | 0.0019                     |
| mismatch repair (I) (M22.0)                           | 27                  | 6 (22.2)          | 6 (22.2)                     | 0 (0)                          | 0.041            | 0.0002  | 0.0035                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.1... | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.030            | 0.0002  | 0.0035                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.9... | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.030            | 0.0009  | 0.0148                     |
| Rho GTPase cycle (M4.14)                              | 9                   | 3 (33.3)          | 3 (33.3)                     | 0 (0)                          | 0.023            | 0.0021  | 0.033                      |

**Table 60:** Enriched Blood Transcription Modules (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO SISTER CHROMATID SEGREGATION                       | 177                 | 26 (14.7)         | 26 (14.7)                    | 0 (0)                          | 0.095            | <0.0001 | 0.004                      |
| GO MITOTIC SISTER CHROMATID SEGREGATION               | 92                  | 18 (19.6)         | 18 (19.6)                    | 0 (0)                          | 0.091            | <0.0001 | 0.004                      |
| GO CHROMOSOME SEGREGATION                             | 272                 | 32 (11.8)         | 32 (11.8)                    | 0 (0)                          | 0.088            | <0.0001 | 0.004                      |
| GO NUCLEAR CHROMOSOME SEGREGATION                     | 228                 | 28 (12.3)         | 28 (12.3)                    | 0 (0)                          | 0.086            | <0.0001 | 0.004                      |
| GO MITOTIC NUCLEAR DIVISION                           | 362                 | 36 (9.9)          | 36 (9.9)                     | 0 (0)                          | 0.080            | <0.0001 | 0.004                      |
| GO REGULATION OF CHROMOSOME SEGREGATION               | 84                  | 14 (16.7)         | 14 (16.7)                    | 0 (0)                          | 0.072            | <0.0001 | 0.004                      |
| GO CELL CYCLE PHASE TRANSITION                        | 254                 | 25 (9.8)          | 25 (9.8)                     | 0 (0)                          | 0.071            | <0.0001 | 0.004                      |
| GO CELL DIVISION                                      | 461                 | 38 (8.2)          | 38 (8.2)                     | 0 (0)                          | 0.070            | <0.0001 | 0.004                      |
| GO REGULATION OF NUCLEAR DIVISION                     | 162                 | 18 (11.1)         | 18 (11.1)                    | 0 (0)                          | 0.067            | <0.0001 | 0.004                      |
| GO ORGANELLE FISSION                                  | 496                 | 39 (7.9)          | 39 (7.9)                     | 0 (0)                          | 0.067            | <0.0001 | 0.004                      |
| GO MITOTIC CELL CYCLE                                 | 767                 | 55 (7.2)          | 55 (7.2)                     | 0 (0)                          | 0.066            | <0.0001 | 0.004                      |
| GO REGULATION OF TRANSCRIPTION INVOLVED IN G1 S TR... | 26                  | 9 (34.6)          | 9 (34.6)                     | 0 (0)                          | 0.064            | <0.0001 | 0.004                      |
| GO CELL CYCLE G1 S PHASE TRANSITION                   | 110                 | 14 (12.7)         | 14 (12.7)                    | 0 (0)                          | 0.064            | <0.0001 | 0.004                      |
| GO G1 S TRANSITION OF MITOTIC CELL CYCLE              | 110                 | 14 (12.7)         | 14 (12.7)                    | 0 (0)                          | 0.064            | <0.0001 | 0.004                      |
| GO SISTER CHROMATID COHESION                          | 111                 | 14 (12.6)         | 14 (12.6)                    | 0 (0)                          | 0.063            | <0.0001 | 0.004                      |
| GO CELL CYCLE CHECKPOINT                              | 196                 | 19 (9.7)          | 19 (9.7)                     | 0 (0)                          | 0.063            | <0.0001 | 0.004                      |
| GO REGULATION OF SISTER CHROMATID SEGREGATION         | 66                  | 11 (16.7)         | 11 (16.7)                    | 0 (0)                          | 0.061            | <0.0001 | 0.004                      |
| GO MITOTIC SPINDLE ORGANIZATION                       | 69                  | 11 (15.9)         | 11 (15.9)                    | 0 (0)                          | 0.060            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL DIVISION                        | 271                 | 21 (7.7)          | 21 (7.7)                     | 0 (0)                          | 0.056            | <0.0001 | 0.004                      |
| GO CHROMOSOME CONDENSATION                            | 31                  | 8 (25.8)          | 8 (25.8)                     | 0 (0)                          | 0.054            | <0.0001 | 0.004                      |
| GO CELL CYCLE PROCESS                                 | 1082                | 62 (5.7)          | 61 (5.6)                     | 1 (0.1)                        | 0.054            | <0.0001 | 0.004                      |
| GO DNA CONFORMATION CHANGE                            | 270                 | 20 (7.4)          | 20 (7.4)                     | 0 (0)                          | 0.053            | <0.0001 | 0.004                      |
| GO ANAPHASE PROMOTING COMPLEX DEPENDENT CATABOLIC ... | 77                  | 10 (13)           | 10 (13)                      | 0 (0)                          | 0.052            | <0.0001 | 0.004                      |
| GO REGULATION OF MICROTUBULE POLYMERIZATION OR DEP... | 179                 | 15 (8.4)          | 15 (8.4)                     | 0 (0)                          | 0.052            | <0.0001 | 0.004                      |
| GO POSITIVE REGULATION OF MITOTIC CELL CYCLE          | 123                 | 12 (9.8)          | 12 (9.8)                     | 0 (0)                          | 0.051            | <0.0001 | 0.004                      |
| GO DNA REPLICATION                                    | 209                 | 16 (7.7)          | 16 (7.7)                     | 0 (0)                          | 0.051            | <0.0001 | 0.004                      |
| GO DNA INTEGRITY CHECKPOINT                           | 148                 | 13 (8.8)          | 13 (8.8)                     | 0 (0)                          | 0.050            | <0.0001 | 0.004                      |
| GO POSITIVE REGULATION OF CELL CYCLE PROCESS          | 247                 | 17 (6.9)          | 17 (6.9)                     | 0 (0)                          | 0.048            | <0.0001 | 0.004                      |
| GO MITOTIC CELL CYCLE CHECKPOINT                      | 140                 | 12 (8.6)          | 12 (8.6)                     | 0 (0)                          | 0.048            | <0.0001 | 0.004                      |
| GO CELL CYCLE                                         | 1316                | 65 (4.9)          | 64 (4.9)                     | 1 (0.1)                        | 0.047            | <0.0001 | 0.004                      |
| GO DNA PACKAGING                                      | 191                 | 14 (7.3)          | 14 (7.3)                     | 0 (0)                          | 0.046            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL CYCLE PROCESS                   | 558                 | 30 (5.4)          | 30 (5.4)                     | 0 (0)                          | 0.046            | <0.0001 | 0.004                      |
| GO REGULATION OF MITOTIC CELL CYCLE                   | 468                 | 26 (5.6)          | 26 (5.6)                     | 0 (0)                          | 0.046            | <0.0001 | 0.004                      |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO NEGATIVE REGULATION OF PROTEIN COMPLEX DISASSEM... | 173                 | 13 (7.5)          | 13 (7.5)                     | 0 (0)                          | 0.046            | <0.0001 | 0.004                      |
| GO CYTOKINESIS                                        | 84                  | 9 (10.7)          | 9 (10.7)                     | 0 (0)                          | 0.045            | <0.0001 | 0.004                      |
| GO CYTOSKELETON DEPENDENT CYTOKINESIS                 | 39                  | 7 (17.9)          | 7 (17.9)                     | 0 (0)                          | 0.045            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL CYCLE PHASE TRANSITION          | 322                 | 19 (5.9)          | 19 (5.9)                     | 0 (0)                          | 0.044            | <0.0001 | 0.004                      |
| GO MICROTUBULE CYTOSKELETON ORGANIZATION INVOLVED ... | 41                  | 7 (17.1)          | 7 (17.1)                     | 0 (0)                          | 0.044            | <0.0001 | 0.004                      |
| GO MITOTIC SPINDLE ASSEMBLY                           | 41                  | 7 (17.1)          | 7 (17.1)                     | 0 (0)                          | 0.044            | <0.0001 | 0.004                      |
| GO MICROTUBULE CYTOSKELETON ORGANIZATION              | 349                 | 20 (5.7)          | 20 (5.7)                     | 0 (0)                          | 0.044            | <0.0001 | 0.004                      |
| GO CELL CYCLE G2 M PHASE TRANSITION                   | 138                 | 11 (8)            | 11 (8)                       | 0 (0)                          | 0.044            | <0.0001 | 0.004                      |
| GO SPINDLE ASSEMBLY                                   | 70                  | 8 (11.4)          | 8 (11.4)                     | 0 (0)                          | 0.043            | <0.0001 | 0.004                      |
| GO REGULATION OF MICROTUBULE BASED PROCESS            | 244                 | 15 (6.1)          | 15 (6.1)                     | 0 (0)                          | 0.043            | <0.0001 | 0.004                      |
| GO REGULATION OF PROTEIN COMPLEX DISASSEMBLY          | 221                 | 14 (6.3)          | 14 (6.3)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO REGULATION OF PROTEASOMAL UBIQUITIN DEPENDENT P... | 148                 | 11 (7.4)          | 11 (7.4)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO DNA DEPENDENT DNA REPLICATION                      | 99                  | 9 (9.1)           | 9 (9.1)                      | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO SPINDLE CHECKPOINT                                 | 25                  | 6 (24)            | 6 (24)                       | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO NEGATIVE REGULATION OF CYTOSKELETON ORGANIZATIO... | 224                 | 14 (6.2)          | 14 (6.2)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO NEGATIVE REGULATION OF MITOTIC CELL CYCLE          | 199                 | 13 (6.5)          | 13 (6.5)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO POSITIVE REGULATION OF MITOTIC NUCLEAR DIVISION    | 51                  | 7 (13.7)          | 7 (13.7)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |

**Table 61:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO CONDENSED CHROMOSOME CENTROMERIC REGION         | 102                 | 17 (16.7)         | 17 (16.7)                    | 0 (0)                          | 0.081            | <0.0001 | 0.0024                     |
| GO CONDENSED CHROMOSOME                            | 196                 | 24 (12.2)         | 24 (12.2)                    | 0 (0)                          | 0.081            | <0.0001 | 0.0024                     |
| GO KINETOCHORE                                     | 120                 | 16 (13.3)         | 16 (13.3)                    | 0 (0)                          | 0.070            | <0.0001 | 0.0024                     |
| GO CHROMOSOME CENTROMERIC REGION                   | 174                 | 19 (10.9)         | 19 (10.9)                    | 0 (0)                          | 0.068            | <0.0001 | 0.0024                     |
| GO CONDENSED NUCLEAR CHROMOSOME CENTROMERIC REGION | 18                  | 8 (44.4)          | 8 (44.4)                     | 0 (0)                          | 0.060            | <0.0001 | 0.0024                     |
| GO CHROMOSOMAL REGION                              | 330                 | 25 (7.6)          | 25 (7.6)                     | 0 (0)                          | 0.058            | <0.0001 | 0.0024                     |
| GO SPINDLE POLE                                    | 126                 | 13 (10.3)         | 13 (10.3)                    | 0 (0)                          | 0.055            | <0.0001 | 0.0024                     |
| GO SPINDLE                                         | 289                 | 21 (7.3)          | 21 (7.3)                     | 0 (0)                          | 0.054            | <0.0001 | 0.0024                     |
| GO SPINDLE MICROTUBULE                             | 58                  | 9 (15.5)          | 9 (15.5)                     | 0 (0)                          | 0.052            | <0.0001 | 0.0024                     |
| GO CONDENSED NUCLEAR CHROMOSOME                    | 86                  | 10 (11.6)         | 10 (11.6)                    | 0 (0)                          | 0.050            | <0.0001 | 0.0024                     |
| GO CONDENSED CHROMOSOME OUTER KINETOCHORE          | 12                  | 6 (50)            | 6 (50)                       | 0 (0)                          | 0.046            | <0.0001 | 0.0024                     |
| GO MIDBODY                                         | 132                 | 11 (8.3)          | 11 (8.3)                     | 0 (0)                          | 0.045            | <0.0001 | 0.0024                     |
| GO SPINDLE MIDZONE                                 | 27                  | 6 (22.2)          | 6 (22.2)                     | 0 (0)                          | 0.041            | <0.0001 | 0.0024                     |
| GO MITOTIC SPINDLE                                 | 55                  | 7 (12.7)          | 7 (12.7)                     | 0 (0)                          | 0.041            | <0.0001 | 0.0024                     |
| GO CHROMOSOME                                      | 880                 | 39 (4.4)          | 39 (4.4)                     | 0 (0)                          | 0.040            | <0.0001 | 0.0024                     |
| GO NUCLEAR CHROMOSOME                              | 524                 | 24 (4.6)          | 24 (4.6)                     | 0 (0)                          | 0.038            | <0.0001 | 0.0024                     |
| GO MICROTUBULE                                     | 406                 | 17 (4.2)          | 17 (4.2)                     | 0 (0)                          | 0.033            | <0.0001 | 0.0024                     |
| GO CENTROSOME                                      | 487                 | 19 (3.9)          | 19 (3.9)                     | 0 (0)                          | 0.032            | <0.0001 | 0.0024                     |
| GO MICROTUBULE ORGANIZING CENTER                   | 623                 | 21 (3.4)          | 21 (3.4)                     | 0 (0)                          | 0.029            | <0.0001 | 0.0024                     |
| GO MICROTUBULE CYTOSKELETON                        | 1068                | 32 (3)            | 32 (3)                       | 0 (0)                          | 0.028            | <0.0001 | 0.0024                     |
| GO REPLICATION FORK                                | 62                  | 5 (8.1)           | 5 (8.1)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0024                     |
| GO SUPRAMOLECULAR FIBER                            | 671                 | 18 (2.7)          | 18 (2.7)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0024                     |

| Gene Set Name                              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO CYTOSKELETAL PART                       | 1437                | 34 (2.4)          | 34 (2.4)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0024                     |
| GO CYTOSKELETON                            | 1967                | 35 (1.8)          | 35 (1.8)                     | 0 (0)                          | 0.017            | <0.0001 | 0.0024                     |
| GO NUCLEAR REPLICATION FORK                | 39                  | 4 (10.3)          | 4 (10.3)                     | 0 (0)                          | 0.025            | 0.0002  | 0.0047                     |
| GO MICROTUBULE ASSOCIATED COMPLEX          | 145                 | 7 (4.8)           | 7 (4.8)                      | 0 (0)                          | 0.027            | 0.0003  | 0.0063                     |
| GO DNA PACKAGING COMPLEX                   | 105                 | 5 (4.8)           | 5 (4.8)                      | 0 (0)                          | 0.022            | 0.0003  | 0.0063                     |
| GO GERM CELL NUCLEUS                       | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.021            | 0.0003  | 0.0063                     |
| GO PROTEIN DNA COMPLEX                     | 172                 | 6 (3.5)           | 6 (3.5)                      | 0 (0)                          | 0.021            | 0.0004  | 0.0081                     |
| GO ANAPHASE PROMOTING COMPLEX              | 22                  | 3 (13.6)          | 3 (13.6)                     | 0 (0)                          | 0.021            | 0.0005  | 0.0097                     |
| GO KINESIN COMPLEX                         | 54                  | 4 (7.4)           | 4 (7.4)                      | 0 (0)                          | 0.023            | 0.0007  | 0.0132                     |
| GO CYTOPLASMIC MICROTUBULE                 | 57                  | 4 (7)             | 4 (7)                        | 0 (0)                          | 0.023            | 0.001   | 0.0182                     |
| GO CHROMOSOME TELOMERIC REGION             | 162                 | 6 (3.7)           | 6 (3.7)                      | 0 (0)                          | 0.021            | 0.0011  | 0.0195                     |
| GO ENDOPLASMIC RETICULUM CHAPERONE COMPLEX | 11                  | 2 (18.2)          | 2 (18.2)                     | 0 (0)                          | 0.015            | 0.0021  | 0.0361                     |
| GO MCM COMPLEX                             | 11                  | 2 (18.2)          | 2 (18.2)                     | 0 (0)                          | 0.015            | 0.0024  | 0.04                       |
| GO NUCLEAR CHROMOSOME TELOMERIC REGION     | 132                 | 5 (3.8)           | 5 (3.8)                      | 0 (0)                          | 0.020            | 0.0026  | 0.0422                     |
| GO NUCLEAR UBIQUITIN LIGASE COMPLEX        | 42                  | 3 (7.1)           | 3 (7.1)                      | 0 (0)                          | 0.018            | 0.0032  | 0.0492                     |
| GO INTERCELLULAR BRIDGE                    | 44                  | 3 (6.8)           | 3 (6.8)                      | 0 (0)                          | 0.018            | 0.0032  | 0.0492                     |
| GO MALE GERM CELL NUCLEUS                  | 15                  | 2 (13.3)          | 2 (13.3)                     | 0 (0)                          | 0.015            | 0.0041  | 0.0614                     |
| GO MICROTUBULE ORGANIZING CENTER PART      | 144                 | 5 (3.5)           | 5 (3.5)                      | 0 (0)                          | 0.019            | 0.0051  | 0.0745                     |
| GO CENTRIOLE                               | 101                 | 4 (4)             | 4 (4)                        | 0 (0)                          | 0.018            | 0.007   | 0.0997                     |

**Table 62:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE15750 DAY6 VS DAY10 TRAF6KO EFF CD8 TCELL UP       | 201                 | 48 (23.9)         | 48 (23.9)                    | 0 (0)                          | 0.173            | <0.0001 | 0.0015                     |
| GSE15750 DAY6 VS DAY10 EFF CD8 TCELL UP               | 201                 | 45 (22.4)         | 45 (22.4)                    | 0 (0)                          | 0.161            | <0.0001 | 0.0015                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL OLD... | 201                 | 41 (20.4)         | 41 (20.4)                    | 0 (0)                          | 0.144            | <0.0001 | 0.0015                     |
| GSE39556 CD8A DC VS NK CELL MOUSE 3H POST POLYIC I... | 201                 | 41 (20.4)         | 41 (20.4)                    | 0 (0)                          | 0.144            | <0.0001 | 0.0015                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL YOU... | 201                 | 40 (19.9)         | 40 (19.9)                    | 0 (0)                          | 0.140            | <0.0001 | 0.0015                     |
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 37 (20.2)         | 37 (20.2)                    | 0 (0)                          | 0.137            | <0.0001 | 0.0015                     |
| GSE24634 TEFF VS TCONV DAY7 IN CULTURE UP             | 198                 | 38 (19.2)         | 38 (19.2)                    | 0 (0)                          | 0.134            | <0.0001 | 0.0015                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL OLD... | 200                 | 38 (19)           | 38 (19)                      | 0 (0)                          | 0.133            | <0.0001 | 0.0015                     |
| GSE21063 WT VS NFATC1 KO 8H ANTI IGM STIM BCELL UP    | 199                 | 37 (18.6)         | 37 (18.6)                    | 0 (0)                          | 0.129            | <0.0001 | 0.0015                     |
| GSE30962 PRIMARY VS SECONDARY ACUTE LCMV INF CD8 T... | 199                 | 37 (18.6)         | 37 (18.6)                    | 0 (0)                          | 0.129            | <0.0001 | 0.0015                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 12H UP           | 182                 | 35 (19.2)         | 35 (19.2)                    | 0 (0)                          | 0.129            | <0.0001 | 0.0015                     |
| GOLDRATH EFF VS MEMORY CD8 TCELL UP                   | 200                 | 37 (18.5)         | 37 (18.5)                    | 0 (0)                          | 0.129            | <0.0001 | 0.0015                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE IL4 STIM DN        | 197                 | 36 (18.3)         | 36 (18.3)                    | 0 (0)                          | 0.126            | <0.0001 | 0.0015                     |
| GSE2405 S AUREUS VS UNTREATED NEUTROPHIL DN           | 198                 | 36 (18.2)         | 36 (18.2)                    | 0 (0)                          | 0.126            | <0.0001 | 0.0015                     |
| GSE45365 HEALTHY VS MCMV INFECTION CD11B DC DN        | 190                 | 35 (18.4)         | 35 (18.4)                    | 0 (0)                          | 0.125            | <0.0001 | 0.0015                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL YOU... | 200                 | 36 (18)           | 36 (18)                      | 0 (0)                          | 0.125            | <0.0001 | 0.0015                     |
| GSE24634 TREG VS TCONV POST DAY7 IL4 CONVERSION UP    | 196                 | 35 (17.9)         | 35 (17.9)                    | 0 (0)                          | 0.123            | <0.0001 | 0.0015                     |
| GSE14415 NATURAL TREG VS TCONV DN                     | 181                 | 31 (17.1)         | 31 (17.1)                    | 0 (0)                          | 0.113            | <0.0001 | 0.0015                     |
| GSE14415 INDUCED VS NATURAL TREG DN                   | 178                 | 30 (16.9)         | 30 (16.9)                    | 0 (0)                          | 0.110            | <0.0001 | 0.0015                     |
| GSE33292 WT VS TCF1 KO DN3 THYMOCYTE DN               | 200                 | 32 (16)           | 32 (16)                      | 0 (0)                          | 0.110            | <0.0001 | 0.0015                     |
| GSE40274 CTRL VS EOS TRANSDUCED ACTIVATED CD4 TCEL... | 172                 | 29 (16.9)         | 29 (16.9)                    | 0 (0)                          | 0.109            | <0.0001 | 0.0015                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE25088 WT VS STAT6 KO MACROPHAGE DN                 | 196                 | 31 (15.8)         | 31 (15.8)                    | 0 (0)                          | 0.107            | <0.0001 | 0.0015                     |
| GSE39110 DAY3 VS DAY6 POST IMMUNIZATION CD8 TCELL ... | 201                 | 31 (15.4)         | 31 (15.4)                    | 0 (0)                          | 0.105            | <0.0001 | 0.0015                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY7 ... | 195                 | 30 (15.4)         | 30 (15.4)                    | 0 (0)                          | 0.104            | <0.0001 | 0.0015                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 29 (15.3)         | 29 (15.3)                    | 0 (0)                          | 0.102            | <0.0001 | 0.0015                     |
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 28 (15.6)         | 28 (15.6)                    | 0 (0)                          | 0.102            | <0.0001 | 0.0015                     |
| GSE12845 IGD POS BLOOD VS PRE GC TONSIL BCELL DN      | 202                 | 30 (14.9)         | 29 (14.4)                    | 1 (0.5)                        | 0.101            | <0.0001 | 0.0015                     |
| GSE13547 2H VS 12 H ANTI IGM STIM BCELL UP            | 173                 | 26 (15)           | 26 (15)                      | 0 (0)                          | 0.096            | <0.0001 | 0.0015                     |
| GOLDRATH NAIVE VS EFF CD8 TCELL DN                    | 198                 | 28 (14.1)         | 28 (14.1)                    | 0 (0)                          | 0.095            | <0.0001 | 0.0015                     |
| GSE45365 WT VS IFNAR KO BCELL MCMV INFECTION DN       | 188                 | 27 (14.4)         | 27 (14.4)                    | 0 (0)                          | 0.095            | <0.0001 | 0.0015                     |
| GSE23568 ID3 KO VS WT CD8 TCELL UP                    | 200                 | 28 (14)           | 28 (14)                      | 0 (0)                          | 0.095            | <0.0001 | 0.0015                     |
| GSE45365 WT VS IFNAR KO BCELL DN                      | 181                 | 25 (13.8)         | 25 (13.8)                    | 0 (0)                          | 0.089            | <0.0001 | 0.0015                     |
| GSE14415 TCONV VS FOXP3 KO INDUCED TREG DN            | 183                 | 25 (13.7)         | 25 (13.7)                    | 0 (0)                          | 0.089            | <0.0001 | 0.0015                     |
| GSE37532 WT VS PPARG KO VISCERAL ADIPOSE TISSUE TR... | 196                 | 26 (13.3)         | 26 (13.3)                    | 0 (0)                          | 0.088            | <0.0001 | 0.0015                     |
| GSE23568 CTRL VS ID3 TRANSDUCECD CD8 TCELL DN         | 199                 | 26 (13.1)         | 26 (13.1)                    | 0 (0)                          | 0.087            | <0.0001 | 0.0015                     |
| GSE2405 HEAT KILLED LYSATE VS LIVE A PHAGOCYTOPHIL... | 199                 | 26 (13.1)         | 26 (13.1)                    | 0 (0)                          | 0.087            | <0.0001 | 0.0015                     |
| GSE27241 WT VS RORGT KO TH17 POLARIZED CD4 TCELL U... | 164                 | 23 (14)           | 23 (14)                      | 0 (0)                          | 0.087            | <0.0001 | 0.0015                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 2H UP            | 180                 | 24 (13.3)         | 24 (13.3)                    | 0 (0)                          | 0.086            | <0.0001 | 0.0015                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 23 (13.4)         | 23 (13.4)                    | 0 (0)                          | 0.084            | <0.0001 | 0.0015                     |
| GSE24634 TEFF VS TCONV DAY10 IN CULTURE UP            | 200                 | 25 (12.5)         | 25 (12.5)                    | 0 (0)                          | 0.084            | <0.0001 | 0.0015                     |
| GSE28726 NAIVE CD4 TCELL VS NAIVE VA24NEG NKTCELL ... | 201                 | 25 (12.4)         | 25 (12.4)                    | 0 (0)                          | 0.083            | <0.0001 | 0.0015                     |
| KAECH DAY8 EFF VS MEMORY CD8 TCELL UP                 | 202                 | 25 (12.4)         | 25 (12.4)                    | 0 (0)                          | 0.083            | <0.0001 | 0.0015                     |
| GSE21063 CTRL VS ANTI IGM STIM BCELL NFATC1 KO 8H ... | 196                 | 24 (12.2)         | 24 (12.2)                    | 0 (0)                          | 0.081            | <0.0001 | 0.0015                     |
| GSE28726 NAIVE VS ACTIVATED CD4 TCELL DN              | 199                 | 24 (12.1)         | 24 (12.1)                    | 0 (0)                          | 0.080            | <0.0001 | 0.0015                     |
| GSE22313 HEALTHY VS SLE MOUSE CD4 TCELL DN            | 200                 | 24 (12)           | 23 (11.5)                    | 1 (0.5)                        | 0.080            | <0.0001 | 0.0015                     |
| GSE23502 WT VS HDC KO MYELOID DERIVED SUPPRESSOR C... | 200                 | 24 (12)           | 24 (12)                      | 0 (0)                          | 0.080            | <0.0001 | 0.0015                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 23 (12.2)         | 23 (12.2)                    | 0 (0)                          | 0.080            | <0.0001 | 0.0015                     |
| GSE13547 CTRL VS ANTI IGM STIM ZFX KO BCELL 2H UP     | 162                 | 21 (13)           | 21 (13)                      | 0 (0)                          | 0.079            | <0.0001 | 0.0015                     |
| GSE17301 ACD3 ACD28 VS ACD3 ACD28 AND IFNA5 STIM C... | 194                 | 23 (11.9)         | 23 (11.9)                    | 0 (0)                          | 0.078            | <0.0001 | 0.0015                     |
| GSE19941 LPS VS LPS AND IL10 STIM IL10 KO MACROPHA... | 182                 | 22 (12.1)         | 22 (12.1)                    | 0 (0)                          | 0.077            | <0.0001 | 0.0015                     |

**Table 63:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG CELL CYCLE                              | 124                 | 18 (14.5)         | 18 (14.5)                    | 0 (0)                          | 0.078            | <0.0001 | 0.0093                     |
| KEGG OOCYTE MEIOSIS                          | 112                 | 9 (8)             | 9 (8)                        | 0 (0)                          | 0.040            | <0.0001 | 0.0093                     |
| KEGG PROGESTERONE MEDIATED OOCYTE MATURATION | 87                  | 6 (6.9)           | 6 (6.9)                      | 0 (0)                          | 0.029            | 0.0002  | 0.0124                     |
| KEGG P53 SIGNALING PATHWAY                   | 68                  | 5 (7.4)           | 4 (5.9)                      | 1 (1.5)                        | 0.027            | 0.0006  | 0.0223                     |
| KEGG DNA REPLICATION                         | 36                  | 4 (11.1)          | 4 (11.1)                     | 0 (0)                          | 0.026            | 0.0005  | 0.0223                     |

**Table 64:** Enriched MSigDB KEGG Pathways (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                           | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO KINASE BINDING                       | 608                 | 14 (2.3)          | 14 (2.3)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0232                     |
| GO ENZYME BINDING                       | 1744                | 29 (1.7)          | 29 (1.7)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0232                     |
| GO ADENYL NUCLEOTIDE BINDING            | 1502                | 24 (1.6)          | 24 (1.6)                     | 0 (0)                          | 0.015            | <0.0001 | 0.0232                     |
| GO RIBONUCLEOTIDE BINDING               | 1845                | 28 (1.5)          | 28 (1.5)                     | 0 (0)                          | 0.014            | <0.0001 | 0.0232                     |
| GO HISTONE KINASE ACTIVITY              | 19                  | 4 (21.1)          | 4 (21.1)                     | 0 (0)                          | 0.029            | 0.0002  | 0.0372                     |
| GO DNA BINDING BENDING                  | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.021            | 0.0004  | 0.0619                     |
| GO DNA HELICASE ACTIVITY                | 53                  | 4 (7.5)           | 4 (7.5)                      | 0 (0)                          | 0.023            | 0.0005  | 0.0664                     |
| GO MICROTUBULE BINDING                  | 201                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.022            | 0.0006  | 0.0697                     |
| GO RNA DNA HYBRID RIBONUCLEASE ACTIVITY | 7                   | 2 (28.6)          | 2 (28.6)                     | 0 (0)                          | 0.015            | 0.0007  | 0.0722                     |

**Table 65:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME CELL CYCLE MITOTIC                           | 308                 | 32 (10.4)         | 32 (10.4)                    | 0 (0)                          | 0.080            | <0.0001 | 0.0024                     |
| REACTOME DNA REPLICATION                              | 188                 | 22 (11.7)         | 22 (11.7)                    | 0 (0)                          | 0.076            | <0.0001 | 0.0024                     |
| REACTOME CELL CYCLE                                   | 400                 | 36 (9)            | 36 (9)                       | 0 (0)                          | 0.074            | <0.0001 | 0.0024                     |
| REACTOME MITOTIC M M G1 PHASES                        | 168                 | 20 (11.9)         | 20 (11.9)                    | 0 (0)                          | 0.073            | <0.0001 | 0.0024                     |
| REACTOME G1 S SPECIFIC TRANSCRIPTION                  | 17                  | 9 (52.9)          | 9 (52.9)                     | 0 (0)                          | 0.068            | <0.0001 | 0.0024                     |
| REACTOME E2F MEDIATED REGULATION OF DNA REPLICATIO... | 33                  | 10 (30.3)         | 10 (30.3)                    | 0 (0)                          | 0.068            | <0.0001 | 0.0024                     |
| REACTOME MITOTIC G1 G1 S PHASES                       | 130                 | 15 (11.5)         | 15 (11.5)                    | 0 (0)                          | 0.063            | <0.0001 | 0.0024                     |
| REACTOME MITOTIC PROMETAPHASE                         | 86                  | 12 (14)           | 12 (14)                      | 0 (0)                          | 0.061            | <0.0001 | 0.0024                     |
| REACTOME G1 S TRANSITION                              | 106                 | 12 (11.3)         | 12 (11.3)                    | 0 (0)                          | 0.055            | <0.0001 | 0.0024                     |
| REACTOME G2 M CHECKPOINTS                             | 42                  | 8 (19)            | 8 (19)                       | 0 (0)                          | 0.051            | <0.0001 | 0.0024                     |
| REACTOME CELL CYCLE CHECKPOINTS                       | 112                 | 11 (9.8)          | 11 (9.8)                     | 0 (0)                          | 0.049            | <0.0001 | 0.0024                     |
| REACTOME REGULATION OF MITOTIC CELL CYCLE             | 77                  | 9 (11.7)          | 9 (11.7)                     | 0 (0)                          | 0.047            | <0.0001 | 0.0024                     |
| REACTOME S PHASE                                      | 106                 | 9 (8.5)           | 9 (8.5)                      | 0 (0)                          | 0.041            | <0.0001 | 0.0024                     |
| REACTOME ACTIVATION OF THE PRE REPLICATIVE COMPLEX    | 30                  | 6 (20)            | 6 (20)                       | 0 (0)                          | 0.041            | <0.0001 | 0.0024                     |
| REACTOME ACTIVATION OF ATR IN RESPONSE TO REPLICAT... | 36                  | 6 (16.7)          | 6 (16.7)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0024                     |
| REACTOME SYNTHESIS OF DNA                             | 90                  | 8 (8.9)           | 8 (8.9)                      | 0 (0)                          | 0.039            | <0.0001 | 0.0024                     |
| REACTOME M G1 TRANSITION                              | 78                  | 7 (9)             | 7 (9)                        | 0 (0)                          | 0.036            | <0.0001 | 0.0024                     |
| REACTOME G0 AND EARLY G1                              | 23                  | 5 (21.7)          | 5 (21.7)                     | 0 (0)                          | 0.035            | <0.0001 | 0.0024                     |
| REACTOME DNA STRAND ELONGATION                        | 30                  | 5 (16.7)          | 5 (16.7)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0024                     |
| REACTOME ASSEMBLY OF THE PRE REPLICATIVE COMPLEX      | 63                  | 6 (9.5)           | 6 (9.5)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0024                     |
| REACTOME APC C CDC20 MEDIATED DEGRADATION OF MITOT... | 65                  | 6 (9.2)           | 6 (9.2)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0024                     |
| REACTOME E2F ENABLED INHIBITION OF PRE REPLICATION... | 10                  | 4 (40)            | 4 (40)                       | 0 (0)                          | 0.031            | <0.0001 | 0.0024                     |
| REACTOME UNWINDING OF DNA                             | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0024                     |
| REACTOME ASSOCIATION OF LICENSING FACTORS WITH THE... | 13                  | 4 (30.8)          | 4 (30.8)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0024                     |
| REACTOME CYCLIN A B1 ASSOCIATED EVENTS DURING G2 M... | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0024                     |
| REACTOME APC CDC20 MEDIATED DEGRADATION OF NEK2A      | 21                  | 4 (19)            | 4 (19)                       | 0 (0)                          | 0.028            | <0.0001 | 0.0024                     |
| REACTOME DEPOSITION OF NEW CENPA CONTAINING NUCLEO... | 62                  | 5 (8.1)           | 5 (8.1)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0024                     |
| REACTOME CDC6 ASSOCIATION WITH THE ORC ORIGIN COMP... | 11                  | 3 (27.3)          | 3 (27.3)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0024                     |
| REACTOME CHROMOSOME MAINTENANCE                       | 118                 | 7 (5.9)           | 7 (5.9)                      | 0 (0)                          | 0.030            | 0.0002  | 0.0043                     |
| REACTOME APC C CDH1 MEDIATED DEGRADATION OF CDC20 ... | 64                  | 5 (7.8)           | 5 (7.8)                      | 0 (0)                          | 0.027            | 0.0002  | 0.0043                     |
| REACTOME PHOSPHORYLATION OF THE APC C                 | 17                  | 3 (17.6)          | 3 (17.6)                     | 0 (0)                          | 0.022            | 0.0002  | 0.0043                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME ORC1 REMOVAL FROM CHROMATIN                  | 65                  | 5 (7.7)           | 5 (7.7)                      | 0 (0)                          | 0.027            | 0.0003  | 0.0063                     |
| REACTOME APC C CDC20 MEDIATED DEGRADATION OF CYCLI... | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.021            | 0.0006  | 0.0123                     |
| REACTOME INHIBITION OF THE PROTEOLYTIC ACTIVITY OF... | 18                  | 3 (16.7)          | 3 (16.7)                     | 0 (0)                          | 0.022            | 0.0007  | 0.0139                     |
| REACTOME MITOTIC G2 G2 M PHASES                       | 78                  | 5 (6.4)           | 5 (6.4)                      | 0 (0)                          | 0.025            | 0.0014  | 0.027                      |
| REACTOME ACTIVATION OF CHAPERONE GENES BY ATF6 ALP... | 9                   | 2 (22.2)          | 2 (22.2)                     | 0 (0)                          | 0.015            | 0.0029  | 0.0543                     |
| REACTOME RECRUITMENT OF NUMA TO MITOTIC CENTROSOME... | 10                  | 2 (20)            | 2 (20)                       | 0 (0)                          | 0.015            | 0.0046  | 0.0812                     |
| REACTOME ACTIVATION OF CHAPERONES BY ATF6 ALPHA       | 11                  | 2 (18.2)          | 2 (18.2)                     | 0 (0)                          | 0.015            | 0.0046  | 0.0812                     |
| REACTOME HORMONE SENSITIVE LIPASE HSL MEDIATED TRI... | 12                  | 2 (16.7)          | 2 (16.7)                     | 0 (0)                          | 0.015            | 0.0047  | 0.0812                     |
| REACTOME G2 M DNA DAMAGE CHECKPOINT                   | 10                  | 2 (20)            | 2 (20)                       | 0 (0)                          | 0.015            | 0.005   | 0.0842                     |
| REACTOME RECRUITMENT OF MITOTIC CENTROSOME PROTEIN... | 63                  | 4 (6.3)           | 4 (6.3)                      | 0 (0)                          | 0.022            | 0.0056  | 0.092                      |

**Table 66:** Enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| cell cycle and transcription (M4.0)                   | 318                 | 98 (30.8)         | 98 (30.8)                    | 0 (0)                          | 0.139            | <0.0001 | 0.0018                     |
| cell cycle (I) (M4.1)                                 | 139                 | 74 (53.2)         | 74 (53.2)                    | 0 (0)                          | 0.135            | <0.0001 | 0.0018                     |
| PLK1 signaling events (M4.2)                          | 32                  | 23 (71.9)         | 23 (71.9)                    | 0 (0)                          | 0.047            | <0.0001 | 0.0018                     |
| cell cycle (III) (M103)                               | 51                  | 20 (39.2)         | 20 (39.2)                    | 0 (0)                          | 0.039            | <0.0001 | 0.0018                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.5... | 33                  | 18 (54.5)         | 18 (54.5)                    | 0 (0)                          | 0.036            | <0.0001 | 0.0018                     |
| cell division (stimulated CD4+ T cells) (M46)         | 27                  | 15 (55.6)         | 15 (55.6)                    | 0 (0)                          | 0.030            | <0.0001 | 0.0018                     |
| mitotic cell division (M6)                            | 27                  | 15 (55.6)         | 15 (55.6)                    | 0 (0)                          | 0.030            | <0.0001 | 0.0018                     |
| E2F transcription factor network (M8)                 | 14                  | 12 (85.7)         | 12 (85.7)                    | 0 (0)                          | 0.025            | <0.0001 | 0.0018                     |
| mitotic cell cycle (M4.7)                             | 20                  | 12 (60)           | 12 (60)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0018                     |
| cell cycle (II) (M4.10)                               | 14                  | 11 (78.6)         | 11 (78.6)                    | 0 (0)                          | 0.023            | <0.0001 | 0.0018                     |
| cell division in stimulated CD4 T cells (M4.6)        | 19                  | 11 (57.9)         | 11 (57.9)                    | 0 (0)                          | 0.022            | <0.0001 | 0.0018                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.9... | 15                  | 10 (66.7)         | 10 (66.7)                    | 0 (0)                          | 0.021            | <0.0001 | 0.0018                     |
| Plasma cell surface signature (S3)                    | 23                  | 10 (43.5)         | 10 (43.5)                    | 0 (0)                          | 0.020            | <0.0001 | 0.0018                     |
| mitotic cell cycle - DNA replication (M4.4)           | 28                  | 10 (35.7)         | 10 (35.7)                    | 0 (0)                          | 0.020            | <0.0001 | 0.0018                     |
| C-MYC transcriptional network (M4.12)                 | 12                  | 9 (75)            | 9 (75)                       | 0 (0)                          | 0.018            | <0.0001 | 0.0018                     |
| Ran mediated mitosis (M15)                            | 13                  | 9 (69.2)          | 9 (69.2)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0018                     |
| E2F1 targets (Q3) (M10.0)                             | 31                  | 8 (25.8)          | 8 (25.8)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0018                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.1... | 11                  | 6 (54.5)          | 6 (54.5)                     | 0 (0)                          | 0.012            | <0.0001 | 0.0018                     |
| plasma cells, immunoglobulins (M156.1)                | 22                  | 6 (27.3)          | 6 (27.3)                     | 0 (0)                          | 0.012            | <0.0001 | 0.0018                     |
| transcription regulation in cell development (M49)    | 45                  | 10 (22.2)         | 10 (22.2)                    | 0 (0)                          | 0.019            | 0.0003  | 0.0052                     |
| Rho GTPase cycle (M4.14)                              | 9                   | 5 (55.6)          | 5 (55.6)                     | 0 (0)                          | 0.010            | 0.0004  | 0.0066                     |
| mismatch repair (I) (M22.0)                           | 27                  | 6 (22.2)          | 6 (22.2)                     | 0 (0)                          | 0.012            | 0.0017  | 0.0267                     |
| plasma cells and B cells, immunoglobulins (M156.0)    | 30                  | 5 (16.7)          | 5 (16.7)                     | 0 (0)                          | 0.010            | 0.0046  | 0.0692                     |

**Table 67:** Enriched Blood Transcription Modules (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO MITOTIC CELL CYCLE                                 | 767                 | 81 (10.6)         | 81 (10.6)                    | 0 (0)                          | 0.069            | <0.0001 | 0.004                      |
| GO CELL CYCLE PROCESS                                 | 1082                | 93 (8.6)          | 92 (8.5)                     | 1 (0.1)                        | 0.063            | <0.0001 | 0.004                      |
| GO MITOTIC NUCLEAR DIVISION                           | 362                 | 48 (13.3)         | 48 (13.3)                    | 0 (0)                          | 0.060            | <0.0001 | 0.004                      |
| GO CELL CYCLE                                         | 1316                | 101 (7.7)         | 100 (7.6)                    | 1 (0.1)                        | 0.059            | <0.0001 | 0.004                      |
| GO CHROMOSOME SEGREGATION                             | 272                 | 42 (15.4)         | 42 (15.4)                    | 0 (0)                          | 0.059            | <0.0001 | 0.004                      |
| GO ORGANELLE FISSION                                  | 496                 | 53 (10.7)         | 53 (10.7)                    | 0 (0)                          | 0.057            | <0.0001 | 0.004                      |
| GO RESPONSE TO ENDOPLASMIC RETICULUM STRESS           | 234                 | 38 (16.2)         | 38 (16.2)                    | 0 (0)                          | 0.056            | <0.0001 | 0.004                      |
| GO CELL DIVISION                                      | 461                 | 50 (10.8)         | 50 (10.8)                    | 0 (0)                          | 0.056            | <0.0001 | 0.004                      |
| GO SISTER CHROMATID SEGREGATION                       | 177                 | 34 (19.2)         | 34 (19.2)                    | 0 (0)                          | 0.054            | <0.0001 | 0.004                      |
| GO NUCLEAR CHROMOSOME SEGREGATION                     | 228                 | 36 (15.8)         | 36 (15.8)                    | 0 (0)                          | 0.053            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL CYCLE                           | 948                 | 66 (7)            | 65 (6.9)                     | 1 (0.1)                        | 0.048            | <0.0001 | 0.004                      |
| GO CELL CYCLE PHASE TRANSITION                        | 254                 | 32 (12.6)         | 32 (12.6)                    | 0 (0)                          | 0.045            | <0.0001 | 0.004                      |
| GO RESPONSE TO TOPOLOGICALLY INCORRECT PROTEIN        | 164                 | 28 (17.1)         | 28 (17.1)                    | 0 (0)                          | 0.045            | <0.0001 | 0.004                      |
| GO CELLULAR RESPONSE TO TOPOLOGICALLY INCORRECT PR... | 123                 | 26 (21.1)         | 26 (21.1)                    | 0 (0)                          | 0.045            | <0.0001 | 0.004                      |
| GO CELLULAR RESPONSE TO STRESS                        | 1563                | 84 (5.4)          | 82 (5.2)                     | 2 (0.1)                        | 0.043            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL CYCLE PROCESS                   | 558                 | 42 (7.5)          | 42 (7.5)                     | 0 (0)                          | 0.042            | <0.0001 | 0.004                      |
| GO REGULATION OF MITOTIC CELL CYCLE                   | 468                 | 37 (7.9)          | 37 (7.9)                     | 0 (0)                          | 0.041            | <0.0001 | 0.004                      |
| GO MICROTUBULE CYTOSKELETON ORGANIZATION              | 349                 | 32 (9.2)          | 32 (9.2)                     | 0 (0)                          | 0.040            | <0.0001 | 0.004                      |
| GO MITOTIC SISTER CHROMATID SEGREGATION               | 92                  | 22 (23.9)         | 22 (23.9)                    | 0 (0)                          | 0.040            | <0.0001 | 0.004                      |
| GO CARBOHYDRATE DERIVATIVE BIOSYNTHETIC PROCESS       | 592                 | 40 (6.8)          | 40 (6.8)                     | 0 (0)                          | 0.039            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL DIVISION                        | 271                 | 28 (10.3)         | 28 (10.3)                    | 0 (0)                          | 0.039            | <0.0001 | 0.004                      |
| GO NEGATIVE REGULATION OF CELL CYCLE                  | 433                 | 34 (7.9)          | 33 (7.6)                     | 1 (0.2)                        | 0.038            | <0.0001 | 0.004                      |
| GO IRE1 MEDIATED UNFOLDED PROTEIN RESPONSE            | 57                  | 20 (35.1)         | 20 (35.1)                    | 0 (0)                          | 0.038            | <0.0001 | 0.004                      |
| GO MICROTUBULE BASED PROCESS                          | 522                 | 37 (7.1)          | 37 (7.1)                     | 0 (0)                          | 0.038            | <0.0001 | 0.004                      |
| GO ORGANELLE LOCALIZATION                             | 415                 | 33 (8)            | 33 (8)                       | 0 (0)                          | 0.038            | <0.0001 | 0.004                      |
| GO ESTABLISHMENT OF LOCALIZATION IN CELL              | 1676                | 79 (4.7)          | 79 (4.7)                     | 0 (0)                          | 0.038            | <0.0001 | 0.004                      |
| GO CHROMOSOME ORGANIZATION                            | 1007                | 53 (5.3)          | 53 (5.3)                     | 0 (0)                          | 0.037            | <0.0001 | 0.004                      |
| GO CELL CYCLE CHECKPOINT                              | 196                 | 24 (12.2)         | 24 (12.2)                    | 0 (0)                          | 0.037            | <0.0001 | 0.004                      |
| GO PROTEASOMAL PROTEIN CATABOLIC PROCESS              | 272                 | 26 (9.6)          | 26 (9.6)                     | 0 (0)                          | 0.036            | <0.0001 | 0.004                      |
| GO REGULATION OF NUCLEAR DIVISION                     | 162                 | 22 (13.6)         | 22 (13.6)                    | 0 (0)                          | 0.035            | <0.0001 | 0.004                      |
| GO SINGLE ORGANISM CELLULAR LOCALIZATION              | 898                 | 47 (5.2)          | 47 (5.2)                     | 0 (0)                          | 0.035            | <0.0001 | 0.004                      |
| GO GLYCOPROTEIN METABOLIC PROCESS                     | 353                 | 28 (7.9)          | 28 (7.9)                     | 0 (0)                          | 0.035            | <0.0001 | 0.004                      |
| GO REGULATION OF CELL CYCLE PHASE TRANSITION          | 322                 | 27 (8.4)          | 27 (8.4)                     | 0 (0)                          | 0.035            | <0.0001 | 0.004                      |
| GO DNA METABOLIC PROCESS                              | 751                 | 41 (5.5)          | 40 (5.3)                     | 1 (0.1)                        | 0.034            | <0.0001 | 0.004                      |
| GO CELLULAR MACROMOLECULE LOCALIZATION                | 1237                | 57 (4.6)          | 57 (4.6)                     | 0 (0)                          | 0.034            | <0.0001 | 0.004                      |
| GO REGULATION OF MICROTUBULE BASED PROCESS            | 244                 | 24 (9.8)          | 24 (9.8)                     | 0 (0)                          | 0.034            | <0.0001 | 0.004                      |
| GO GOLGI VESICLE TRANSPORT                            | 321                 | 26 (8.1)          | 26 (8.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO PROTEIN LOCALIZATION                               | 1814                | 74 (4.1)          | 74 (4.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO CARBOHYDRATE DERIVATIVE METABOLIC PROCESS          | 1043                | 49 (4.7)          | 49 (4.7)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO GLYCOSYLATION                                      | 263                 | 24 (9.1)          | 24 (9.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO PROTEIN COMPLEX SUBUNIT ORGANIZATION               | 1523                | 64 (4.2)          | 63 (4.1)                     | 1 (0.1)                        | 0.033            | <0.0001 | 0.004                      |
| GO SISTER CHROMATID COHESION                          | 111                 | 19 (17.1)         | 19 (17.1)                    | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO DNA REPLICATION                                    | 209                 | 22 (10.5)         | 22 (10.5)                    | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO REGULATION OF MICROTUBULE POLYMERIZATION OR DEP... | 179                 | 21 (11.7)         | 21 (11.7)                    | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO INTRACELLULAR PROTEIN TRANSPORT                    | 780                 | 40 (5.1)          | 40 (5.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO POSITIVE REGULATION OF CELL CYCLE PROCESS          | 247                 | 23 (9.3)          | 23 (9.3)                     | 0 (0)                          | 0.033            | <0.0001 | 0.004                      |
| GO PROTEIN FOLDING                                    | 217                 | 22 (10.1)         | 22 (10.1)                    | 0 (0)                          | 0.032            | <0.0001 | 0.004                      |

| Gene Set Name                           | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO REGULATION OF ORGANELLE ORGANIZATION | 1180                | 52 (4.4)          | 52 (4.4)                     | 0 (0)                          | 0.032            | <0.0001 | 0.004                      |
| GO PROTEIN COMPLEX ASSEMBLY             | 1132                | 50 (4.4)          | 50 (4.4)                     | 0 (0)                          | 0.032            | <0.0001 | 0.004                      |
| GO PROTEIN COMPLEX BIOGENESIS           | 1132                | 50 (4.4)          | 50 (4.4)                     | 0 (0)                          | 0.032            | <0.0001 | 0.004                      |

**Table 68:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO ENDOPLASMIC RETICULUM PART                         | 1162                | 101 (8.7)         | 101 (8.7)                    | 0 (0)                          | 0.065            | <0.0001 | 0.0019                     |
| GO NUCLEAR OUTER MEMBRANE ENDOPLASMIC RETICULUM ME... | 1005                | 85 (8.5)          | 85 (8.5)                     | 0 (0)                          | 0.061            | <0.0001 | 0.0019                     |
| GO ENDOPLASMIC RETICULUM                              | 1631                | 111 (6.8)         | 111 (6.8)                    | 0 (0)                          | 0.055            | <0.0001 | 0.0019                     |
| GO CONDENSED CHROMOSOME                               | 196                 | 29 (14.8)         | 29 (14.8)                    | 0 (0)                          | 0.045            | <0.0001 | 0.0019                     |
| GO CHROMOSOME                                         | 880                 | 56 (6.4)          | 56 (6.4)                     | 0 (0)                          | 0.043            | <0.0001 | 0.0019                     |
| GO ENDOPLASMIC RETICULUM LUMEN                        | 202                 | 27 (13.4)         | 27 (13.4)                    | 0 (0)                          | 0.041            | <0.0001 | 0.0019                     |
| GO SPINDLE                                            | 289                 | 30 (10.4)         | 30 (10.4)                    | 0 (0)                          | 0.040            | <0.0001 | 0.0019                     |
| GO CHROMOSOMAL REGION                                 | 330                 | 31 (9.4)          | 31 (9.4)                     | 0 (0)                          | 0.040            | <0.0001 | 0.0019                     |
| GO CHROMOSOME CENTROMERIC REGION                      | 174                 | 25 (14.4)         | 25 (14.4)                    | 0 (0)                          | 0.040            | <0.0001 | 0.0019                     |
| GO CONDENSED CHROMOSOME CENTROMERIC REGION            | 102                 | 22 (21.6)         | 22 (21.6)                    | 0 (0)                          | 0.039            | <0.0001 | 0.0019                     |
| GO MICROTUBULE CYTOSKELETON                           | 1068                | 57 (5.3)          | 57 (5.3)                     | 0 (0)                          | 0.038            | <0.0001 | 0.0019                     |
| GO KINETOCHORE                                        | 120                 | 22 (18.3)         | 22 (18.3)                    | 0 (0)                          | 0.038            | <0.0001 | 0.0019                     |
| GO CENTROSOME                                         | 487                 | 32 (6.6)          | 32 (6.6)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0019                     |
| GO MICROTUBULE ORGANIZING CENTER                      | 623                 | 36 (5.8)          | 36 (5.8)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0019                     |
| GO NUCLEAR CHROMOSOME                                 | 524                 | 29 (5.5)          | 29 (5.5)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0019                     |
| GO MIDBODY                                            | 132                 | 17 (12.9)         | 17 (12.9)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0019                     |
| GO PIGMENT GRANULE                                    | 102                 | 16 (15.7)         | 16 (15.7)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0019                     |
| GO ENDOPLASMIC RETICULUM GOLGI INTERMEDIATE COMPAR... | 106                 | 16 (15.1)         | 16 (15.1)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0019                     |
| GO SPINDLE POLE                                       | 126                 | 16 (12.7)         | 16 (12.7)                    | 0 (0)                          | 0.027            | <0.0001 | 0.0019                     |
| GO ROUGH ENDOPLASMIC RETICULUM                        | 71                  | 14 (19.7)         | 14 (19.7)                    | 0 (0)                          | 0.026            | <0.0001 | 0.0019                     |
| GO INTRINSIC COMPONENT OF ENDOPLASMIC RETICULUM ME... | 135                 | 14 (10.4)         | 14 (10.4)                    | 0 (0)                          | 0.023            | <0.0001 | 0.0019                     |
| GO MICROTUBULE ASSOCIATED COMPLEX                     | 145                 | 14 (9.7)          | 14 (9.7)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0019                     |
| GO KINESIN COMPLEX                                    | 54                  | 11 (20.4)         | 11 (20.4)                    | 0 (0)                          | 0.021            | <0.0001 | 0.0019                     |
| GO SPINDLE MICROTUBULE                                | 58                  | 11 (19)           | 11 (19)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0019                     |
| GO CONDENSED NUCLEAR CHROMOSOME                       | 86                  | 11 (12.8)         | 11 (12.8)                    | 0 (0)                          | 0.020            | <0.0001 | 0.0019                     |
| GO ENDOPLASMIC RETICULUM CHAPERONE COMPLEX            | 11                  | 9 (81.8)          | 9 (81.8)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0019                     |
| GO ER TO GOLGI TRANSPORT VESICLE MEMBRANE             | 53                  | 9 (17)            | 9 (17)                       | 0 (0)                          | 0.017            | <0.0001 | 0.0019                     |
| GO CONDENSED CHROMOSOME OUTER KINETOCHORE             | 12                  | 8 (66.7)          | 8 (66.7)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0019                     |
| GO CONDENSED NUCLEAR CHROMOSOME CENTROMERIC REGION    | 18                  | 8 (44.4)          | 8 (44.4)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0019                     |
| GO SMOOTH ENDOPLASMIC RETICULUM                       | 33                  | 8 (24.2)          | 8 (24.2)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0019                     |
| GO SPINDLE MIDZONE                                    | 27                  | 7 (25.9)          | 7 (25.9)                     | 0 (0)                          | 0.014            | <0.0001 | 0.0019                     |
| GO MICROTUBULE                                        | 406                 | 27 (6.7)          | 27 (6.7)                     | 0 (0)                          | 0.031            | 0.0002  | 0.0032                     |
| GO ER TO GOLGI TRANSPORT VESICLE                      | 69                  | 10 (14.5)         | 10 (14.5)                    | 0 (0)                          | 0.018            | 0.0002  | 0.0032                     |
| GO ENDOPLASMIC RETICULUM GOLGI INTERMEDIATE COMPAR... | 64                  | 9 (14.1)          | 9 (14.1)                     | 0 (0)                          | 0.017            | 0.0002  | 0.0032                     |
| GO MITOTIC SPINDLE                                    | 55                  | 8 (14.5)          | 8 (14.5)                     | 0 (0)                          | 0.015            | 0.0002  | 0.0032                     |
| GO ROUGH ENDOPLASMIC RETICULUM MEMBRANE               | 21                  | 6 (28.6)          | 6 (28.6)                     | 0 (0)                          | 0.012            | 0.0002  | 0.0032                     |



| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO GOLGI MEMBRANE                                     | 703                 | 37 (5.3)          | 37 (5.3)                     | 0 (0)                          | 0.032            | 0.0003  | 0.0047                     |
| GO ENDOCYTIC VESICLE LUMEN                            | 17                  | 4 (23.5)          | 4 (23.5)                     | 0 (0)                          | 0.008            | 0.0004  | 0.0061                     |
| GO ENDOPLASMIC RETICULUM QUALITY CONTROL COMPARTME... | 13                  | 4 (30.8)          | 4 (30.8)                     | 0 (0)                          | 0.008            | 0.0005  | 0.0075                     |
| GO CYTOSKELETAL PART                                  | 1437                | 58 (4)            | 58 (4)                       | 0 (0)                          | 0.031            | 0.0006  | 0.0085                     |
| GO PRONUCLEUS                                         | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.008            | 0.0006  | 0.0085                     |
| GO GOLGI APPARATUS PART                               | 890                 | 41 (4.6)          | 41 (4.6)                     | 0 (0)                          | 0.031            | 0.0009  | 0.0122                     |
| GO CYTOPLASMIC MICROTUBULE                            | 57                  | 7 (12.3)          | 7 (12.3)                     | 0 (0)                          | 0.013            | 0.0009  | 0.0122                     |
| GO COATED VESICLE MEMBRANE                            | 137                 | 11 (8)            | 11 (8)                       | 0 (0)                          | 0.018            | 0.001   | 0.0133                     |
| GO GOLGI APPARATUS                                    | 1445                | 58 (4)            | 58 (4)                       | 0 (0)                          | 0.031            | 0.0013  | 0.0169                     |
| GO COATED VESICLE                                     | 233                 | 15 (6.4)          | 15 (6.4)                     | 0 (0)                          | 0.021            | 0.0014  | 0.0178                     |
| GO INTRACELLULAR VESICLE                              | 1258                | 50 (4)            | 49 (3.9)                     | 1 (0.1)                        | 0.030            | 0.0016  | 0.0199                     |
| GO SUPRAMOLECULAR FIBER                               | 671                 | 29 (4.3)          | 29 (4.3)                     | 0 (0)                          | 0.026            | 0.0019  | 0.0231                     |
| GO COPI COATED VESICLE                                | 23                  | 4 (17.4)          | 4 (17.4)                     | 0 (0)                          | 0.008            | 0.0039  | 0.0465                     |
| GO MICROTUBULE END                                    | 22                  | 4 (18.2)          | 4 (18.2)                     | 0 (0)                          | 0.008            | 0.0043  | 0.0502                     |

**Table 69:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 99 (54.1)         | 99 (54.1)                    | 0 (0)                          | 0.175            | <0.0001 | 0.0012                     |
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 89 (49.7)         | 89 (49.7)                    | 0 (0)                          | 0.155            | <0.0001 | 0.0012                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 72 (38.3)         | 72 (38.3)                    | 0 (0)                          | 0.120            | <0.0001 | 0.0012                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 70 (36.8)         | 70 (36.8)                    | 0 (0)                          | 0.116            | <0.0001 | 0.0012                     |
| GSE15750 DAY6 VS DAY10 EFF CD8 TCELL UP               | 201                 | 71 (35.3)         | 71 (35.3)                    | 0 (0)                          | 0.116            | <0.0001 | 0.0012                     |
| GSE15750 DAY6 VS DAY10 TRAF6KO EFF CD8 TCELL UP       | 201                 | 66 (32.8)         | 66 (32.8)                    | 0 (0)                          | 0.107            | <0.0001 | 0.0012                     |
| GSE22886 NAIVE BCELL VS BLOOD PLASMA CELL DN          | 194                 | 62 (32)           | 62 (32)                      | 0 (0)                          | 0.101            | <0.0001 | 0.0012                     |
| GSE30962 PRIMARY VS SECONDARY ACUTE LCMV INF CD8 T... | 199                 | 62 (31.2)         | 62 (31.2)                    | 0 (0)                          | 0.100            | <0.0001 | 0.0012                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL YOU... | 201                 | 60 (29.9)         | 60 (29.9)                    | 0 (0)                          | 0.096            | <0.0001 | 0.0012                     |
| GSE24634 TEFF VS TCONV DAY7 IN CULTURE UP             | 198                 | 59 (29.8)         | 59 (29.8)                    | 0 (0)                          | 0.095            | <0.0001 | 0.0012                     |
| GOLDRATH EFF VS MEMORY CD8 TCELL UP                   | 200                 | 58 (29)           | 58 (29)                      | 0 (0)                          | 0.093            | <0.0001 | 0.0012                     |
| GSE12845 IGD POS VS NEG BLOOD BCELL DN                | 186                 | 56 (30.1)         | 56 (30.1)                    | 0 (0)                          | 0.091            | <0.0001 | 0.0012                     |
| GSE22886 NAIVE BCELL VS BM PLASMA CELL DN             | 195                 | 56 (28.7)         | 56 (28.7)                    | 0 (0)                          | 0.090            | <0.0001 | 0.0012                     |
| GSE39110 DAY3 VS DAY6 POST IMMUNIZATION CD8 TCELL ... | 201                 | 55 (27.4)         | 55 (27.4)                    | 0 (0)                          | 0.087            | <0.0001 | 0.0012                     |
| GSE39556 CD8A DC VS NK CELL MOUSE 3H POST POLYIC I... | 201                 | 55 (27.4)         | 55 (27.4)                    | 0 (0)                          | 0.087            | <0.0001 | 0.0012                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 12H UP           | 182                 | 53 (29.1)         | 53 (29.1)                    | 0 (0)                          | 0.087            | <0.0001 | 0.0012                     |
| GOLDRATH NAIVE VS EFF CD8 TCELL DN                    | 198                 | 54 (27.3)         | 54 (27.3)                    | 0 (0)                          | 0.086            | <0.0001 | 0.0012                     |
| GSE12845 IGD POS BLOOD VS PRE GC TONSIL BCELL DN      | 202                 | 54 (26.7)         | 53 (26.2)                    | 1 (0.5)                        | 0.086            | <0.0001 | 0.0012                     |
| GSE14415 INDUCED VS NATURAL TREG DN                   | 178                 | 52 (29.2)         | 52 (29.2)                    | 0 (0)                          | 0.085            | <0.0001 | 0.0012                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE IL4 STIM DN        | 197                 | 53 (26.9)         | 53 (26.9)                    | 0 (0)                          | 0.085            | <0.0001 | 0.0012                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL OLD... | 201                 | 53 (26.4)         | 53 (26.4)                    | 0 (0)                          | 0.084            | <0.0001 | 0.0012                     |
| GSE21063 WT VS NFATC1 KO 8H ANTI IGM STIM BCELL UP    | 199                 | 52 (26.1)         | 52 (26.1)                    | 0 (0)                          | 0.083            | <0.0001 | 0.0012                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL YOU... | 200                 | 52 (26)           | 52 (26)                      | 0 (0)                          | 0.082            | <0.0001 | 0.0012                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL OLD... | 200                 | 51 (25.5)         | 51 (25.5)                    | 0 (0)                          | 0.081            | <0.0001 | 0.0012                     |
| GSE14415 TCONV VS FOXP3 KO INDUCED TREG DN            | 183                 | 48 (26.2)         | 48 (26.2)                    | 0 (0)                          | 0.078            | <0.0001 | 0.0012                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE2405 S AUREUS VS UNTREATED NEUTROPHIL DN           | 198                 | 49 (24.7)         | 49 (24.7)                    | 0 (0)                          | 0.077            | <0.0001 | 0.0012                     |
| GSE33292 WT VS TCF1 KO DN3 THYMOCYTE DN               | 200                 | 49 (24.5)         | 49 (24.5)                    | 0 (0)                          | 0.077            | <0.0001 | 0.0012                     |
| GSE14415 NATURAL TREG VS TCONV DN                     | 181                 | 47 (26)           | 47 (26)                      | 0 (0)                          | 0.076            | <0.0001 | 0.0012                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE DN                 | 196                 | 48 (24.5)         | 48 (24.5)                    | 0 (0)                          | 0.076            | <0.0001 | 0.0012                     |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 47 (25.1)         | 47 (25.1)                    | 0 (0)                          | 0.075            | <0.0001 | 0.0012                     |
| GSE20727 CTRL VS ROS INHIBITOR TREATED DC DN          | 191                 | 47 (24.6)         | 47 (24.6)                    | 0 (0)                          | 0.075            | <0.0001 | 0.0012                     |
| GSE45365 HEALTHY VS MCMV INFECTION CD11B DC DN        | 190                 | 46 (24.2)         | 46 (24.2)                    | 0 (0)                          | 0.073            | <0.0001 | 0.0012                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY7 ... | 195                 | 46 (23.6)         | 46 (23.6)                    | 0 (0)                          | 0.073            | <0.0001 | 0.0012                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 44 (25.6)         | 44 (25.6)                    | 0 (0)                          | 0.072            | <0.0001 | 0.0012                     |
| GSE24634 TREG VS TCONV POST DAY7 IL4 CONVERSION UP    | 196                 | 45 (23)           | 45 (23)                      | 0 (0)                          | 0.071            | <0.0001 | 0.0012                     |
| GSE40274 CTRL VS FOXP3 AND HELIOS TRANSDUCED ACTIV... | 198                 | 45 (22.7)         | 45 (22.7)                    | 0 (0)                          | 0.071            | <0.0001 | 0.0012                     |
| GSE40273 EOS KO VS WT TREG UP                         | 199                 | 44 (22.1)         | 44 (22.1)                    | 0 (0)                          | 0.069            | <0.0001 | 0.0012                     |
| GSE45365 WT VS IFNAR KO BCELL MCMV INFECTION DN       | 188                 | 43 (22.9)         | 43 (22.9)                    | 0 (0)                          | 0.069            | <0.0001 | 0.0012                     |
| GSE13547 2H VS 12 H ANTI IGM STIM BCELL UP            | 173                 | 42 (24.3)         | 42 (24.3)                    | 0 (0)                          | 0.068            | <0.0001 | 0.0012                     |
| GSE20727 CTRL VS ROS INH AND DNFB ALLERGEN TREATED... | 194                 | 43 (22.2)         | 43 (22.2)                    | 0 (0)                          | 0.068            | <0.0001 | 0.0012                     |
| GSE23568 CTRL VS ID3 TRANSDUCED CD8 TCELL DN          | 199                 | 43 (21.6)         | 43 (21.6)                    | 0 (0)                          | 0.067            | <0.0001 | 0.0012                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 2H UP            | 180                 | 41 (22.8)         | 41 (22.8)                    | 0 (0)                          | 0.066            | <0.0001 | 0.0012                     |
| GSE22886 IGG IGA MEMORY BCELL VS BLOOD PLASMA CELL... | 197                 | 42 (21.3)         | 42 (21.3)                    | 0 (0)                          | 0.066            | <0.0001 | 0.0012                     |
| KAECH DAY8 EFF VS MEMORY CD8 TCELL UP                 | 202                 | 42 (20.8)         | 42 (20.8)                    | 0 (0)                          | 0.065            | <0.0001 | 0.0012                     |
| GSE45365 WT VS IFNAR KO BCELL DN                      | 181                 | 40 (22.1)         | 40 (22.1)                    | 0 (0)                          | 0.064            | <0.0001 | 0.0012                     |
| GSE10239 NAIVE VS DAY4.5 EFF CD8 TCELL DN             | 199                 | 40 (20.1)         | 40 (20.1)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0012                     |
| GSE2405 HEAT KILLED LYSATE VS LIVE A PHAGOCYTOPHIL... | 199                 | 40 (20.1)         | 40 (20.1)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0012                     |
| GSE40274 CTRL VS FOXP3 TRANSDUCED ACTIVATED CD4 TC... | 201                 | 40 (19.9)         | 40 (19.9)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0012                     |
| GSE5679 CTRL VS PPARG LIGAND ROSIGLITAZONE TREATED... | 201                 | 40 (19.9)         | 40 (19.9)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0012                     |
| GSE40274 CTRL VS EOS TRANSDUCED ACTIVATED CD4 TCEL... | 172                 | 38 (22.1)         | 38 (22.1)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0012                     |

**Table 70:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                  | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG CELL CYCLE                | 124                 | 23 (18.5)         | 23 (18.5)                    | 0 (0)                          | 0.039            | <0.0001 | 0.0046                     |
| KEGG N GLYCAN BIOSYNTHESIS     | 46                  | 13 (28.3)         | 13 (28.3)                    | 0 (0)                          | 0.025            | <0.0001 | 0.0046                     |
| KEGG PROTEIN EXPORT            | 23                  | 11 (47.8)         | 11 (47.8)                    | 0 (0)                          | 0.022            | <0.0001 | 0.0046                     |
| KEGG P53 SIGNALING PATHWAY     | 68                  | 11 (16.2)         | 10 (14.7)                    | 1 (1.5)                        | 0.020            | <0.0001 | 0.0046                     |
| KEGG OOCYTE MEIOSIS            | 112                 | 12 (10.7)         | 12 (10.7)                    | 0 (0)                          | 0.021            | 0.0005  | 0.0186                     |
| KEGG VIBRIO CHOLERAE INFECTION | 53                  | 6 (11.3)          | 6 (11.3)                     | 0 (0)                          | 0.011            | 0.003   | 0.093                      |

**Table 71:** Enriched MSigDB KEGG Pathways (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO TRANSFERASE ACTIVITY TRANSFERRING HEXOSYL GROUP... | 201                 | 21 (10.4)         | 21 (10.4)                    | 0 (0)                          | 0.032            | <0.0001 | 0.0186                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO TRANSFERASE ACTIVITY TRANSFERRING GLYCOSYL GROU... | 279                 | 21 (7.5)          | 21 (7.5)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0186                     |
| GO TUBULIN BINDING                                    | 272                 | 19 (7)            | 19 (7)                       | 0 (0)                          | 0.026            | <0.0001 | 0.0186                     |
| GO MICROTUBULE BINDING                                | 201                 | 15 (7.5)          | 15 (7.5)                     | 0 (0)                          | 0.022            | 0.0002  | 0.0186                     |
| GO ISOMERASE ACTIVITY                                 | 161                 | 12 (7.5)          | 12 (7.5)                     | 0 (0)                          | 0.019            | 0.0002  | 0.0186                     |
| GO MICROTUBULE MOTOR ACTIVITY                         | 76                  | 10 (13.2)         | 10 (13.2)                    | 0 (0)                          | 0.018            | <0.0001 | 0.0186                     |
| GO UNFOLDED PROTEIN BINDING                           | 94                  | 10 (10.6)         | 10 (10.6)                    | 0 (0)                          | 0.018            | <0.0001 | 0.0186                     |
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY TRANSPOS... | 22                  | 7 (31.8)          | 7 (31.8)                     | 0 (0)                          | 0.014            | 0.0002  | 0.0186                     |
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY             | 53                  | 7 (13.2)          | 7 (13.2)                     | 0 (0)                          | 0.013            | 0.0002  | 0.0186                     |
| GO HISTONE KINASE ACTIVITY                            | 19                  | 5 (26.3)          | 5 (26.3)                     | 0 (0)                          | 0.010            | 0.0002  | 0.0186                     |
| GO MISFOLDED PROTEIN BINDING                          | 12                  | 4 (33.3)          | 4 (33.3)                     | 0 (0)                          | 0.008            | 0.0005  | 0.0422                     |
| GO KINASE BINDING                                     | 608                 | 29 (4.8)          | 29 (4.8)                     | 0 (0)                          | 0.027            | 0.0007  | 0.0464                     |
| GO MOTOR ACTIVITY                                     | 129                 | 11 (8.5)          | 11 (8.5)                     | 0 (0)                          | 0.018            | 0.0007  | 0.0464                     |
| GO MANNOSIDASE ACTIVITY                               | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.008            | 0.0007  | 0.0464                     |
| GO CARBOHYDRATE BINDING                               | 275                 | 15 (5.5)          | 15 (5.5)                     | 0 (0)                          | 0.020            | 0.0009  | 0.0523                     |
| GO UDP GLYCOSYLTRANSFERASE ACTIVITY                   | 138                 | 11 (8)            | 11 (8)                       | 0 (0)                          | 0.018            | 0.0009  | 0.0523                     |
| GO ATP DEPENDENT MICROTUBULE MOTOR ACTIVITY           | 18                  | 4 (22.2)          | 4 (22.2)                     | 0 (0)                          | 0.008            | 0.0016  | 0.0874                     |

**Table 72:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME CELL CYCLE MITOTIC                           | 308                 | 48 (15.6)         | 48 (15.6)                    | 0 (0)                          | 0.065            | <0.0001 | 0.0023                     |
| REACTOME CELL CYCLE                                   | 400                 | 51 (12.8)         | 51 (12.8)                    | 0 (0)                          | 0.061            | <0.0001 | 0.0023                     |
| REACTOME DNA REPLICATION                              | 188                 | 32 (17)           | 32 (17)                      | 0 (0)                          | 0.050            | <0.0001 | 0.0023                     |
| REACTOME METABOLISM OF PROTEINS                       | 424                 | 43 (10.1)         | 43 (10.1)                    | 0 (0)                          | 0.050            | <0.0001 | 0.0023                     |
| REACTOME MITOTIC M M G1 PHASES                        | 168                 | 28 (16.7)         | 28 (16.7)                    | 0 (0)                          | 0.045            | <0.0001 | 0.0023                     |
| REACTOME ASPARAGINE N LINKED GLYCOSYLATION            | 81                  | 24 (29.6)         | 24 (29.6)                    | 0 (0)                          | 0.044            | <0.0001 | 0.0023                     |
| REACTOME POST TRANSLATIONAL PROTEIN MODIFICATION      | 181                 | 28 (15.5)         | 28 (15.5)                    | 0 (0)                          | 0.044            | <0.0001 | 0.0023                     |
| REACTOME DIABETES PATHWAYS                            | 129                 | 23 (17.8)         | 22 (17.1)                    | 1 (0.8)                        | 0.039            | <0.0001 | 0.0023                     |
| REACTOME UNFOLDED PROTEIN RESPONSE                    | 78                  | 18 (23.1)         | 18 (23.1)                    | 0 (0)                          | 0.033            | <0.0001 | 0.0023                     |
| REACTOME SRP DEPENDENT COTRANSLATIONAL PROTEIN TAR... | 108                 | 18 (16.7)         | 18 (16.7)                    | 0 (0)                          | 0.031            | <0.0001 | 0.0023                     |
| REACTOME MITOTIC G1 G1 S PHASES                       | 130                 | 18 (13.8)         | 18 (13.8)                    | 0 (0)                          | 0.030            | <0.0001 | 0.0023                     |
| REACTOME TRANSLATION                                  | 145                 | 18 (12.4)         | 18 (12.4)                    | 0 (0)                          | 0.029            | <0.0001 | 0.0023                     |
| REACTOME ACTIVATION OF CHAPERONE GENES BY XBP1S       | 46                  | 15 (32.6)         | 15 (32.6)                    | 0 (0)                          | 0.029            | <0.0001 | 0.0023                     |
| REACTOME MITOTIC PROMETAPHASE                         | 86                  | 16 (18.6)         | 16 (18.6)                    | 0 (0)                          | 0.029            | <0.0001 | 0.0023                     |
| REACTOME CELL CYCLE CHECKPOINTS                       | 112                 | 16 (14.3)         | 16 (14.3)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0023                     |
| REACTOME G1 S TRANSITION                              | 106                 | 15 (14.2)         | 15 (14.2)                    | 0 (0)                          | 0.026            | <0.0001 | 0.0023                     |
| REACTOME REGULATION OF MITOTIC CELL CYCLE             | 77                  | 12 (15.6)         | 12 (15.6)                    | 0 (0)                          | 0.022            | <0.0001 | 0.0023                     |
| REACTOME G2 M CHECKPOINTS                             | 42                  | 11 (26.2)         | 11 (26.2)                    | 0 (0)                          | 0.021            | <0.0001 | 0.0023                     |
| REACTOME E2F MEDIATED REGULATION OF DNA REPLICATIO... | 33                  | 10 (30.3)         | 10 (30.3)                    | 0 (0)                          | 0.020            | <0.0001 | 0.0023                     |
| REACTOME G1 S SPECIFIC TRANSCRIPTION                  | 17                  | 9 (52.9)          | 9 (52.9)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0023                     |
| REACTOME M G1 TRANSITION                              | 78                  | 10 (12.8)         | 10 (12.8)                    | 0 (0)                          | 0.018            | <0.0001 | 0.0023                     |
| REACTOME TRANSPORT TO THE GOLGI AND SUBSEQUENT MOD... | 33                  | 9 (27.3)          | 9 (27.3)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0023                     |
| REACTOME ACTIVATION OF ATR IN RESPONSE TO REPLICAT... | 36                  | 8 (22.2)          | 8 (22.2)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0023                     |
| REACTOME KINESINS                                     | 24                  | 7 (29.2)          | 7 (29.2)                     | 0 (0)                          | 0.014            | <0.0001 | 0.0023                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME CYCLIN A B1 ASSOCIATED EVENTS DURING G2 M... | 15                  | 6 (40)            | 6 (40)                       | 0 (0)                          | 0.012            | <0.0001 | 0.0023                     |
| REACTOME N GLYCAN TRIMMING IN THE ER AND CALNEXIN ... | 13                  | 6 (46.2)          | 6 (46.2)                     | 0 (0)                          | 0.012            | <0.0001 | 0.0023                     |
| REACTOME ANTIGEN PRESENTATION FOLDING ASSEMBLY AND... | 20                  | 6 (30)            | 6 (30)                       | 0 (0)                          | 0.012            | <0.0001 | 0.0023                     |
| REACTOME ASSOCIATION OF LICENSING FACTORS WITH THE... | 13                  | 5 (38.5)          | 5 (38.5)                     | 0 (0)                          | 0.010            | <0.0001 | 0.0023                     |
| REACTOME CALNEXIN CALRETICULIN CYCLE                  | 11                  | 5 (45.5)          | 5 (45.5)                     | 0 (0)                          | 0.010            | <0.0001 | 0.0023                     |
| REACTOME MITOTIC G2 G2 M PHASES                       | 78                  | 11 (14.1)         | 11 (14.1)                    | 0 (0)                          | 0.020            | 0.0002  | 0.0042                     |
| REACTOME G0 AND EARLY G1                              | 23                  | 6 (26.1)          | 6 (26.1)                     | 0 (0)                          | 0.012            | 0.0002  | 0.0042                     |
| REACTOME UNWINDING OF DNA                             | 11                  | 5 (45.5)          | 5 (45.5)                     | 0 (0)                          | 0.010            | 0.0002  | 0.0042                     |
| REACTOME ACTIVATION OF THE PRE REPLICATIVE COMPLEX    | 30                  | 6 (20)            | 6 (20)                       | 0 (0)                          | 0.012            | 0.0003  | 0.0058                     |
| REACTOME APC CDC20 MEDIATED DEGRADATION OF NEK2A      | 21                  | 5 (23.8)          | 5 (23.8)                     | 0 (0)                          | 0.010            | 0.0003  | 0.0058                     |
| REACTOME ACTIVATION OF CHAPERONE GENES BY ATF6 ALP... | 9                   | 4 (44.4)          | 4 (44.4)                     | 0 (0)                          | 0.008            | 0.0003  | 0.0058                     |
| REACTOME DNA STRAND ELONGATION                        | 30                  | 6 (20)            | 6 (20)                       | 0 (0)                          | 0.012            | 0.0004  | 0.0073                     |
| REACTOME ACTIVATION OF CHAPERONES BY ATF6 ALPHA       | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.008            | 0.0004  | 0.0073                     |
| REACTOME S PHASE                                      | 106                 | 11 (10.4)         | 11 (10.4)                    | 0 (0)                          | 0.019            | 0.0005  | 0.0089                     |
| REACTOME SYNTHESIS OF DNA                             | 90                  | 10 (11.1)         | 10 (11.1)                    | 0 (0)                          | 0.018            | 0.0006  | 0.0096                     |
| REACTOME APC C CDC20 MEDIATED DEGRADATION OF MITOT... | 65                  | 8 (12.3)          | 8 (12.3)                     | 0 (0)                          | 0.015            | 0.0006  | 0.0096                     |
| REACTOME CDC6 ASSOCIATION WITH THE ORC ORIGIN COMP... | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.008            | 0.0006  | 0.0096                     |
| REACTOME E2F ENABLED INHIBITION OF PRE REPLICATION... | 10                  | 4 (40)            | 4 (40)                       | 0 (0)                          | 0.008            | 0.0006  | 0.0096                     |
| REACTOME ASSEMBLY OF THE PRE REPLICATIVE COMPLEX      | 63                  | 8 (12.7)          | 8 (12.7)                     | 0 (0)                          | 0.015            | 0.0007  | 0.0107                     |
| REACTOME SYNTHESIS SECRETION AND INACTIVATION OF G... | 13                  | 4 (30.8)          | 4 (30.8)                     | 0 (0)                          | 0.008            | 0.0007  | 0.0107                     |
| REACTOME SYNTHESIS SECRETION AND DEACYLATION OF GH... | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.008            | 0.0012  | 0.018                      |
| REACTOME METABOLISM OF NUCLEOTIDES                    | 72                  | 8 (11.1)          | 8 (11.1)                     | 0 (0)                          | 0.015            | 0.0014  | 0.0205                     |
| REACTOME PHOSPHORYLATION OF THE APC C                 | 17                  | 4 (23.5)          | 4 (23.5)                     | 0 (0)                          | 0.008            | 0.0018  | 0.0258                     |
| REACTOME APC C CDH1 MEDIATED DEGRADATION OF CDC20 ... | 64                  | 7 (10.9)          | 7 (10.9)                     | 0 (0)                          | 0.013            | 0.0019  | 0.0261                     |
| REACTOME AMINO ACID SYNTHESIS AND INTERCONVERSION ... | 16                  | 4 (25)            | 4 (25)                       | 0 (0)                          | 0.008            | 0.0019  | 0.0261                     |
| REACTOME SYNTHESIS SECRETION AND INACTIVATION OF G... | 18                  | 4 (22.2)          | 4 (22.2)                     | 0 (0)                          | 0.008            | 0.002   | 0.027                      |

**Table 73:** Enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| cell cycle (I) (M4.1)                                 | 139                 | 33 (23.7)         | 33 (23.7)                    | 0 (0)                          | 0.081            | <0.0001 | 0.0031                     |
| cell cycle and transcription (M4.0)                   | 318                 | 46 (14.5)         | 44 (13.8)                    | 2 (0.6)                        | 0.080            | <0.0001 | 0.0031                     |
| PLK1 signaling events (M4.2)                          | 32                  | 12 (37.5)         | 12 (37.5)                    | 0 (0)                          | 0.037            | <0.0001 | 0.0031                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.5... | 33                  | 11 (33.3)         | 11 (33.3)                    | 0 (0)                          | 0.034            | <0.0001 | 0.0031                     |
| cell division (stimulated CD4+ T cells) (M46)         | 27                  | 10 (37)           | 10 (37)                      | 0 (0)                          | 0.031            | <0.0001 | 0.0031                     |
| cell cycle (III) (M103)                               | 51                  | 9 (17.6)          | 9 (17.6)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0031                     |
| mitotic cell division (M6)                            | 27                  | 8 (29.6)          | 8 (29.6)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0031                     |
| cell cycle (II) (M4.10)                               | 14                  | 7 (50)            | 7 (50)                       | 0 (0)                          | 0.023            | <0.0001 | 0.0031                     |
| E2F transcription factor network (M8)                 | 14                  | 7 (50)            | 7 (50)                       | 0 (0)                          | 0.023            | <0.0001 | 0.0031                     |
| Plasma cell surface signature (S3)                    | 23                  | 7 (30.4)          | 7 (30.4)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0031                     |
| plasma cells, immunoglobulins (M156.1)                | 22                  | 6 (27.3)          | 6 (27.3)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0031                     |
| mitotic cell cycle (M4.7)                             | 20                  | 5 (25)            | 5 (25)                       | 0 (0)                          | 0.016            | 0.0002  | 0.0058                     |
| mitotic cell cycle in stimulated CD4 T cells (M4.1... | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.013            | 0.0003  | 0.008                      |

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| Ran mediated mitosis (M15)                         | 13                  | 4 (30.8)          | 4 (30.8)                     | 0 (0)                          | 0.013            | 0.0009  | 0.0222                     |
| cell division in stimulated CD4 T cells (M4.6)     | 19                  | 4 (21.1)          | 4 (21.1)                     | 0 (0)                          | 0.013            | 0.0023  | 0.053                      |
| plasma cells and B cells, immunoglobulins (M156.0) | 30                  | 4 (13.3)          | 4 (13.3)                     | 0 (0)                          | 0.012            | 0.0043  | 0.0875                     |
| C-MYC transcriptional network (M4.12)              | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.010            | 0.0043  | 0.0875                     |

**Table 74:** Enriched Blood Transcription Modules (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RESPONSE TO ENDOPLASMIC RETICULUM STRESS           | 234                 | 29 (12.4)         | 29 (12.4)                    | 0 (0)                          | 0.057            | <0.0001 | 0.0097                     |
| GO CELLULAR RESPONSE TO TOPOLOGICALLY INCORRECT PR... | 123                 | 20 (16.3)         | 20 (16.3)                    | 0 (0)                          | 0.049            | <0.0001 | 0.0097                     |
| GO RESPONSE TO TOPOLOGICALLY INCORRECT PROTEIN        | 164                 | 21 (12.8)         | 21 (12.8)                    | 0 (0)                          | 0.047            | <0.0001 | 0.0097                     |
| GO IRE1 MEDIATED UNFOLDED PROTEIN RESPONSE            | 57                  | 15 (26.3)         | 15 (26.3)                    | 0 (0)                          | 0.043            | <0.0001 | 0.0097                     |
| GO PROTEIN FOLDING                                    | 217                 | 19 (8.8)          | 19 (8.8)                     | 0 (0)                          | 0.038            | <0.0001 | 0.0097                     |
| GO MITOTIC NUCLEAR DIVISION                           | 362                 | 24 (6.6)          | 24 (6.6)                     | 0 (0)                          | 0.037            | <0.0001 | 0.0097                     |
| GO ORGANELLE FISSION                                  | 496                 | 27 (5.4)          | 27 (5.4)                     | 0 (0)                          | 0.035            | <0.0001 | 0.0097                     |
| GO MITOTIC CELL CYCLE                                 | 767                 | 36 (4.7)          | 36 (4.7)                     | 0 (0)                          | 0.035            | <0.0001 | 0.0097                     |
| GO CELL CYCLE PHASE TRANSITION                        | 254                 | 18 (7.1)          | 18 (7.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.0097                     |
| GO PROTEASOMAL PROTEIN CATABOLIC PROCESS              | 272                 | 18 (6.6)          | 18 (6.6)                     | 0 (0)                          | 0.032            | <0.0001 | 0.0097                     |
| GO CELL CYCLE PROCESS                                 | 1082                | 43 (4)            | 43 (4)                       | 0 (0)                          | 0.032            | <0.0001 | 0.0097                     |
| GO CELLULAR RESPONSE TO STRESS                        | 1563                | 56 (3.6)          | 56 (3.6)                     | 0 (0)                          | 0.031            | <0.0001 | 0.0097                     |
| GO CHROMOSOME SEGREGATION                             | 272                 | 17 (6.2)          | 17 (6.2)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0097                     |
| GO CELL DIVISION                                      | 461                 | 22 (4.8)          | 22 (4.8)                     | 0 (0)                          | 0.030            | <0.0001 | 0.0097                     |
| GO NUCLEAR CHROMOSOME SEGREGATION                     | 228                 | 15 (6.6)          | 15 (6.6)                     | 0 (0)                          | 0.029            | <0.0001 | 0.0097                     |
| GO REGULATION OF NUCLEAR DIVISION                     | 162                 | 13 (8)            | 13 (8)                       | 0 (0)                          | 0.029            | <0.0001 | 0.0097                     |
| GO CELL CYCLE                                         | 1316                | 45 (3.4)          | 45 (3.4)                     | 0 (0)                          | 0.029            | <0.0001 | 0.0097                     |
| GO SISTER CHROMATID SEGREGATION                       | 177                 | 13 (7.3)          | 13 (7.3)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0097                     |
| GO CELL REDOX HOMEOSTASIS                             | 67                  | 10 (14.9)         | 10 (14.9)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0097                     |
| GO CARBOHYDRATE DERIVATIVE BIOSYNTHETIC PROCESS       | 592                 | 24 (4.1)          | 24 (4.1)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0097                     |
| GO ERAD PATHWAY                                       | 74                  | 10 (13.5)         | 10 (13.5)                    | 0 (0)                          | 0.027            | <0.0001 | 0.0097                     |
| GO PROTEIN N LINKED GLYCOSYLATION                     | 75                  | 10 (13.3)         | 10 (13.3)                    | 0 (0)                          | 0.027            | <0.0001 | 0.0097                     |
| GO REGULATION OF CELL DIVISION                        | 271                 | 15 (5.5)          | 15 (5.5)                     | 0 (0)                          | 0.027            | <0.0001 | 0.0097                     |
| GO CELL CYCLE CHECKPOINT                              | 196                 | 13 (6.6)          | 13 (6.6)                     | 0 (0)                          | 0.027            | <0.0001 | 0.0097                     |
| GO REGULATION OF CELL CYCLE                           | 948                 | 32 (3.4)          | 32 (3.4)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0097                     |
| GO CELLULAR HOMEOSTASIS                               | 678                 | 25 (3.7)          | 24 (3.5)                     | 1 (0.1)                        | 0.026            | <0.0001 | 0.0097                     |
| GO POSITIVE REGULATION OF CELL CYCLE PROCESS          | 247                 | 14 (5.7)          | 14 (5.7)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0097                     |
| GO MITOTIC SISTER CHROMATID SEGREGATION               | 92                  | 10 (10.9)         | 10 (10.9)                    | 0 (0)                          | 0.026            | <0.0001 | 0.0097                     |
| GO PROTEIN CATABOLIC PROCESS                          | 582                 | 22 (3.8)          | 22 (3.8)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0097                     |
| GO GLYCOSYLATION                                      | 263                 | 14 (5.3)          | 14 (5.3)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0097                     |
| GO ER ASSOCIATED UBIQUITIN DEPENDENT PROTEIN CATAB... | 61                  | 9 (14.8)          | 9 (14.8)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0097                     |
| GO REGULATION OF CELL CYCLE PROCESS                   | 558                 | 21 (3.8)          | 21 (3.8)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0097                     |
| GO POSITIVE REGULATION OF CELL CYCLE                  | 331                 | 15 (4.5)          | 15 (4.5)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0097                     |
| GO PEPTIDYL ASPARAGINE MODIFICATION                   | 39                  | 8 (20.5)          | 8 (20.5)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0097                     |
| GO REGULATION OF CHROMOSOME SEGREGATION               | 84                  | 9 (10.7)          | 9 (10.7)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0097                     |
| GO REGULATION OF MICROTUBULE POLYMERIZATION OR DEP... | 179                 | 11 (6.1)          | 11 (6.1)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0097                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO ALPHA AMINO ACID METABOLIC PROCESS                 | 228                 | 12 (5.3)          | 12 (5.3)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0097                     |
| GO CELL CYCLE G1 S PHASE TRANSITION                   | 110                 | 9 (8.2)           | 9 (8.2)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO G1 S TRANSITION OF MITOTIC CELL CYCLE              | 110                 | 9 (8.2)           | 9 (8.2)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO SISTER CHROMATID COHESION                          | 111                 | 9 (8.1)           | 9 (8.1)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO REGULATION OF SISTER CHROMATID SEGREGATION         | 66                  | 8 (12.1)          | 8 (12.1)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO PROTEIN EXIT FROM ENDOPLASMIC RETICULUM            | 20                  | 7 (35)            | 7 (35)                       | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO MITOTIC SPINDLE ORGANIZATION                       | 69                  | 8 (11.6)          | 8 (11.6)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0097                     |
| GO REGULATION OF TRANSCRIPTION INVOLVED IN G1 S TR... | 26                  | 6 (23.1)          | 6 (23.1)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0097                     |
| GO ER NUCLEUS SIGNALING PATHWAY                       | 34                  | 6 (17.6)          | 6 (17.6)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0097                     |
| GO NEGATIVE REGULATION OF RESPONSE TO ENDOPLASMIC ... | 39                  | 6 (15.4)          | 6 (15.4)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0097                     |
| GO RETROGRADE PROTEIN TRANSPORT ER TO CYTOSOL         | 16                  | 5 (31.2)          | 5 (31.2)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0097                     |
| GO ENDOPLASMIC RETICULUM TO CYTOSOL TRANSPORT         | 23                  | 5 (21.7)          | 5 (21.7)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0097                     |
| GO REGULATION OF MITOTIC CELL CYCLE                   | 468                 | 18 (3.8)          | 18 (3.8)                     | 0 (0)                          | 0.024            | 0.0002  | 0.0172                     |
| GO POSITIVE REGULATION OF MITOTIC CELL CYCLE          | 123                 | 9 (7.3)           | 9 (7.3)                      | 0 (0)                          | 0.022            | 0.0002  | 0.0172                     |

**Table 75:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO ENDOPLASMIC RETICULUM PART                         | 1162                | 67 (5.8)          | 67 (5.8)                     | 0 (0)                          | 0.048            | <0.0001 | 0.0034                     |
| GO NUCLEAR OUTER MEMBRANE ENDOPLASMIC RETICULUM ME... | 1005                | 55 (5.5)          | 55 (5.5)                     | 0 (0)                          | 0.044            | <0.0001 | 0.0034                     |
| GO ENDOPLASMIC RETICULUM LUMEN                        | 202                 | 21 (10.4)         | 21 (10.4)                    | 0 (0)                          | 0.043            | <0.0001 | 0.0034                     |
| GO ENDOPLASMIC RETICULUM                              | 1631                | 75 (4.6)          | 75 (4.6)                     | 0 (0)                          | 0.040            | <0.0001 | 0.0034                     |
| GO ENDOPLASMIC RETICULUM CHAPERONE COMPLEX            | 11                  | 9 (81.8)          | 9 (81.8)                     | 0 (0)                          | 0.029            | <0.0001 | 0.0034                     |
| GO INTRINSIC COMPONENT OF ENDOPLASMIC RETICULUM ME... | 135                 | 12 (8.9)          | 12 (8.9)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0034                     |
| GO ROUGH ENDOPLASMIC RETICULUM                        | 71                  | 10 (14.1)         | 10 (14.1)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0034                     |
| GO CONDENSED CHROMOSOME                               | 196                 | 13 (6.6)          | 13 (6.6)                     | 0 (0)                          | 0.027            | <0.0001 | 0.0034                     |
| GO CHROMOSOME CENTROMERIC REGION                      | 174                 | 12 (6.9)          | 12 (6.9)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0034                     |
| GO CONDENSED CHROMOSOME CENTROMERIC REGION            | 102                 | 10 (9.8)          | 10 (9.8)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0034                     |
| GO PIGMENT GRANULE                                    | 102                 | 10 (9.8)          | 10 (9.8)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0034                     |
| GO ENDOPLASMIC RETICULUM GOLGI INTERMEDIATE COMPAR... | 106                 | 10 (9.4)          | 9 (8.5)                      | 1 (0.9)                        | 0.025            | <0.0001 | 0.0034                     |
| GO SMOOTH ENDOPLASMIC RETICULUM                       | 33                  | 7 (21.2)          | 7 (21.2)                     | 0 (0)                          | 0.021            | <0.0001 | 0.0034                     |
| GO CONDENSED NUCLEAR CHROMOSOME CENTROMERIC REGION    | 18                  | 5 (27.8)          | 5 (27.8)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0034                     |
| GO ROUGH ENDOPLASMIC RETICULUM MEMBRANE               | 21                  | 5 (23.8)          | 5 (23.8)                     | 0 (0)                          | 0.016            | <0.0001 | 0.0034                     |
| GO CONDENSED CHROMOSOME OUTER KINETOCHORE             | 12                  | 4 (33.3)          | 4 (33.3)                     | 0 (0)                          | 0.013            | <0.0001 | 0.0034                     |
| GO ENDOCYTIC VESICLE LUMEN                            | 17                  | 4 (23.5)          | 4 (23.5)                     | 0 (0)                          | 0.013            | <0.0001 | 0.0034                     |
| GO KINETOCHORE                                        | 120                 | 9 (7.5)           | 9 (7.5)                      | 0 (0)                          | 0.022            | 0.0003  | 0.0097                     |
| GO CHROMOSOMAL REGION                                 | 330                 | 14 (4.2)          | 14 (4.2)                     | 0 (0)                          | 0.023            | 0.0004  | 0.0123                     |
| GO VESICLE LUMEN                                      | 106                 | 7 (6.6)           | 6 (5.7)                      | 1 (0.9)                        | 0.017            | 0.0005  | 0.0146                     |
| GO DERLIN 1 RETROTRANSLOCATION COMPLEX                | 11                  | 3 (27.3)          | 3 (27.3)                     | 0 (0)                          | 0.010            | 0.001   | 0.0278                     |
| GO SPINDLE POLE                                       | 126                 | 8 (6.3)           | 8 (6.3)                      | 0 (0)                          | 0.019            | 0.0014  | 0.0341                     |
| GO MIDBODY                                            | 132                 | 8 (6.1)           | 8 (6.1)                      | 0 (0)                          | 0.019            | 0.0014  | 0.0341                     |
| GO SPINDLE MIDZONE                                    | 27                  | 4 (14.8)          | 4 (14.8)                     | 0 (0)                          | 0.012            | 0.0014  | 0.0341                     |
| GO GOLGI APPARATUS PART                               | 890                 | 27 (3)            | 26 (2.9)                     | 1 (0.1)                        | 0.023            | 0.0019  | 0.0411                     |

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO INTRINSIC COMPONENT OF ORGANELLE MEMBRANE | 281                 | 12 (4.3)          | 12 (4.3)                     | 0 (0)                          | 0.021            | 0.0018  | 0.0411                     |
| GO CYTOPLASMIC MICROTUBULE                   | 57                  | 5 (8.8)           | 5 (8.8)                      | 0 (0)                          | 0.014            | 0.0019  | 0.0411                     |
| GO CENTROSOME                                | 487                 | 17 (3.5)          | 17 (3.5)                     | 0 (0)                          | 0.022            | 0.0022  | 0.0459                     |
| GO GOLGI APPARATUS                           | 1445                | 37 (2.6)          | 36 (2.5)                     | 1 (0.1)                        | 0.022            | 0.0029  | 0.0584                     |
| GO GOLGI MEMBRANE                            | 703                 | 22 (3.1)          | 22 (3.1)                     | 0 (0)                          | 0.022            | 0.0035  | 0.0681                     |

**Table 76:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 74 (40.4)         | 74 (40.4)                    | 0 (0)                          | 0.180            | <0.0001 | 0.0018                     |
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 71 (39.7)         | 71 (39.7)                    | 0 (0)                          | 0.173            | <0.0001 | 0.0018                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 64 (34)           | 64 (34)                      | 0 (0)                          | 0.150            | <0.0001 | 0.0018                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 58 (30.5)         | 58 (30.5)                    | 0 (0)                          | 0.133            | <0.0001 | 0.0018                     |
| GSE22886 NAIVE BCELL VS BM PLASMA CELL DN             | 195                 | 48 (24.6)         | 47 (24.1)                    | 1 (0.5)                        | 0.107            | <0.0001 | 0.0018                     |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 42 (22.5)         | 42 (22.5)                    | 0 (0)                          | 0.094            | <0.0001 | 0.0018                     |
| GSE12845 IGD POS VS NEG BLOOD BCELL DN                | 186                 | 39 (21)           | 39 (21)                      | 0 (0)                          | 0.087            | <0.0001 | 0.0018                     |
| GSE20727 CTRL VS ROS INHIBITOR TREATED DC DN          | 191                 | 39 (20.4)         | 39 (20.4)                    | 0 (0)                          | 0.086            | <0.0001 | 0.0018                     |
| GSE22886 NAIVE BCELL VS BLOOD PLASMA CELL DN          | 194                 | 38 (19.6)         | 38 (19.6)                    | 0 (0)                          | 0.083            | <0.0001 | 0.0018                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL YOU... | 201                 | 34 (16.9)         | 34 (16.9)                    | 0 (0)                          | 0.072            | <0.0001 | 0.0018                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 32 (18.6)         | 32 (18.6)                    | 0 (0)                          | 0.072            | <0.0001 | 0.0018                     |
| GSE13411 IGM MEMORY BCELL VS PLASMA CELL DN           | 190                 | 33 (17.4)         | 33 (17.4)                    | 0 (0)                          | 0.072            | <0.0001 | 0.0018                     |
| GSE22886 IGG IGA MEMORY BCELL VS BM PLASMA CELL DN    | 190                 | 32 (16.8)         | 31 (16.3)                    | 1 (0.5)                        | 0.069            | <0.0001 | 0.0018                     |
| GSE24634 TEFF VS TCONV DAY7 IN CULTURE UP             | 198                 | 32 (16.2)         | 32 (16.2)                    | 0 (0)                          | 0.068            | <0.0001 | 0.0018                     |
| GSE13411 NAIVE BCELL VS PLASMA CELL DN                | 188                 | 31 (16.5)         | 31 (16.5)                    | 0 (0)                          | 0.067            | <0.0001 | 0.0018                     |
| GSE22886 IGM MEMORY BCELL VS BM PLASMA CELL DN        | 194                 | 31 (16)           | 31 (16)                      | 0 (0)                          | 0.067            | <0.0001 | 0.0018                     |
| GSE15750 DAY6 VS DAY10 EFF CD8 TCELL UP               | 201                 | 31 (15.4)         | 31 (15.4)                    | 0 (0)                          | 0.066            | <0.0001 | 0.0018                     |
| GSE15750 DAY6 VS DAY10 TRAF6KO EFF CD8 TCELL UP       | 201                 | 31 (15.4)         | 31 (15.4)                    | 0 (0)                          | 0.066            | <0.0001 | 0.0018                     |
| GSE12845 IGD POS BLOOD VS PRE GC TONSIL BCELL DN      | 202                 | 31 (15.3)         | 31 (15.3)                    | 0 (0)                          | 0.065            | <0.0001 | 0.0018                     |
| GSE45365 HEALTHY VS MCMV INFECTION CD11B DC DN        | 190                 | 30 (15.8)         | 30 (15.8)                    | 0 (0)                          | 0.065            | <0.0001 | 0.0018                     |
| GSE22886 IGG IGA MEMORY BCELL VS BLOOD PLASMA CELL... | 197                 | 29 (14.7)         | 29 (14.7)                    | 0 (0)                          | 0.062            | <0.0001 | 0.0018                     |
| GSE40273 EOS KO VS WT TREG UP                         | 199                 | 29 (14.6)         | 29 (14.6)                    | 0 (0)                          | 0.061            | <0.0001 | 0.0018                     |
| GSE10325 BCELL VS LUPUS BCELL DN                      | 200                 | 29 (14.5)         | 29 (14.5)                    | 0 (0)                          | 0.061            | <0.0001 | 0.0018                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL YOU... | 200                 | 29 (14.5)         | 29 (14.5)                    | 0 (0)                          | 0.061            | <0.0001 | 0.0018                     |
| GSE39556 CD8A DC VS NK CELL MOUSE 3H POST POLYIC I... | 201                 | 29 (14.4)         | 29 (14.4)                    | 0 (0)                          | 0.061            | <0.0001 | 0.0018                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE IL4 STIM DN        | 197                 | 28 (14.2)         | 28 (14.2)                    | 0 (0)                          | 0.059            | <0.0001 | 0.0018                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL OLD... | 201                 | 28 (13.9)         | 28 (13.9)                    | 0 (0)                          | 0.059            | <0.0001 | 0.0018                     |
| GSE12366 PLASMA CELL VS MEMORY BCELL UP               | 185                 | 27 (14.6)         | 26 (14.1)                    | 1 (0.5)                        | 0.059            | <0.0001 | 0.0018                     |
| GSE40666 UNTREATED VS IFNA STIM STAT4 KO EFFECTOR ... | 196                 | 27 (13.8)         | 27 (13.8)                    | 0 (0)                          | 0.057            | <0.0001 | 0.0018                     |
| GOLDRATH EFF VS MEMORY CD8 TCELL UP                   | 200                 | 27 (13.5)         | 26 (13)                      | 1 (0.5)                        | 0.057            | <0.0001 | 0.0018                     |
| GSE3982 CENT MEMORY CD4 TCELL VS TH1 DN               | 200                 | 27 (13.5)         | 26 (13)                      | 1 (0.5)                        | 0.057            | <0.0001 | 0.0018                     |
| GSE40274 CTRL VS FOXP3 AND HELIOS TRANSDUCED ACTIV... | 198                 | 26 (13.1)         | 26 (13.1)                    | 0 (0)                          | 0.055            | <0.0001 | 0.0018                     |
| GSE41867 DAY6 VS DAY8 LCMV ARMSTRONG EFFECTOR CD8 ... | 201                 | 26 (12.9)         | 26 (12.9)                    | 0 (0)                          | 0.054            | <0.0001 | 0.0018                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 12H UP           | 182                 | 25 (13.7)         | 25 (13.7)                    | 0 (0)                          | 0.054            | <0.0001 | 0.0018                     |
| GSE29618 PDC VS MDC DAY7 FLU VACCINE UP               | 194                 | 25 (12.9)         | 24 (12.4)                    | 1 (0.5)                        | 0.053            | <0.0001 | 0.0018                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE24634 TREG VS TCONV POST DAY7 IL4 CONVERSION UP    | 196                 | 25 (12.8)         | 25 (12.8)                    | 0 (0)                          | 0.053            | <0.0001 | 0.0018                     |
| GOLDRATH NAIVE VS EFF CD8 TCELL DN                    | 198                 | 25 (12.6)         | 24 (12.1)                    | 1 (0.5)                        | 0.052            | <0.0001 | 0.0018                     |
| GSE30962 PRIMARY VS SECONDARY ACUTE LCMV INF CD8 T... | 199                 | 25 (12.6)         | 25 (12.6)                    | 0 (0)                          | 0.052            | <0.0001 | 0.0018                     |
| GSE33292 WT VS TCF1 KO DN3 THYMOCYTE DN               | 200                 | 25 (12.5)         | 25 (12.5)                    | 0 (0)                          | 0.052            | <0.0001 | 0.0018                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL OLD... | 200                 | 25 (12.5)         | 23 (11.5)                    | 2 (1)                          | 0.052            | <0.0001 | 0.0018                     |
| GSE12366 PLASMA CELL VS NAIVE BCELL UP                | 188                 | 24 (12.8)         | 23 (12.2)                    | 1 (0.5)                        | 0.051            | <0.0001 | 0.0018                     |
| GSE13411 SWITCHED MEMORY BCELL VS PLASMA CELL DN      | 190                 | 24 (12.6)         | 23 (12.1)                    | 1 (0.5)                        | 0.051            | <0.0001 | 0.0018                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE DN                 | 196                 | 24 (12.2)         | 24 (12.2)                    | 0 (0)                          | 0.051            | <0.0001 | 0.0018                     |
| GSE21063 WT VS NFATC1 KO 8H ANTI IGM STIM BCELL UP    | 199                 | 24 (12.1)         | 24 (12.1)                    | 0 (0)                          | 0.050            | <0.0001 | 0.0018                     |
| GSE39110 DAY3 VS DAY6 POST IMMUNIZATION CD8 TCELL ... | 201                 | 24 (11.9)         | 24 (11.9)                    | 0 (0)                          | 0.050            | <0.0001 | 0.0018                     |
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 180                 | 23 (12.8)         | 23 (12.8)                    | 0 (0)                          | 0.050            | <0.0001 | 0.0018                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY7 ... | 195                 | 23 (11.8)         | 23 (11.8)                    | 0 (0)                          | 0.048            | <0.0001 | 0.0018                     |
| GSE29618 BCELL VS PDC DAY7 FLU VACCINE DN             | 202                 | 23 (11.4)         | 21 (10.4)                    | 2 (1)                          | 0.048            | <0.0001 | 0.0018                     |
| GSE11386 NAIVE VS MEMORY BCELL UP                     | 183                 | 22 (12)           | 22 (12)                      | 0 (0)                          | 0.047            | <0.0001 | 0.0018                     |
| GSE14415 TCONV VS FOXP3 KO INDUCED TREG DN            | 183                 | 22 (12)           | 22 (12)                      | 0 (0)                          | 0.047            | <0.0001 | 0.0018                     |

**Table 77:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG N GLYCAN BIOSYNTHESIS                   | 46                  | 9 (19.6)          | 9 (19.6)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0093                     |
| KEGG PROTEIN EXPORT                          | 23                  | 7 (30.4)          | 7 (30.4)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0093                     |
| KEGG CELL CYCLE                              | 124                 | 10 (8.1)          | 10 (8.1)                     | 0 (0)                          | 0.024            | 0.0002  | 0.0124                     |
| KEGG GLUTATHIONE METABOLISM                  | 49                  | 5 (10.2)          | 4 (8.2)                      | 1 (2)                          | 0.014            | 0.001   | 0.0465                     |
| KEGG P53 SIGNALING PATHWAY                   | 68                  | 6 (8.8)           | 6 (8.8)                      | 0 (0)                          | 0.016            | 0.0016  | 0.0478                     |
| KEGG VIBRIO CHOLERAE INFECTION               | 53                  | 5 (9.4)           | 5 (9.4)                      | 0 (0)                          | 0.014            | 0.0015  | 0.0478                     |
| KEGG GLYCINE SERINE AND THREONINE METABOLISM | 31                  | 4 (12.9)          | 4 (12.9)                     | 0 (0)                          | 0.012            | 0.0018  | 0.0478                     |
| KEGG OOCYTE MEIOSIS                          | 112                 | 7 (6.2)           | 7 (6.2)                      | 0 (0)                          | 0.017            | 0.0043  | 0.1                        |

**Table 78:** Enriched MSigDB KEGG Pathways (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO TRANSFERASE ACTIVITY TRANSFERRING HEXOSYL GROUP... | 201                 | 12 (6)            | 12 (6)                       | 0 (0)                          | 0.024            | <0.0001 | 0.0372                     |
| GO UNFOLDED PROTEIN BINDING                           | 94                  | 8 (8.5)           | 8 (8.5)                      | 0 (0)                          | 0.021            | 0.0002  | 0.0372                     |
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY TRANSPOS... | 22                  | 6 (27.3)          | 6 (27.3)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0372                     |
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY             | 53                  | 6 (11.3)          | 6 (11.3)                     | 0 (0)                          | 0.017            | 0.0002  | 0.0372                     |
| GO MISFOLDED PROTEIN BINDING                          | 12                  | 4 (33.3)          | 4 (33.3)                     | 0 (0)                          | 0.013            | 0.0002  | 0.0372                     |
| GO TRANSFERASE ACTIVITY TRANSFERRING GLYCOSYL GROU... | 279                 | 13 (4.7)          | 13 (4.7)                     | 0 (0)                          | 0.023            | 0.0003  | 0.0464                     |
| GO ISOMERASE ACTIVITY                                 | 161                 | 9 (5.6)           | 9 (5.6)                      | 0 (0)                          | 0.020            | 0.0004  | 0.0464                     |
| GO CHAPERONE BINDING                                  | 81                  | 7 (8.6)           | 7 (8.6)                      | 0 (0)                          | 0.019            | 0.0004  | 0.0464                     |



| Gene Set Name                                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO CYSTEINE TYPE ENDOPEPTIDASE INHIBITOR ACTIVITY | 55                  | 5 (9.1)           | 4 (7.3)                      | 1 (1.8)                        | 0.014            | 0.0006  | 0.0619                     |

**Table 79:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME DIABETES PATHWAYS                            | 129                 | 16 (12.4)         | 16 (12.4)                    | 0 (0)                          | 0.038            | <0.0001 | 0.0045                     |
| REACTOME UNFOLDED PROTEIN RESPONSE                    | 78                  | 14 (17.9)         | 14 (17.9)                    | 0 (0)                          | 0.038            | <0.0001 | 0.0045                     |
| REACTOME ASPARAGINE N LINKED GLYCOSYLATION            | 81                  | 14 (17.3)         | 14 (17.3)                    | 0 (0)                          | 0.038            | <0.0001 | 0.0045                     |
| REACTOME POST TRANSLATIONAL PROTEIN MODIFICATION      | 181                 | 16 (8.8)          | 16 (8.8)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0045                     |
| REACTOME METABOLISM OF PROTEINS                       | 424                 | 24 (5.7)          | 24 (5.7)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0045                     |
| REACTOME CELL CYCLE MITOTIC                           | 308                 | 20 (6.5)          | 20 (6.5)                     | 0 (0)                          | 0.034            | <0.0001 | 0.0045                     |
| REACTOME ACTIVATION OF CHAPERONE GENES BY XBP1S       | 46                  | 11 (23.9)         | 11 (23.9)                    | 0 (0)                          | 0.033            | <0.0001 | 0.0045                     |
| REACTOME CELL CYCLE                                   | 400                 | 21 (5.2)          | 21 (5.2)                     | 0 (0)                          | 0.031            | <0.0001 | 0.0045                     |
| REACTOME SRP DEPENDENT COTRANSLATIONAL PROTEIN TAR... | 108                 | 11 (10.2)         | 11 (10.2)                    | 0 (0)                          | 0.028            | <0.0001 | 0.0045                     |
| REACTOME TRANSLATION                                  | 145                 | 11 (7.6)          | 11 (7.6)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0045                     |
| REACTOME E2F MEDIATED REGULATION OF DNA REPLICATIO... | 33                  | 7 (21.2)          | 7 (21.2)                     | 0 (0)                          | 0.021            | <0.0001 | 0.0045                     |
| REACTOME G1 S SPECIFIC TRANSCRIPTION                  | 17                  | 6 (35.3)          | 6 (35.3)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0045                     |
| REACTOME TRANSPORT TO THE GOLGI AND SUBSEQUENT MOD... | 33                  | 6 (18.2)          | 6 (18.2)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0045                     |
| REACTOME ACTIVATION OF CHAPERONE GENES BY ATF6 ALP... | 9                   | 4 (44.4)          | 4 (44.4)                     | 0 (0)                          | 0.013            | <0.0001 | 0.0045                     |
| REACTOME ACTIVATION OF CHAPERONES BY ATF6 ALPHA       | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.013            | <0.0001 | 0.0045                     |
| REACTOME CELL CYCLE CHECKPOINTS                       | 112                 | 9 (8)             | 9 (8)                        | 0 (0)                          | 0.022            | 0.0003  | 0.0126                     |
| REACTOME G2 M CHECKPOINTS                             | 42                  | 6 (14.3)          | 6 (14.3)                     | 0 (0)                          | 0.018            | 0.0004  | 0.015                      |
| REACTOME AMINO ACID SYNTHESIS AND INTERCONVERSION ... | 16                  | 4 (25)            | 4 (25)                       | 0 (0)                          | 0.013            | 0.0004  | 0.015                      |
| REACTOME REGULATION OF MITOTIC CELL CYCLE             | 77                  | 7 (9.1)           | 7 (9.1)                      | 0 (0)                          | 0.019            | 0.0005  | 0.0177                     |
| REACTOME MITOTIC M M G1 PHASES                        | 168                 | 11 (6.5)          | 11 (6.5)                     | 0 (0)                          | 0.024            | 0.0007  | 0.0236                     |
| REACTOME E2F ENABLED INHIBITION OF PRE REPLICATION... | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.010            | 0.0009  | 0.0289                     |
| REACTOME DNA REPLICATION                              | 188                 | 11 (5.9)          | 11 (5.9)                     | 0 (0)                          | 0.023            | 0.0011  | 0.0337                     |
| REACTOME MITOTIC PROMETAPHASE                         | 86                  | 7 (8.1)           | 7 (8.1)                      | 0 (0)                          | 0.018            | 0.0019  | 0.0557                     |
| REACTOME MITOTIC G1 G1 S PHASES                       | 130                 | 8 (6.2)           | 8 (6.2)                      | 0 (0)                          | 0.019            | 0.0039  | 0.0973                     |
| REACTOME G1 S TRANSITION                              | 106                 | 7 (6.6)           | 7 (6.6)                      | 0 (0)                          | 0.017            | 0.0039  | 0.0973                     |
| REACTOME CYCLIN A B1 ASSOCIATED EVENTS DURING G2 M... | 15                  | 3 (20)            | 3 (20)                       | 0 (0)                          | 0.009            | 0.0038  | 0.0973                     |
| REACTOME APC C CDC20 MEDIATED DEGRADATION OF CYCLI... | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.009            | 0.0039  | 0.0973                     |

**Table 80:** Enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| Plasma cell surface signature (S3)     | 23                  | 7 (30.4)          | 7 (30.4)                     | 0 (0)                          | 0.051            | <0.0001 | 0.0173                     |
| plasma cells, immunoglobulins (M156.1) | 22                  | 5 (22.7)          | 5 (22.7)                     | 0 (0)                          | 0.036            | <0.0001 | 0.0173                     |

**Table 81:** Enriched Blood Transcription Modules (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RESPONSE TO ENDOPLASMIC RETICULUM STRESS           | 234                 | 15 (6.4)          | 15 (6.4)                     | 0 (0)                          | 0.044            | <0.0001 | 0.031                      |
| GO CELLULAR RESPONSE TO TOPOLOGICALLY INCORRECT PR... | 123                 | 10 (8.1)          | 10 (8.1)                     | 0 (0)                          | 0.043            | <0.0001 | 0.031                      |
| GO RESPONSE TO TOPOLOGICALLY INCORRECT PROTEIN        | 164                 | 11 (6.7)          | 11 (6.7)                     | 0 (0)                          | 0.040            | <0.0001 | 0.031                      |
| GO ER ASSOCIATED UBIQUITIN DEPENDENT PROTEIN CATAB... | 61                  | 7 (11.5)          | 7 (11.5)                     | 0 (0)                          | 0.040            | <0.0001 | 0.031                      |
| GO CELL REDOX HOMEOSTASIS                             | 67                  | 7 (10.4)          | 7 (10.4)                     | 0 (0)                          | 0.039            | <0.0001 | 0.031                      |
| GO ERAD PATHWAY                                       | 74                  | 7 (9.5)           | 7 (9.5)                      | 0 (0)                          | 0.037            | <0.0001 | 0.031                      |
| GO IRE1 MEDIATED UNFOLDED PROTEIN RESPONSE            | 57                  | 6 (10.5)          | 6 (10.5)                     | 0 (0)                          | 0.035            | <0.0001 | 0.031                      |
| GO PROTEIN FOLDING                                    | 217                 | 11 (5.1)          | 11 (5.1)                     | 0 (0)                          | 0.034            | <0.0001 | 0.031                      |
| GO PROTEIN EXIT FROM ENDOPLASMIC RETICULUM            | 20                  | 4 (20)            | 4 (20)                       | 0 (0)                          | 0.029            | <0.0001 | 0.031                      |
| GO ER NUCLEUS SIGNALING PATHWAY                       | 34                  | 4 (11.8)          | 4 (11.8)                     | 0 (0)                          | 0.026            | <0.0001 | 0.031                      |
| GO PROTEASOMAL PROTEIN CATABOLIC PROCESS              | 272                 | 8 (2.9)           | 8 (2.9)                      | 0 (0)                          | 0.021            | <0.0001 | 0.031                      |
| GO CELLULAR HOMEOSTASIS                               | 678                 | 16 (2.4)          | 16 (2.4)                     | 0 (0)                          | 0.020            | <0.0001 | 0.031                      |
| GO CELLULAR RESPONSE TO STRESS                        | 1563                | 23 (1.5)          | 21 (1.3)                     | 2 (0.1)                        | 0.014            | <0.0001 | 0.031                      |
| GO HOMEOSTATIC PROCESS                                | 1333                | 19 (1.4)          | 19 (1.4)                     | 0 (0)                          | 0.013            | <0.0001 | 0.031                      |
| GO CELLULAR RESPONSE TO ORGANIC SUBSTANCE             | 1848                | 23 (1.2)          | 22 (1.2)                     | 1 (0.1)                        | 0.012            | <0.0001 | 0.031                      |
| GO RETROGRADE PROTEIN TRANSPORT ER TO CYTOSOL         | 16                  | 3 (18.8)          | 3 (18.8)                     | 0 (0)                          | 0.022            | 0.0003  | 0.0872                     |

**Table 82:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO ENDOPLASMIC RETICULUM CHAPERONE COMPLEX            | 11                  | 5 (45.5)          | 5 (45.5)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0117                     |
| GO ENDOPLASMIC RETICULUM LUMEN                        | 202                 | 12 (5.9)          | 12 (5.9)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0117                     |
| GO ENDOPLASMIC RETICULUM PART                         | 1162                | 33 (2.8)          | 33 (2.8)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0117                     |
| GO NUCLEAR OUTER MEMBRANE ENDOPLASMIC RETICULUM ME... | 1005                | 26 (2.6)          | 26 (2.6)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0117                     |
| GO ENDOPLASMIC RETICULUM                              | 1631                | 39 (2.4)          | 39 (2.4)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0117                     |
| GO PIGMENT GRANULE                                    | 102                 | 5 (4.9)           | 5 (4.9)                      | 0 (0)                          | 0.023            | 0.0003  | 0.0292                     |
| GO ENDOPLASMIC RETICULUM GOLGI INTERMEDIATE COMPAR... | 106                 | 5 (4.7)           | 5 (4.7)                      | 0 (0)                          | 0.022            | 0.0007  | 0.0584                     |
| GO ROUGH ENDOPLASMIC RETICULUM                        | 71                  | 4 (5.6)           | 4 (5.6)                      | 0 (0)                          | 0.021            | 0.0009  | 0.0657                     |
| GO SMOOTH ENDOPLASMIC RETICULUM                       | 33                  | 3 (9.1)           | 3 (9.1)                      | 0 (0)                          | 0.020            | 0.0012  | 0.0779                     |

**Table 83:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 39 (21.8)         | 39 (21.8)                    | 0 (0)                          | 0.149            | <0.0001 | 0.008                      |
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 35 (19.1)         | 35 (19.1)                    | 0 (0)                          | 0.130            | <0.0001 | 0.008                      |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 31 (16.5)         | 31 (16.5)                    | 0 (0)                          | 0.112            | <0.0001 | 0.008                      |
| GSE22886 NAIVE BCELL VS BM PLASMA CELL DN             | 195                 | 24 (12.3)         | 24 (12.3)                    | 0 (0)                          | 0.082            | <0.0001 | 0.008                      |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 23 (12.3)         | 23 (12.3)                    | 0 (0)                          | 0.081            | <0.0001 | 0.008                      |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 22 (11.6)         | 22 (11.6)                    | 0 (0)                          | 0.076            | <0.0001 | 0.008                      |
| GSE12845 IGD POS VS NEG BLOOD BCELL DN                | 186                 | 20 (10.8)         | 20 (10.8)                    | 0 (0)                          | 0.070            | <0.0001 | 0.008                      |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 180                 | 18 (10)           | 18 (10)                      | 0 (0)                          | 0.064            | <0.0001 | 0.008                      |
| GSE22886 IGG IGA MEMORY BCELL VS BM PLASMA CELL DN    | 190                 | 17 (8.9)          | 17 (8.9)                     | 0 (0)                          | 0.058            | <0.0001 | 0.008                      |
| GSE20727 CTRL VS ROS INHIBITOR TREATED DC DN          | 191                 | 17 (8.9)          | 17 (8.9)                     | 0 (0)                          | 0.058            | <0.0001 | 0.008                      |
| GSE22886 NAIVE BCELL VS BLOOD PLASMA CELL DN          | 194                 | 16 (8.2)          | 16 (8.2)                     | 0 (0)                          | 0.053            | <0.0001 | 0.008                      |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 14 (8.1)          | 14 (8.1)                     | 0 (0)                          | 0.050            | <0.0001 | 0.008                      |
| GSE40273 EOS KO VS WT TREG UP                         | 199                 | 15 (7.5)          | 15 (7.5)                     | 0 (0)                          | 0.049            | <0.0001 | 0.008                      |
| GSE29618 PDC VS MDC DAY7 FLU VACCINE UP               | 194                 | 14 (7.2)          | 14 (7.2)                     | 0 (0)                          | 0.046            | <0.0001 | 0.008                      |
| GSE10325 BCELL VS LUPUS BCELL DN                      | 200                 | 14 (7)            | 14 (7)                       | 0 (0)                          | 0.046            | <0.0001 | 0.008                      |
| GSE41867 DAY6 VS DAY8 LCMV ARMSTRONG EFFECTOR CD8 ... | 201                 | 14 (7)            | 14 (7)                       | 0 (0)                          | 0.045            | <0.0001 | 0.008                      |
| GSE13411 NAIVE BCELL VS PLASMA CELL DN                | 188                 | 13 (6.9)          | 13 (6.9)                     | 0 (0)                          | 0.044            | <0.0001 | 0.008                      |
| GSE13411 IGM MEMORY BCELL VS PLASMA CELL DN           | 190                 | 13 (6.8)          | 13 (6.8)                     | 0 (0)                          | 0.044            | <0.0001 | 0.008                      |
| GSE40666 UNTREATED VS IFNA STIM STAT4 KO EFFECTOR ... | 196                 | 13 (6.6)          | 13 (6.6)                     | 0 (0)                          | 0.043            | <0.0001 | 0.008                      |
| GSE22886 IGM MEMORY BCELL VS BM PLASMA CELL DN        | 194                 | 12 (6.2)          | 12 (6.2)                     | 0 (0)                          | 0.040            | <0.0001 | 0.008                      |
| GSE339 CD4POS VS CD8POS DC DN                         | 199                 | 12 (6)            | 12 (6)                       | 0 (0)                          | 0.039            | <0.0001 | 0.008                      |
| GSE29618 MONOCYTE VS PDC DAY7 FLU VACCINE DN          | 197                 | 11 (5.6)          | 11 (5.6)                     | 0 (0)                          | 0.036            | <0.0001 | 0.008                      |
| GSE3982 CENT MEMORY CD4 TCELL VS TH1 DN               | 200                 | 11 (5.5)          | 10 (5)                       | 1 (0.5)                        | 0.035            | <0.0001 | 0.008                      |
| GSE29618 BCELL VS PDC DAY7 FLU VACCINE DN             | 202                 | 11 (5.4)          | 11 (5.4)                     | 0 (0)                          | 0.035            | <0.0001 | 0.008                      |
| GSE12366 PLASMA CELL VS MEMORY BCELL UP               | 185                 | 10 (5.4)          | 10 (5.4)                     | 0 (0)                          | 0.034            | <0.0001 | 0.008                      |
| GSE12366 GC BCELL VS PLASMA CELL DN                   | 186                 | 10 (5.4)          | 10 (5.4)                     | 0 (0)                          | 0.034            | <0.0001 | 0.008                      |
| GSE22886 IGG IGA MEMORY BCELL VS BLOOD PLASMA CELL... | 197                 | 10 (5.1)          | 10 (5.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.008                      |
| GSE29618 PDC VS MDC UP                                | 197                 | 10 (5.1)          | 10 (5.1)                     | 0 (0)                          | 0.033            | <0.0001 | 0.008                      |
| GSE40274 CTRL VS FOXP3 AND HELIOS TRANSDUCED ACTIV... | 198                 | 10 (5.1)          | 10 (5.1)                     | 0 (0)                          | 0.032            | <0.0001 | 0.008                      |
| GSE29618 BCELL VS PDC DN                              | 200                 | 10 (5)            | 10 (5)                       | 0 (0)                          | 0.032            | <0.0001 | 0.008                      |
| GSE43260 BTLA POS VS NEG INTRATUMORAL CD8 TCELL UP    | 200                 | 10 (5)            | 10 (5)                       | 0 (0)                          | 0.032            | <0.0001 | 0.008                      |
| GSE32164 RESTING DIFFERENTIATED VS ALTERNATIVELY A... | 202                 | 10 (5)            | 9 (4.5)                      | 1 (0.5)                        | 0.032            | <0.0001 | 0.008                      |
| GSE12366 PLASMA CELL VS NAIVE BCELL UP                | 188                 | 9 (4.8)           | 9 (4.8)                      | 0 (0)                          | 0.030            | <0.0001 | 0.008                      |
| GSE13411 SWITCHED MEMORY BCELL VS PLASMA CELL DN      | 190                 | 9 (4.7)           | 9 (4.7)                      | 0 (0)                          | 0.030            | <0.0001 | 0.008                      |
| GSE29618 MONOCYTE VS PDC DN                           | 192                 | 9 (4.7)           | 9 (4.7)                      | 0 (0)                          | 0.030            | <0.0001 | 0.008                      |
| GSE21670 UNTREATED VS TGFB TREATED STAT3 KO CD4 TC... | 197                 | 9 (4.6)           | 9 (4.6)                      | 0 (0)                          | 0.029            | <0.0001 | 0.008                      |
| GSE41867 MEMORY VS EXHAUSTED CD8 TCELL DAY30 LCMV ... | 198                 | 9 (4.5)           | 9 (4.5)                      | 0 (0)                          | 0.029            | <0.0001 | 0.008                      |
| GSE40274 FOXP3 VS FOXP3 AND EOS TRANSDUCED ACTIVAT... | 202                 | 9 (4.5)           | 8 (4)                        | 1 (0.5)                        | 0.029            | <0.0001 | 0.008                      |
| GSE6269 E COLI VS STAPH AUREUS INF PBMC DN            | 174                 | 8 (4.6)           | 8 (4.6)                      | 0 (0)                          | 0.028            | <0.0001 | 0.008                      |
| GSE22886 NAIVE VS IGG IGA MEMORY BCELL DN             | 193                 | 8 (4.1)           | 7 (3.6)                      | 1 (0.5)                        | 0.026            | <0.0001 | 0.008                      |
| GSE29617 CTRL VS TIV FLU VACCINE PBMC 2008 DN         | 196                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.026            | <0.0001 | 0.008                      |
| GSE29164 DAY3 VS DAY7 UNTREATED MELANOMA DN           | 199                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.026            | <0.0001 | 0.008                      |
| GSE32164 ALTERNATIVELY ACT M2 VS CMYC INHIBITED MA... | 200                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.026            | <0.0001 | 0.008                      |
| GSE7460 FOXP3 MUT VS WT ACT WITH TGFB TCONV UP        | 200                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.026            | <0.0001 | 0.008                      |
| GSE15330 HSC VS LYMPHOID PRIMED MULTIPOTENT PROGEN... | 183                 | 7 (3.8)           | 7 (3.8)                      | 0 (0)                          | 0.024            | <0.0001 | 0.008                      |
| GSE17974 IL4 AND ANTI IL12 VS UNTREATED 12H ACT CD... | 192                 | 7 (3.6)           | 7 (3.6)                      | 0 (0)                          | 0.023            | <0.0001 | 0.008                      |
| GSE22886 NAIVE VS IGM MEMORY BCELL DN                 | 195                 | 7 (3.6)           | 6 (3.1)                      | 1 (0.5)                        | 0.023            | <0.0001 | 0.008                      |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY3 ... | 198                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.022            | <0.0001 | 0.008                      |
| GSE360 CTRL VS M TUBERCULOSIS DC DN                   | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.022            | <0.0001 | 0.008                      |
| GOLDRATH NAIVE VS MEMORY CD8 TCELL DN                 | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.022            | <0.0001 | 0.008                      |

**Table 84:** Enriched MSigDB Immunological Signatures (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name       | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG PROTEIN EXPORT | 23                  | 3 (13)            | 3 (13)                       | 0 (0)                          | 0.021            | 0.0003  | 0.0558                     |

**Table 85:** Enriched MSigDB KEGG Pathways (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY TRANSPOS... | 22                  | 4 (18.2)          | 4 (18.2)                     | 0 (0)                          | 0.029            | <0.0001 | 0.031                      |
| GO UNFOLDED PROTEIN BINDING                           | 94                  | 6 (6.4)           | 6 (6.4)                      | 0 (0)                          | 0.029            | <0.0001 | 0.031                      |
| GO ISOMERASE ACTIVITY                                 | 161                 | 6 (3.7)           | 6 (3.7)                      | 0 (0)                          | 0.022            | <0.0001 | 0.031                      |
| GO INTRAMOLECULAR OXIDOREDUCTASE ACTIVITY             | 53                  | 4 (7.5)           | 4 (7.5)                      | 0 (0)                          | 0.024            | 0.0002  | 0.0372                     |
| GO G PROTEIN COUPLED CHEMOATTRACTANT RECEPTOR ACTI... | 25                  | 3 (12)            | 3 (12)                       | 0 (0)                          | 0.021            | 0.0002  | 0.0372                     |
| GO MISFOLDED PROTEIN BINDING                          | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.023            | 0.0003  | 0.0464                     |

**Table 86:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME UNFOLDED PROTEIN RESPONSE                    | 78                  | 6 (7.7)           | 6 (7.7)                      | 0 (0)                          | 0.031            | <0.0001 | 0.0168                     |
| REACTOME DIABETES PATHWAYS                            | 129                 | 7 (5.4)           | 7 (5.4)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0168                     |
| REACTOME ACTIVATION OF CHAPERONE GENES BY ATF6 ALP... | 9                   | 3 (33.3)          | 3 (33.3)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0168                     |
| REACTOME ACTIVATION OF CHAPERONES BY ATF6 ALPHA       | 11                  | 3 (27.3)          | 3 (27.3)                     | 0 (0)                          | 0.023            | <0.0001 | 0.0168                     |
| REACTOME ASPARAGINE N LINKED GLYCOSYLATION            | 81                  | 5 (6.2)           | 5 (6.2)                      | 0 (0)                          | 0.025            | 0.0002  | 0.027                      |
| REACTOME ACTIVATION OF CHAPERONE GENES BY XBP1S       | 46                  | 4 (8.7)           | 4 (8.7)                      | 0 (0)                          | 0.025            | 0.0003  | 0.0337                     |

**Table 87:** Enriched MSigDB Reactome Pathways (B Cells, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                          | 15                  | 3 (20)            | 3 (20)                       | 0 (0)                          | 0.115            | <0.0001 | 0.0291                     |
| GO GAS TRANSPORT                             | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.100            | <0.0001 | 0.0291                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS       | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.097            | <0.0001 | 0.0291                     |
| GO T CELL MIGRATION                          | 14                  | 2 (14.3)          | 2 (14.3)                     | 0 (0)                          | 0.077            | <0.0001 | 0.0291                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS       | 30                  | 3 (10)            | 3 (10)                       | 0 (0)                          | 0.073            | <0.0001 | 0.0291                     |
| GO BICARBONATE TRANSPORT                     | 44                  | 3 (6.8)           | 3 (6.8)                      | 0 (0)                          | 0.054            | <0.0001 | 0.0291                     |
| GO LYMPHOCYTE CHEMOTAXIS                     | 37                  | 2 (5.4)           | 2 (5.4)                      | 0 (0)                          | 0.041            | <0.0001 | 0.0291                     |
| GO RESPONSE TO HYDROGEN PEROXIDE             | 109                 | 4 (3.7)           | 4 (3.7)                      | 0 (0)                          | 0.034            | <0.0001 | 0.0291                     |
| GO REACTIVE OXYGEN SPECIES METABOLIC PROCESS | 96                  | 3 (3.1)           | 3 (3.1)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0291                     |
| GO PROTEIN HETEROOLIGOMERIZATION             | 113                 | 3 (2.7)           | 3 (2.7)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0291                     |
| GO RESPONSE TO REACTIVE OXYGEN SPECIES       | 191                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0291                     |
| GO RESPONSE TO TOXIC SUBSTANCE               | 241                 | 4 (1.7)           | 4 (1.7)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0291                     |

| Gene Set Name                             | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RECEPTOR MEDIATED ENDOCYTOSIS          | 213                 | 3 (1.4)           | 3 (1.4)                      | 0 (0)                          | 0.013            | <0.0001 | 0.0291                     |
| GO RESPONSE TO OXIDATIVE STRESS           | 352                 | 4 (1.1)           | 4 (1.1)                      | 0 (0)                          | 0.011            | <0.0001 | 0.0291                     |
| GO POSITIVE REGULATION OF CELL DEATH      | 606                 | 5 (0.8)           | 5 (0.8)                      | 0 (0)                          | 0.008            | <0.0001 | 0.0291                     |
| GO RESPONSE TO INORGANIC SUBSTANCE        | 484                 | 4 (0.8)           | 4 (0.8)                      | 0 (0)                          | 0.008            | <0.0001 | 0.0291                     |
| GO DETOXIFICATION                         | 76                  | 3 (3.9)           | 3 (3.9)                      | 0 (0)                          | 0.035            | 0.0002  | 0.0547                     |
| GO LYMPHOCYTE MIGRATION                   | 48                  | 2 (4.2)           | 2 (4.2)                      | 0 (0)                          | 0.033            | 0.0004  | 0.0979                     |
| GO RESPONSE TO OXYGEN CONTAINING COMPOUND | 1385                | 5 (0.4)           | 5 (0.4)                      | 0 (0)                          | 0.004            | 0.0004  | 0.0979                     |

**Table 88:** Enriched MSigDB Biological Processes (B Cells, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                        | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HEMOGLOBIN COMPLEX                | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.130            | <0.0001 | 0.0146                     |
| GO ENDOCYTIC VESICLE LUMEN           | 17                  | 3 (17.6)          | 3 (17.6)                     | 0 (0)                          | 0.107            | <0.0001 | 0.0146                     |
| GO VESICLE LUMEN                     | 106                 | 3 (2.8)           | 3 (2.8)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0146                     |
| GO BLOOD MICROPARTICLE               | 118                 | 3 (2.5)           | 3 (2.5)                      | 0 (0)                          | 0.023            | <0.0001 | 0.0146                     |
| GO CYTOSOLIC SMALL RIBOSOMAL SUBUNIT | 43                  | 2 (4.7)           | 2 (4.7)                      | 0 (0)                          | 0.036            | 0.0006  | 0.0584                     |
| GO CYTOSOLIC PART                    | 220                 | 3 (1.4)           | 3 (1.4)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0584                     |
| GO ENDOCYTIC VESICLE                 | 255                 | 3 (1.2)           | 3 (1.2)                      | 0 (0)                          | 0.011            | 0.0006  | 0.0584                     |
| GO SMALL RIBOSOMAL SUBUNIT           | 67                  | 2 (3)             | 2 (3)                        | 0 (0)                          | 0.025            | 0.0009  | 0.0657                     |

**Table 89:** Enriched MSigDB Cellular Components (B Cells, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 3 (21.4)          | 3 (21.4)                     | 0 (0)                          | 0.120            | <0.0001 | 0.0186                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 3 (7.3)           | 3 (7.3)                      | 0 (0)                          | 0.058            | <0.0001 | 0.0186                     |
| GO OXYGEN BINDING                                     | 47                  | 3 (6.4)           | 3 (6.4)                      | 0 (0)                          | 0.052            | <0.0001 | 0.0186                     |
| GO ANTIOXIDANT ACTIVITY                               | 69                  | 3 (4.3)           | 3 (4.3)                      | 0 (0)                          | 0.037            | <0.0001 | 0.0186                     |
| GO TETRAPYRROLE BINDING                               | 133                 | 3 (2.3)           | 3 (2.3)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0186                     |
| GO CHEMOKINE BINDING                                  | 21                  | 2 (9.5)           | 2 (9.5)                      | 0 (0)                          | 0.061            | 0.0002  | 0.0232                     |
| GO G PROTEIN COUPLED CHEMOATTRACTANT RECEPTOR ACTI... | 25                  | 2 (8)             | 2 (8)                        | 0 (0)                          | 0.054            | 0.0002  | 0.0232                     |
| GO IRON ION BINDING                                   | 162                 | 3 (1.9)           | 3 (1.9)                      | 0 (0)                          | 0.017            | 0.0002  | 0.0232                     |
| GO OXIDOREDUCTASE ACTIVITY                            | 712                 | 4 (0.6)           | 4 (0.6)                      | 0 (0)                          | 0.005            | 0.0005  | 0.0516                     |
| GO CYTOKINE BINDING                                   | 92                  | 2 (2.2)           | 2 (2.2)                      | 0 (0)                          | 0.019            | 0.001   | 0.0929                     |

**Table 90:** Enriched MSigDB Molecular Functions (B Cells, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| enriched in monocytes (II) (M11.0)                     | 183                 | 22 (12)           | 22 (12)                      | 0 (0)                          | 0.074            | <0.0001 | 0.0058                     |
| Monocyte surface signature (S4)                        | 84                  | 11 (13.1)         | 11 (13.1)                    | 0 (0)                          | 0.053            | <0.0001 | 0.0058                     |
| cell cycle and transcription (M4.0)                    | 318                 | 19 (6)            | 19 (6)                       | 0 (0)                          | 0.044            | <0.0001 | 0.0058                     |
| enriched in activated dendritic cells (II) (M165)      | 35                  | 7 (20)            | 7 (20)                       | 0 (0)                          | 0.043            | <0.0001 | 0.0058                     |
| TLR and inflammatory signaling (M16)                   | 43                  | 7 (16.3)          | 7 (16.3)                     | 0 (0)                          | 0.041            | <0.0001 | 0.0058                     |
| formyl peptide receptor mediated neutrophil respon...  | 10                  | 5 (50)            | 5 (50)                       | 0 (0)                          | 0.036            | <0.0001 | 0.0058                     |
| suppression of MAPK signaling (M56)                    | 12                  | 4 (33.3)          | 4 (33.3)                     | 0 (0)                          | 0.028            | 0.0002  | 0.0099                     |
| enriched in neutrophils (I) (M37.1)                    | 47                  | 6 (12.8)          | 5 (10.6)                     | 1 (2.1)                        | 0.034            | 0.0003  | 0.0115                     |
| antiviral IFN signature (M75)                          | 22                  | 5 (22.7)          | 5 (22.7)                     | 0 (0)                          | 0.033            | 0.0003  | 0.0115                     |
| myeloid cell enriched receptors and transporters (...) | 30                  | 5 (16.7)          | 5 (16.7)                     | 0 (0)                          | 0.031            | 0.0007  | 0.0242                     |
| enriched in activated dendritic cells/monocytes (M...  | 16                  | 4 (25)            | 3 (18.8)                     | 1 (6.2)                        | 0.027            | 0.0008  | 0.0252                     |
| RIG-1 like receptor signaling (M68)                    | 9                   | 3 (33.3)          | 3 (33.3)                     | 0 (0)                          | 0.021            | 0.001   | 0.0288                     |
| G protein coupled receptors cluster (M155)             | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.021            | 0.0013  | 0.0346                     |
| enriched in monocytes (III) (M73)                      | 11                  | 3 (27.3)          | 3 (27.3)                     | 0 (0)                          | 0.021            | 0.0019  | 0.047                      |
| type I interferon response (M127)                      | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.021            | 0.0026  | 0.06                       |
| innate antiviral response (M150)                       | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.021            | 0.0032  | 0.0692                     |
| chemokines and inflammatory molecules in myeloid c...  | 18                  | 3 (16.7)          | 2 (11.1)                     | 1 (5.6)                        | 0.020            | 0.0049  | 0.0997                     |

**Table 91:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO INNATE IMMUNE RESPONSE                          | 589                 | 27 (4.6)          | 25 (4.2)                     | 2 (0.3)                        | 0.039            | <0.0001 | 0.0122                     |
| GO DEFENSE RESPONSE TO VIRUS                       | 165                 | 11 (6.7)          | 11 (6.7)                     | 0 (0)                          | 0.038            | <0.0001 | 0.0122                     |
| GO RESPONSE TO INTERFERON GAMMA                    | 140                 | 10 (7.1)          | 9 (6.4)                      | 1 (0.7)                        | 0.038            | <0.0001 | 0.0122                     |
| GO INTERFERON GAMMA MEDIATED SIGNALING PATHWAY     | 67                  | 7 (10.4)          | 7 (10.4)                     | 0 (0)                          | 0.036            | <0.0001 | 0.0122                     |
| GO RESPONSE TO TYPE I INTERFERON                   | 67                  | 7 (10.4)          | 7 (10.4)                     | 0 (0)                          | 0.036            | <0.0001 | 0.0122                     |
| GO RESPONSE TO VIRUS                               | 248                 | 13 (5.2)          | 13 (5.2)                     | 0 (0)                          | 0.035            | <0.0001 | 0.0122                     |
| GO CELLULAR RESPONSE TO INTERFERON GAMMA           | 118                 | 8 (6.8)           | 7 (5.9)                      | 1 (0.8)                        | 0.033            | <0.0001 | 0.0122                     |
| GO RESPONSE TO HEAT                                | 89                  | 7 (7.9)           | 7 (7.9)                      | 0 (0)                          | 0.032            | <0.0001 | 0.0122                     |
| GO IMMUNE RESPONSE                                 | 1052                | 37 (3.5)          | 35 (3.3)                     | 2 (0.2)                        | 0.032            | <0.0001 | 0.0122                     |
| GO CYTOKINE MEDIATED SIGNALING PATHWAY             | 448                 | 18 (4)            | 17 (3.8)                     | 1 (0.2)                        | 0.032            | <0.0001 | 0.0122                     |
| GO IMMUNE EFFECTOR PROCESS                         | 456                 | 18 (3.9)          | 17 (3.7)                     | 1 (0.2)                        | 0.031            | <0.0001 | 0.0122                     |
| GO DEFENSE RESPONSE                                | 1197                | 40 (3.3)          | 37 (3.1)                     | 3 (0.3)                        | 0.031            | <0.0001 | 0.0122                     |
| GO REGULATION OF ACUTE INFLAMMATORY RESPONSE       | 74                  | 6 (8.1)           | 6 (8.1)                      | 0 (0)                          | 0.030            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF LEUKOCYTE MIGRATION      | 109                 | 7 (6.4)           | 6 (5.5)                      | 1 (0.9)                        | 0.029            | <0.0001 | 0.0122                     |
| GO RESPONSE TO TEMPERATURE STIMULUS                | 148                 | 8 (5.4)           | 8 (5.4)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0122                     |
| GO DEFENSE RESPONSE TO OTHER ORGANISM              | 483                 | 17 (3.5)          | 16 (3.3)                     | 1 (0.2)                        | 0.028            | <0.0001 | 0.0122                     |
| GO REGULATION OF FEVER GENERATION                  | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0122                     |
| GO NEGATIVE REGULATION OF VIRAL GENOME REPLICATION | 49                  | 5 (10.2)          | 5 (10.2)                     | 0 (0)                          | 0.028            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF MONOCYTE CHEMOTAXIS      | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.027            | <0.0001 | 0.0122                     |
| GO REGULATION OF HEAT GENERATION                   | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.027            | <0.0001 | 0.0122                     |
| GO RESPONSE TO CYTOKINE                            | 710                 | 22 (3.1)          | 21 (3)                       | 1 (0.1)                        | 0.027            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF CYTOKINE SECRETION       | 96                  | 6 (6.2)           | 6 (6.2)                      | 0 (0)                          | 0.027            | <0.0001 | 0.0122                     |
| GO REGULATION OF MONOCYTE CHEMOTAXIS               | 20                  | 4 (20)            | 4 (20)                       | 0 (0)                          | 0.026            | <0.0001 | 0.0122                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO REGULATION OF LEUKOCYTE MIGRATION                  | 148                 | 7 (4.7)           | 6 (4.1)                      | 1 (0.7)                        | 0.025            | <0.0001 | 0.0122                     |
| GO CELLULAR RESPONSE TO CYTOKINE STIMULUS             | 602                 | 18 (3)            | 17 (2.8)                     | 1 (0.2)                        | 0.025            | <0.0001 | 0.0122                     |
| GO REGULATION OF IMMUNE RESPONSE                      | 821                 | 23 (2.8)          | 21 (2.6)                     | 2 (0.2)                        | 0.025            | <0.0001 | 0.0122                     |
| GO INFLAMMATORY RESPONSE                              | 451                 | 13 (2.9)          | 12 (2.7)                     | 1 (0.2)                        | 0.023            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF DEFENSE RESPONSE            | 363                 | 11 (3)            | 10 (2.8)                     | 1 (0.3)                        | 0.023            | <0.0001 | 0.0122                     |
| GO RESPONSE TO BIOTIC STIMULUS                        | 863                 | 22 (2.5)          | 21 (2.4)                     | 1 (0.1)                        | 0.022            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF IMMUNE SYSTEM PROCESS       | 833                 | 21 (2.5)          | 20 (2.4)                     | 1 (0.1)                        | 0.022            | <0.0001 | 0.0122                     |
| GO REGULATION OF DEFENSE RESPONSE                     | 757                 | 19 (2.5)          | 18 (2.4)                     | 1 (0.1)                        | 0.022            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF IMMUNE RESPONSE             | 529                 | 14 (2.6)          | 14 (2.6)                     | 0 (0)                          | 0.021            | <0.0001 | 0.0122                     |
| GO REGULATION OF ENDOTHELIAL CELL DEVELOPMENT         | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.021            | <0.0001 | 0.0122                     |
| GO REGULATION OF ESTABLISHMENT OF ENDOTHELIAL BARR... | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.021            | <0.0001 | 0.0122                     |
| GO REGULATION OF IMMUNE SYSTEM PROCESS                | 1369                | 30 (2.2)          | 27 (2)                       | 3 (0.2)                        | 0.020            | <0.0001 | 0.0122                     |
| GO IMMUNE SYSTEM PROCESS                              | 1932                | 41 (2.1)          | 39 (2)                       | 2 (0.1)                        | 0.020            | <0.0001 | 0.0122                     |
| GO RESPONSE TO EXTERNAL STIMULUS                      | 1798                | 34 (1.9)          | 31 (1.7)                     | 3 (0.2)                        | 0.018            | <0.0001 | 0.0122                     |
| GO POSITIVE REGULATION OF RESPONSE TO STIMULUS        | 1898                | 28 (1.5)          | 25 (1.3)                     | 3 (0.2)                        | 0.014            | <0.0001 | 0.0122                     |
| GO NEGATIVE REGULATION OF VIRAL PROCESS               | 91                  | 6 (6.6)           | 6 (6.6)                      | 0 (0)                          | 0.027            | 0.0002  | 0.0202                     |
| GO POSITIVE REGULATION OF ACUTE INFLAMMATORY RESPO... | 28                  | 4 (14.3)          | 4 (14.3)                     | 0 (0)                          | 0.025            | 0.0002  | 0.0202                     |
| GO POSITIVE REGULATION OF INFLAMMATORY RESPONSE       | 112                 | 6 (5.4)           | 5 (4.5)                      | 1 (0.9)                        | 0.025            | 0.0002  | 0.0202                     |
| GO POSITIVE REGULATION OF CHEMOTAXIS                  | 120                 | 6 (5)             | 5 (4.2)                      | 1 (0.8)                        | 0.024            | 0.0002  | 0.0202                     |
| GO POSITIVE REGULATION OF LEUKOCYTE CHEMOTAXIS        | 81                  | 5 (6.2)           | 5 (6.2)                      | 0 (0)                          | 0.024            | 0.0002  | 0.0202                     |
| GO REGULATION OF INNATE IMMUNE RESPONSE               | 357                 | 10 (2.8)          | 10 (2.8)                     | 0 (0)                          | 0.021            | 0.0002  | 0.0202                     |
| GO REGULATION OF CYTOKINE PRODUCTION                  | 561                 | 14 (2.5)          | 14 (2.5)                     | 0 (0)                          | 0.021            | 0.0002  | 0.0202                     |
| GO CELLULAR RESPONSE TO ORGANIC SUBSTANCE             | 1848                | 28 (1.5)          | 25 (1.4)                     | 3 (0.2)                        | 0.014            | 0.0002  | 0.0202                     |
| GO REGULATION OF CYTOKINE SECRETION                   | 147                 | 7 (4.8)           | 7 (4.8)                      | 0 (0)                          | 0.025            | 0.0003  | 0.0258                     |
| GO REGULATION OF VIRAL GENOME REPLICATION             | 75                  | 5 (6.7)           | 5 (6.7)                      | 0 (0)                          | 0.024            | 0.0003  | 0.0258                     |
| GO PHAGOCYTOSIS                                       | 163                 | 7 (4.3)           | 7 (4.3)                      | 0 (0)                          | 0.024            | 0.0003  | 0.0258                     |
| GO CELLULAR RESPONSE TO HEAT                          | 36                  | 4 (11.1)          | 4 (11.1)                     | 0 (0)                          | 0.024            | 0.0003  | 0.0258                     |

**Table 92:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                 | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO ENDOCYTIC VESICLE MEMBRANE | 150                 | 7 (4.7)           | 7 (4.7)                      | 0 (0)                          | 0.025            | 0.0002  | 0.0584                     |
| GO ENDOCYTIC VESICLE          | 255                 | 9 (3.5)           | 9 (3.5)                      | 0 (0)                          | 0.024            | 0.0002  | 0.0584                     |
| GO EXTRACELLULAR SPACE        | 1339                | 22 (1.6)          | 19 (1.4)                     | 3 (0.2)                        | 0.015            | 0.0003  | 0.0584                     |

**Table 93:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                               | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE13485 CTRL VS DAY7 YF17D VACCINE PBMC DN | 202                 | 33 (16.3)         | 33 (16.3)                    | 0 (0)                          | 0.109            | <0.0001 | 0.002                      |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE13485 DAY3 VS DAY7 YF17D VACCINE PBMC DN           | 199                 | 27 (13.6)         | 27 (13.6)                    | 0 (0)                          | 0.088            | <0.0001 | 0.002                      |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC DN        | 199                 | 27 (13.6)         | 27 (13.6)                    | 0 (0)                          | 0.088            | <0.0001 | 0.002                      |
| GSE14000 UNSTIM VS 4H LPS DC DN                       | 197                 | 26 (13.2)         | 26 (13.2)                    | 0 (0)                          | 0.085            | <0.0001 | 0.002                      |
| GSE13485 DAY1 VS DAY7 YF17D VACCINE PBMC DN           | 199                 | 26 (13.1)         | 26 (13.1)                    | 0 (0)                          | 0.084            | <0.0001 | 0.002                      |
| GSE42724 NAIVE BCELL VS PLASMABLAST UP                | 192                 | 25 (13)           | 25 (13)                      | 0 (0)                          | 0.083            | <0.0001 | 0.002                      |
| GSE13485 CTRL VS DAY3 YF17D VACCINE PBMC DN           | 198                 | 25 (12.6)         | 25 (12.6)                    | 0 (0)                          | 0.081            | <0.0001 | 0.002                      |
| GSE19888 ADENOSINE A3R INH PRETREAT AND ACT BY A3R... | 202                 | 25 (12.4)         | 25 (12.4)                    | 0 (0)                          | 0.080            | <0.0001 | 0.002                      |
| GSE11057 PBMC VS MEM CD4 TCELL UP                     | 193                 | 24 (12.4)         | 23 (11.9)                    | 1 (0.5)                        | 0.079            | <0.0001 | 0.002                      |
| GSE19888 ADENOSINE A3R INH VS ACT WITH INHIBITOR P... | 200                 | 24 (12)           | 24 (12)                      | 0 (0)                          | 0.077            | <0.0001 | 0.002                      |
| GSE10325 LUPUS CD4 TCELL VS LUPUS MYELOID DN          | 202                 | 24 (11.9)         | 24 (11.9)                    | 0 (0)                          | 0.077            | <0.0001 | 0.002                      |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 8H DN             | 193                 | 23 (11.9)         | 23 (11.9)                    | 0 (0)                          | 0.075            | <0.0001 | 0.002                      |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR DN           | 197                 | 22 (11.2)         | 22 (11.2)                    | 0 (0)                          | 0.071            | <0.0001 | 0.002                      |
| GSE10325 MYELOID VS LUPUS MYELOID DN                  | 199                 | 22 (11.1)         | 22 (11.1)                    | 0 (0)                          | 0.070            | <0.0001 | 0.002                      |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR UP           | 195                 | 21 (10.8)         | 20 (10.3)                    | 1 (0.5)                        | 0.068            | <0.0001 | 0.002                      |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 10H DN          | 198                 | 21 (10.6)         | 21 (10.6)                    | 0 (0)                          | 0.067            | <0.0001 | 0.002                      |
| GSE1432 CTRL VS IFNG 24H MICROGLIA DN                 | 199                 | 21 (10.6)         | 21 (10.6)                    | 0 (0)                          | 0.067            | <0.0001 | 0.002                      |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY10... | 200                 | 21 (10.5)         | 21 (10.5)                    | 0 (0)                          | 0.067            | <0.0001 | 0.002                      |
| GSE1432 CTRL VS IFNG 6H MICROGLIA DN                  | 201                 | 21 (10.4)         | 21 (10.4)                    | 0 (0)                          | 0.067            | <0.0001 | 0.002                      |
| GSE14000 UNSTIM VS 4H LPS DC TRANSLATED RNA DN        | 198                 | 20 (10.1)         | 20 (10.1)                    | 0 (0)                          | 0.064            | <0.0001 | 0.002                      |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 6H DN           | 198                 | 20 (10.1)         | 20 (10.1)                    | 0 (0)                          | 0.064            | <0.0001 | 0.002                      |
| GSE22140 GERMFREE VS SPF ARTHRITIC MOUSE CD4 TCELL... | 199                 | 20 (10.1)         | 20 (10.1)                    | 0 (0)                          | 0.064            | <0.0001 | 0.002                      |
| GSE2706 UNSTIM VS 8H R848 DC DN                       | 194                 | 19 (9.8)          | 17 (8.8)                     | 2 (1)                          | 0.061            | <0.0001 | 0.002                      |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 6H DN             | 197                 | 19 (9.6)          | 19 (9.6)                     | 0 (0)                          | 0.061            | <0.0001 | 0.002                      |
| GSE22886 CTRL VS LPS 24H DC DN                        | 200                 | 19 (9.5)          | 18 (9)                       | 1 (0.5)                        | 0.060            | <0.0001 | 0.002                      |
| GSE22140 GERMFREE VS SPF MOUSE CD4 TCELL UP           | 201                 | 19 (9.5)          | 19 (9.5)                     | 0 (0)                          | 0.060            | <0.0001 | 0.002                      |
| GSE34156 TLR1 TLR2 LIGAND VS NOD2 AND TLR1 TLR2 LI... | 198                 | 18 (9.1)          | 18 (9.1)                     | 0 (0)                          | 0.057            | <0.0001 | 0.002                      |
| GSE22196 HEALTHY VS OBESE MOUSE SKIN GAMMADELTA TC... | 199                 | 18 (9)            | 18 (9)                       | 0 (0)                          | 0.057            | <0.0001 | 0.002                      |
| GSE10325 LUPUS BCELL VS LUPUS MYELOID DN              | 200                 | 18 (9)            | 18 (9)                       | 0 (0)                          | 0.057            | <0.0001 | 0.002                      |
| GSE13484 UNSTIM VS YF17D VACCINE STIM PBMC DN         | 200                 | 18 (9)            | 18 (9)                       | 0 (0)                          | 0.057            | <0.0001 | 0.002                      |
| GSE42021 TREG VS TCONV PLN UP                         | 200                 | 18 (9)            | 18 (9)                       | 0 (0)                          | 0.057            | <0.0001 | 0.002                      |
| GSE7509 UNSTIM VS IFNA STIM IMMATURE DC DN            | 171                 | 16 (9.4)          | 15 (8.8)                     | 1 (0.6)                        | 0.055            | <0.0001 | 0.002                      |
| GSE10325 BCELL VS MYELOID DN                          | 198                 | 17 (8.6)          | 17 (8.6)                     | 0 (0)                          | 0.054            | <0.0001 | 0.002                      |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY3 ... | 198                 | 17 (8.6)          | 17 (8.6)                     | 0 (0)                          | 0.054            | <0.0001 | 0.002                      |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 4H DN             | 183                 | 16 (8.7)          | 16 (8.7)                     | 0 (0)                          | 0.053            | <0.0001 | 0.002                      |
| GSE21546 WT VS SAPIA KO DP THYMOCYTES UP              | 194                 | 16 (8.2)          | 16 (8.2)                     | 0 (0)                          | 0.051            | <0.0001 | 0.002                      |
| GSE13485 DAY7 VS DAY21 YF17D VACCINE PBMC UP          | 195                 | 16 (8.2)          | 16 (8.2)                     | 0 (0)                          | 0.051            | <0.0001 | 0.002                      |
| GSE34156 UNTREATED VS 6H TLR1 TLR2 LIGAND TREATED ... | 195                 | 16 (8.2)          | 16 (8.2)                     | 0 (0)                          | 0.051            | <0.0001 | 0.002                      |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 10H DN            | 198                 | 16 (8.1)          | 16 (8.1)                     | 0 (0)                          | 0.051            | <0.0001 | 0.002                      |
| GSE18281 CORTICAL VS MEDULLARY THYMOCYTE UP           | 199                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE21360 PRIMARY VS TERTIARY MEMORY CD8 TCELL DN      | 199                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE42021 CD24HI VS CD24INT TREG THYMUS DN             | 199                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE18281 SUBCAPSULAR VS CENTRAL CORTICAL REGION OF... | 200                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE29618 MONOCYTE VS PDC UP                           | 200                 | 16 (8)            | 15 (7.5)                     | 1 (0.5)                        | 0.050            | <0.0001 | 0.002                      |
| GSE8835 CD4 VS CD8 TCELL CLL PATIENT UP               | 200                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE37533 PPARG1 FOXP3 VS PPARG2 FOXP3 TRANSDUCED C... | 201                 | 16 (8)            | 16 (8)                       | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE1432 1H VS 6H IFNG MICROGLIA DN                    | 202                 | 16 (7.9)          | 16 (7.9)                     | 0 (0)                          | 0.050            | <0.0001 | 0.002                      |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 18H DN          | 184                 | 15 (8.2)          | 15 (8.2)                     | 0 (0)                          | 0.049            | <0.0001 | 0.002                      |



| Gene Set Name                              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 16H DN | 188                 | 15 (8)            | 15 (8)                       | 0 (0)                          | 0.049            | <0.0001 | 0.002                      |
| GSE2706 UNSTIM VS 2H LPS AND R848 DC DN    | 190                 | 15 (7.9)          | 15 (7.9)                     | 0 (0)                          | 0.048            | <0.0001 | 0.002                      |

**Table 94:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name             | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG LEISHMANIA INFECTION | 69                  | 6 (8.7)           | 6 (8.7)                      | 0 (0)                          | 0.030            | 0.0002  | 0.0372                     |

**Table 95:** Enriched MSigDB KEGG Pathways (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO IGG BINDING                                        | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.021            | <0.0001 | 0.0619                     |
| GO SUPEROXIDE GENERATING NADPH OXIDASE ACTIVITY       | 11                  | 3 (27.3)          | 3 (27.3)                     | 0 (0)                          | 0.021            | 0.0002  | 0.0619                     |
| GO CYTOKINE RECEPTOR BINDING                          | 271                 | 8 (3)             | 7 (2.6)                      | 1 (0.4)                        | 0.020            | 0.0002  | 0.0619                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON NAD P H OXYGE... | 16                  | 3 (18.8)          | 3 (18.8)                     | 0 (0)                          | 0.020            | 0.0003  | 0.0697                     |
| GO IMMUNOGLOBULIN BINDING                             | 21                  | 3 (14.3)          | 3 (14.3)                     | 0 (0)                          | 0.020            | 0.0004  | 0.0743                     |
| GO CYTOKINE ACTIVITY                                  | 218                 | 7 (3.2)           | 6 (2.8)                      | 1 (0.5)                        | 0.020            | 0.0006  | 0.0929                     |

**Table 96:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME INTERFERON SIGNALING                | 153                 | 12 (7.8)          | 12 (7.8)                     | 0 (0)                          | 0.043            | <0.0001 | 0.0135                     |
| REACTOME CYTOKINE SIGNALING IN IMMUNE SYSTEM | 265                 | 15 (5.7)          | 15 (5.7)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0135                     |
| REACTOME INTERFERON GAMMA SIGNALING          | 59                  | 7 (11.9)          | 7 (11.9)                     | 0 (0)                          | 0.037            | <0.0001 | 0.0135                     |
| REACTOME INTERFERON ALPHA BETA SIGNALING     | 62                  | 7 (11.3)          | 7 (11.3)                     | 0 (0)                          | 0.037            | <0.0001 | 0.0135                     |
| REACTOME IMMUNE SYSTEM                       | 897                 | 23 (2.6)          | 21 (2.3)                     | 2 (0.2)                        | 0.023            | <0.0001 | 0.0135                     |
| REACTOME G ALPHA I SIGNALLING EVENTS         | 194                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.025            | 0.0006  | 0.0674                     |

**Table 97:** Enriched MSigDB Reactome Pathways (PBMC, Trivalent Influenza Vaccine, Day 1). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| platelet activation - actin binding (M196) | 16                  | 5 (31.2)          | 5 (31.2)                     | 0 (0)                          | 0.053            | <0.0001 | 0.0086                     |
| TBA (M104)                                 | 10                  | 4 (40)            | 4 (40)                       | 0 (0)                          | 0.045            | <0.0001 | 0.0086                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| platelet activation and blood coagulation (M199)      | 11                  | 4 (36.4)          | 4 (36.4)                     | 0 (0)                          | 0.044            | <0.0001 | 0.0086                     |
| chemokine cluster (I) (M27.0)                         | 25                  | 4 (16)            | 4 (16)                       | 0 (0)                          | 0.038            | <0.0001 | 0.0086                     |
| enriched in myeloid cells and monocytes (M81)         | 35                  | 5 (14.3)          | 5 (14.3)                     | 0 (0)                          | 0.044            | 0.0004  | 0.0231                     |
| G protein mediated calcium signaling (M159)           | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.033            | 0.0004  | 0.0231                     |
| TBA (M193)                                            | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.033            | 0.0006  | 0.0297                     |
| enriched in activated dendritic cells (II) (M165)     | 35                  | 4 (11.4)          | 4 (11.4)                     | 0 (0)                          | 0.035            | 0.0017  | 0.0623                     |
| cytoskeleton/actin (SRF transcription targets) (M1... | 14                  | 3 (21.4)          | 3 (21.4)                     | 0 (0)                          | 0.032            | 0.0016  | 0.0623                     |
| TBA (M131)                                            | 14                  | 3 (21.4)          | 3 (21.4)                     | 0 (0)                          | 0.032            | 0.0018  | 0.0623                     |
| cell adhesion (M51)                                   | 37                  | 4 (10.8)          | 4 (10.8)                     | 0 (0)                          | 0.035            | 0.0027  | 0.0836                     |
| cytoskeleton/actin (SRF transcription targets) (M1... | 16                  | 3 (18.8)          | 3 (18.8)                     | 0 (0)                          | 0.031            | 0.0029  | 0.0836                     |

**Table 98:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                 | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO PLATELET DEGRANULATION                     | 107                 | 7 (6.5)           | 7 (6.5)                      | 0 (0)                          | 0.038            | <0.0001 | 0.0274                     |
| GO PLATELET ACTIVATION                        | 142                 | 7 (4.9)           | 7 (4.9)                      | 0 (0)                          | 0.032            | <0.0001 | 0.0274                     |
| GO REGULATED EXOCYTOSIS                       | 224                 | 8 (3.6)           | 8 (3.6)                      | 0 (0)                          | 0.027            | <0.0001 | 0.0274                     |
| GO HEMOSTASIS                                 | 312                 | 10 (3.2)          | 10 (3.2)                     | 0 (0)                          | 0.026            | <0.0001 | 0.0274                     |
| GO POSITIVE REGULATION OF LOCOMOTION          | 422                 | 11 (2.6)          | 11 (2.6)                     | 0 (0)                          | 0.022            | <0.0001 | 0.0274                     |
| GO WOUND HEALING                              | 473                 | 11 (2.3)          | 11 (2.3)                     | 0 (0)                          | 0.020            | <0.0001 | 0.0274                     |
| GO RESPONSE TO WOUNDING                       | 565                 | 12 (2.1)          | 12 (2.1)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0274                     |
| GO IMMUNE EFFECTOR PROCESS                    | 456                 | 10 (2.2)          | 10 (2.2)                     | 0 (0)                          | 0.019            | <0.0001 | 0.0274                     |
| GO DEFENSE RESPONSE TO OTHER ORGANISM         | 483                 | 10 (2.1)          | 10 (2.1)                     | 0 (0)                          | 0.018            | <0.0001 | 0.0274                     |
| GO RESPONSE TO BIOTIC STIMULUS                | 863                 | 16 (1.9)          | 16 (1.9)                     | 0 (0)                          | 0.017            | <0.0001 | 0.0274                     |
| GO DEFENSE RESPONSE                           | 1197                | 21 (1.8)          | 21 (1.8)                     | 0 (0)                          | 0.017            | <0.0001 | 0.0274                     |
| GO INNATE IMMUNE RESPONSE                     | 589                 | 11 (1.9)          | 11 (1.9)                     | 0 (0)                          | 0.017            | <0.0001 | 0.0274                     |
| GO IMMUNE RESPONSE                            | 1052                | 16 (1.5)          | 16 (1.5)                     | 0 (0)                          | 0.014            | <0.0001 | 0.0274                     |
| GO IMMUNE SYSTEM PROCESS                      | 1932                | 24 (1.2)          | 24 (1.2)                     | 0 (0)                          | 0.012            | <0.0001 | 0.0274                     |
| GO REGULATION OF IMMUNE SYSTEM PROCESS        | 1369                | 17 (1.2)          | 17 (1.2)                     | 0 (0)                          | 0.012            | <0.0001 | 0.0274                     |
| GO CELLULAR RESPONSE TO ORGANIC SUBSTANCE     | 1848                | 21 (1.1)          | 21 (1.1)                     | 0 (0)                          | 0.011            | <0.0001 | 0.0274                     |
| GO RESPONSE TO EXTERNAL STIMULUS              | 1798                | 20 (1.1)          | 20 (1.1)                     | 0 (0)                          | 0.011            | <0.0001 | 0.0274                     |
| GO RESPONSE TO INTERFERON ALPHA               | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.030            | 0.0002  | 0.0405                     |
| GO POSITIVE REGULATION OF LEUKOCYTE MIGRATION | 109                 | 5 (4.6)           | 5 (4.6)                      | 0 (0)                          | 0.027            | 0.0002  | 0.0405                     |
| GO CHEMOKINE MEDIATED SIGNALING PATHWAY       | 71                  | 4 (5.6)           | 4 (5.6)                      | 0 (0)                          | 0.027            | 0.0002  | 0.0405                     |
| GO REGULATION OF BODY FLUID LEVELS            | 508                 | 10 (2)            | 10 (2)                       | 0 (0)                          | 0.017            | 0.0002  | 0.0405                     |
| GO CYTOKINE MEDIATED SIGNALING PATHWAY        | 448                 | 9 (2)             | 9 (2)                        | 0 (0)                          | 0.017            | 0.0002  | 0.0405                     |
| GO RESPONSE TO CYTOKINE                       | 710                 | 12 (1.7)          | 12 (1.7)                     | 0 (0)                          | 0.015            | 0.0002  | 0.0405                     |
| GO INTEGRIN MEDIATED SIGNALING PATHWAY        | 82                  | 4 (4.9)           | 4 (4.9)                      | 0 (0)                          | 0.025            | 0.0003  | 0.0465                     |
| GO REGULATION OF LEUKOCYTE MIGRATION          | 148                 | 5 (3.4)           | 5 (3.4)                      | 0 (0)                          | 0.022            | 0.0003  | 0.0465                     |
| GO LEUKOCYTE MEDIATED IMMUNITY                | 158                 | 5 (3.2)           | 5 (3.2)                      | 0 (0)                          | 0.021            | 0.0003  | 0.0465                     |
| GO RESPONSE TO MOLECULE OF BACTERIAL ORIGIN   | 320                 | 7 (2.2)           | 7 (2.2)                      | 0 (0)                          | 0.018            | 0.0003  | 0.0465                     |
| GO CELL ACTIVATION                            | 567                 | 11 (1.9)          | 11 (1.9)                     | 0 (0)                          | 0.017            | 0.0003  | 0.0465                     |
| GO SECRETION BY CELL                          | 488                 | 9 (1.8)           | 9 (1.8)                      | 0 (0)                          | 0.016            | 0.0003  | 0.0465                     |
| GO SECRETION                                  | 590                 | 10 (1.7)          | 10 (1.7)                     | 0 (0)                          | 0.015            | 0.0003  | 0.0465                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HUMORAL IMMUNE RESPONSE MEDIATED BY CIRCULATING... | 38                  | 3 (7.9)           | 3 (7.9)                      | 0 (0)                          | 0.025            | 0.0004  | 0.0547                     |
| GO PLATELET AGGREGATION                               | 39                  | 3 (7.7)           | 3 (7.7)                      | 0 (0)                          | 0.025            | 0.0004  | 0.0547                     |
| GO POSITIVE REGULATION OF LEUKOCYTE CHEMOTAXIS        | 81                  | 4 (4.9)           | 4 (4.9)                      | 0 (0)                          | 0.025            | 0.0004  | 0.0547                     |
| GO EXOCYTOSIS                                         | 310                 | 8 (2.6)           | 8 (2.6)                      | 0 (0)                          | 0.021            | 0.0004  | 0.0547                     |
| GO REGULATION OF BONE RESORPTION                      | 33                  | 3 (9.1)           | 3 (9.1)                      | 0 (0)                          | 0.026            | 0.0005  | 0.0665                     |
| GO REGULATION OF LEUKOCYTE CHEMOTAXIS                 | 95                  | 4 (4.2)           | 4 (4.2)                      | 0 (0)                          | 0.023            | 0.0006  | 0.0775                     |
| GO POSITIVE REGULATION OF ENDOTHELIAL CELL MIGRATI... | 67                  | 4 (6)             | 4 (6)                        | 0 (0)                          | 0.027            | 0.0007  | 0.0835                     |
| GO RESPONSE TO BACTERIUM                              | 502                 | 8 (1.6)           | 8 (1.6)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0835                     |
| GO REGULATION OF CELLULAR COMPONENT MOVEMENT          | 775                 | 11 (1.4)          | 11 (1.4)                     | 0 (0)                          | 0.013            | 0.0007  | 0.0835                     |
| GO RESPONSE TO METAL ION                              | 338                 | 7 (2.1)           | 7 (2.1)                      | 0 (0)                          | 0.017            | 0.0008  | 0.0931                     |

**Table 99:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO PLATELET ALPHA GRANULE                    | 75                  | 8 (10.7)          | 8 (10.7)                     | 0 (0)                          | 0.053            | <0.0001 | 0.0117                     |
| GO PLATELET ALPHA GRANULE LUMEN              | 55                  | 5 (9.1)           | 5 (9.1)                      | 0 (0)                          | 0.038            | <0.0001 | 0.0117                     |
| GO SECRETORY GRANULE LUMEN                   | 85                  | 5 (5.9)           | 5 (5.9)                      | 0 (0)                          | 0.031            | <0.0001 | 0.0117                     |
| GO SECRETORY GRANULE                         | 353                 | 10 (2.8)          | 10 (2.8)                     | 0 (0)                          | 0.024            | <0.0001 | 0.0117                     |
| GO SECRETORY VESICLE                         | 463                 | 11 (2.4)          | 11 (2.4)                     | 0 (0)                          | 0.021            | <0.0001 | 0.0117                     |
| GO ACTIN FILAMENT BUNDLE                     | 56                  | 4 (7.1)           | 4 (7.1)                      | 0 (0)                          | 0.030            | 0.0002  | 0.0167                     |
| GO VESICLE LUMEN                             | 106                 | 5 (4.7)           | 5 (4.7)                      | 0 (0)                          | 0.027            | 0.0002  | 0.0167                     |
| GO PLATELET ALPHA GRANULE MEMBRANE           | 13                  | 3 (23.1)          | 3 (23.1)                     | 0 (0)                          | 0.032            | 0.0004  | 0.0292                     |
| GO PROTEIN COMPLEX INVOLVED IN CELL ADHESION | 30                  | 3 (10)            | 3 (10)                       | 0 (0)                          | 0.027            | 0.0006  | 0.035                      |
| GO EXTRACELLULAR SPACE                       | 1339                | 16 (1.2)          | 16 (1.2)                     | 0 (0)                          | 0.011            | 0.0006  | 0.035                      |
| GO ACTOMYOSIN                                | 62                  | 4 (6.5)           | 4 (6.5)                      | 0 (0)                          | 0.028            | 0.0007  | 0.0372                     |
| GO DNA PACKAGING COMPLEX                     | 105                 | 4 (3.8)           | 4 (3.8)                      | 0 (0)                          | 0.022            | 0.001   | 0.0487                     |
| GO CYTOPLASMIC VESICLE PART                  | 600                 | 10 (1.7)          | 10 (1.7)                     | 0 (0)                          | 0.015            | 0.0012  | 0.0539                     |
| GO CELL SURFACE                              | 729                 | 11 (1.5)          | 11 (1.5)                     | 0 (0)                          | 0.014            | 0.0015  | 0.0626                     |
| GO INTRACELLULAR VESICLE                     | 1258                | 15 (1.2)          | 15 (1.2)                     | 0 (0)                          | 0.011            | 0.002   | 0.0779                     |
| GO BLOOD MICROPARTICLE                       | 118                 | 4 (3.4)           | 4 (3.4)                      | 0 (0)                          | 0.020            | 0.0025  | 0.0912                     |

**Table 100:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                    | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC AT DX UP | 197                 | 16 (8.1)          | 16 (8.1)                     | 0 (0)                          | 0.061            | <0.0001 | 0.009                      |
| GSE11057 PBMC VS MEM CD4 TCELL UP                | 193                 | 13 (6.7)          | 13 (6.7)                     | 0 (0)                          | 0.049            | <0.0001 | 0.009                      |
| GSE13485 DAY3 VS DAY7 YF17D VACCINE PBMC DN      | 199                 | 12 (6)            | 12 (6)                       | 0 (0)                          | 0.044            | <0.0001 | 0.009                      |
| GSE13485 CTRL VS DAY7 YF17D VACCINE PBMC DN      | 202                 | 11 (5.4)          | 11 (5.4)                     | 0 (0)                          | 0.040            | <0.0001 | 0.009                      |
| GSE45365 WT VS IFNAR KO BCELL MCMV INFECTION DN  | 188                 | 10 (5.3)          | 10 (5.3)                     | 0 (0)                          | 0.038            | <0.0001 | 0.009                      |
| GSE45365 HEALTHY VS MCMV INFECTION CD11B DC DN   | 190                 | 10 (5.3)          | 10 (5.3)                     | 0 (0)                          | 0.038            | <0.0001 | 0.009                      |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE9509 LPS VS LPS AND IL10 STIM IL10 KO MACROPHAG... | 190                 | 10 (5.3)          | 10 (5.3)                     | 0 (0)                          | 0.038            | <0.0001 | 0.009                      |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 8H DN             | 193                 | 9 (4.7)           | 9 (4.7)                      | 0 (0)                          | 0.034            | <0.0001 | 0.009                      |
| GSE13485 DAY7 VS DAY21 YF17D VACCINE PBMC UP          | 195                 | 9 (4.6)           | 9 (4.6)                      | 0 (0)                          | 0.034            | <0.0001 | 0.009                      |
| GSE13485 CTRL VS DAY3 YF17D VACCINE PBMC DN           | 198                 | 9 (4.5)           | 9 (4.5)                      | 0 (0)                          | 0.033            | <0.0001 | 0.009                      |
| GSE22886 CTRL VS LPS 24H DC DN                        | 200                 | 9 (4.5)           | 9 (4.5)                      | 0 (0)                          | 0.033            | <0.0001 | 0.009                      |
| GSE7400 CTRL VS CSF3 IN VIVO TREATED PBMC UP          | 200                 | 9 (4.5)           | 9 (4.5)                      | 0 (0)                          | 0.033            | <0.0001 | 0.009                      |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 UP    | 189                 | 8 (4.2)           | 8 (4.2)                      | 0 (0)                          | 0.030            | <0.0001 | 0.009                      |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR UP           | 195                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.030            | <0.0001 | 0.009                      |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 10H DN          | 198                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE10325 MYELOID VS LUPUS MYELOID DN                  | 199                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC DN        | 199                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE37534 UNTREATED VS PIOGLITAZONE TREATED CD4 TCE... | 199                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE360 HIGH DOSE B MALAYI VS M TUBERCULOSIS DC DN     | 200                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE22140 GERMFREE VS SPF MOUSE CD4 TCELL UP           | 201                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE5589 LPS VS LPS AND IL10 STIM IL10 KO MACROPHAG... | 202                 | 8 (4)             | 8 (4)                        | 0 (0)                          | 0.029            | <0.0001 | 0.009                      |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 18H DN          | 184                 | 7 (3.8)           | 7 (3.8)                      | 0 (0)                          | 0.027            | <0.0001 | 0.009                      |
| GSE29615 CTRL VS DAY7 LAIV FLU VACCINE PBMC UP        | 184                 | 7 (3.8)           | 7 (3.8)                      | 0 (0)                          | 0.027            | <0.0001 | 0.009                      |
| GSE42724 NAIVE BCELL VS PLASMABLAST UP                | 192                 | 7 (3.6)           | 7 (3.6)                      | 0 (0)                          | 0.026            | <0.0001 | 0.009                      |
| GSE21546 WT VS SAP1A KO DP THYMOCYTES UP              | 194                 | 7 (3.6)           | 7 (3.6)                      | 0 (0)                          | 0.026            | <0.0001 | 0.009                      |
| GSE13485 DAY1 VS DAY7 YF17D VACCINE PBMC DN           | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE18281 CORTICAL VS MEDULLARY THYMOCYTE UP           | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE21360 PRIMARY VS TERTIARY MEMORY CD8 TCELL DN      | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE22140 HEALTHY VS ARTHRITIC MOUSE CD4 TCELL UP      | 198                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE22196 HEALTHY VS OBESE MOUSE SKIN GAMMADelta TC... | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY3 ... | 198                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE360 LOW DOSE B MALAYI VS M TUBERCULOSIS DC DN      | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE3982 CTRL VS LPS 48H DC DN                         | 198                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE41978 ID2 KO VS BIM KO KLRG1 LOW EFFECTOR CD8 T... | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE43955 TH0 VS TGFB IL6 TH17 ACT CD4 TCELL 1H UP     | 199                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE19888 ADENOSINE A3R INH VS ACT WITH INHIBITOR P... | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE21670 STAT3 KO VS WT CD4 TCELL IL6 TREATED DN      | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE34205 HEALTHY VS FLU INF INFANT PBMC DN            | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE36392 TYPE 2 MYELOID VS NEUTROPHIL IL25 TREATED... | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE42021 TREG VS TCONV PLN UP                         | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE39556 UNTREATED VS 3H POLYIC INJ MOUSE NK CELL ... | 202                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE37605 TREG VS TCONV NOD FOXP3 FUSION GFP DN        | 165                 | 6 (3.6)           | 6 (3.6)                      | 0 (0)                          | 0.025            | <0.0001 | 0.009                      |
| GSE7509 UNSTIM VS IFNA STIM IMMATURE DC DN            | 171                 | 6 (3.5)           | 6 (3.5)                      | 0 (0)                          | 0.024            | <0.0001 | 0.009                      |
| GSE37605 FOXP3 FUSION GFP VS IRES GFP TREG C57BL6 ... | 172                 | 6 (3.5)           | 6 (3.5)                      | 0 (0)                          | 0.024            | <0.0001 | 0.009                      |
| GSE21546 ELK1 KO VS SAP1A KO AND ELK1 KO DP THYMOC... | 191                 | 6 (3.1)           | 6 (3.1)                      | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR DN           | 197                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |
| GSE36888 STAT5 AB KNOCKIN VS WT TCELL IL2 TREATED ... | 198                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |
| GSE14000 UNSTIM VS 16H LPS DC DN                      | 200                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |
| GSE5503 LIVER DC VS MLN DC ACTIVATED ALLOGENIC TCE... | 200                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |
| GSE7219 WT VS NIK NFKB2 KO LPS AND ANTI CD40 STIM ... | 200                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.022            | <0.0001 | 0.009                      |

**Table 101:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG SYSTEMIC LUPUS ERYTHEMATOSUS | 133                 | 6 (4.5)           | 6 (4.5)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0186                     |

**Table 102:** Enriched MSigDB KEGG Pathways (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO CXCR CHEMOKINE RECEPTOR BINDING | 17                  | 4 (23.5)          | 4 (23.5)                     | 0 (0)                          | 0.042            | <0.0001 | 0.0464                     |
| GO CHEMOKINE ACTIVITY              | 47                  | 4 (8.5)           | 4 (8.5)                      | 0 (0)                          | 0.032            | <0.0001 | 0.0464                     |
| GO CHEMOKINE RECEPTOR BINDING      | 57                  | 4 (7)             | 4 (7)                        | 0 (0)                          | 0.029            | 0.0002  | 0.0619                     |
| GO CYTOKINE ACTIVITY               | 218                 | 6 (2.8)           | 6 (2.8)                      | 0 (0)                          | 0.020            | 0.0003  | 0.0697                     |

**Table 103:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME RESPONSE TO ELEVATED PLATELET CYTOSOLIC C... | 81                  | 7 (8.6)           | 7 (8.6)                      | 0 (0)                          | 0.045            | <0.0001 | 0.0168                     |
| REACTOME SMOOTH MUSCLE CONTRACTION                    | 23                  | 4 (17.4)          | 4 (17.4)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0168                     |
| REACTOME PLATELET ACTIVATION SIGNALING AND AGGREGA... | 200                 | 10 (5)            | 10 (5)                       | 0 (0)                          | 0.037            | <0.0001 | 0.0168                     |
| REACTOME HEMOSTASIS                                   | 452                 | 13 (2.9)          | 13 (2.9)                     | 0 (0)                          | 0.025            | <0.0001 | 0.0168                     |
| REACTOME MUSCLE CONTRACTION                           | 46                  | 4 (8.7)           | 4 (8.7)                      | 0 (0)                          | 0.032            | 0.0006  | 0.0674                     |
| REACTOME CHEMOKINE RECEPTORS BIND CHEMOKINES          | 54                  | 4 (7.4)           | 4 (7.4)                      | 0 (0)                          | 0.030            | 0.0005  | 0.0674                     |

**Table 104:** Enriched MSigDB Reactome Pathways (PBMC, Trivalent Influenza Vaccine, Day 2). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| proinflammatory cytokines and chemokines (M29)    | 8                   | 2 (25)            | 2 (25)                       | 0 (0)                          | 0.080            | 0.0003  | 0.0461                     |
| antiviral IFN signature (M75)                     | 22                  | 3 (13.6)          | 3 (13.6)                     | 0 (0)                          | 0.079            | 0.0004  | 0.0461                     |
| enriched in activated dendritic cells (II) (M165) | 35                  | 3 (8.6)           | 3 (8.6)                      | 0 (0)                          | 0.059            | 0.0003  | 0.0461                     |
| enriched in neutrophils (I) (M37.1)               | 47                  | 3 (6.4)           | 3 (6.4)                      | 0 (0)                          | 0.048            | 0.0009  | 0.0778                     |

**Table 105:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO REGULATION OF CHEMOKINE BIOSYNTHETIC PROCESS       | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.107            | <0.0001 | 0.0108                     |
| GO MODULATION OF GROWTH OF SYMBIONT INVOLVED IN IN... | 16                  | 3 (18.8)          | 3 (18.8)                     | 0 (0)                          | 0.094            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF INTERLEUKIN 8 PRODUCTION    | 45                  | 5 (11.1)          | 5 (11.1)                     | 0 (0)                          | 0.085            | <0.0001 | 0.0108                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO NEGATIVE REGULATION OF LIPID CATABOLIC PROCESS     | 21                  | 3 (14.3)          | 3 (14.3)                     | 0 (0)                          | 0.081            | <0.0001 | 0.0108                     |
| GO INFLAMMATORY RESPONSE TO ANTIGENIC STIMULUS        | 25                  | 3 (12)            | 3 (12)                       | 0 (0)                          | 0.073            | <0.0001 | 0.0108                     |
| GO REGULATION OF FEVER GENERATION                     | 11                  | 2 (18.2)          | 2 (18.2)                     | 0 (0)                          | 0.071            | <0.0001 | 0.0108                     |
| GO REGULATION OF INTERLEUKIN 8 BIOSYNTHETIC PROCES... | 12                  | 2 (16.7)          | 2 (16.7)                     | 0 (0)                          | 0.069            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF ACUTE INFLAMMATORY RESPO... | 28                  | 3 (10.7)          | 3 (10.7)                     | 0 (0)                          | 0.068            | <0.0001 | 0.0108                     |
| GO REGULATION OF INTERLEUKIN 8 PRODUCTION             | 61                  | 5 (8.2)           | 5 (8.2)                      | 0 (0)                          | 0.067            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF EXTRINSIC APOPTOTIC SIGN... | 32                  | 3 (9.4)           | 3 (9.4)                      | 0 (0)                          | 0.062            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF SIGNAL TRANSDUCTION IN A... | 32                  | 3 (9.4)           | 3 (9.4)                      | 0 (0)                          | 0.062            | <0.0001 | 0.0108                     |
| GO CHRONIC INFLAMMATORY RESPONSE                      | 15                  | 2 (13.3)          | 2 (13.3)                     | 0 (0)                          | 0.062            | <0.0001 | 0.0108                     |
| GO REGULATION OF HEAT GENERATION                      | 15                  | 2 (13.3)          | 2 (13.3)                     | 0 (0)                          | 0.062            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF GLUCOSE TRANSPORT           | 17                  | 2 (11.8)          | 2 (11.8)                     | 0 (0)                          | 0.059            | <0.0001 | 0.0108                     |
| GO REGULATION OF CHEMOKINE PRODUCTION                 | 65                  | 4 (6.2)           | 4 (6.2)                      | 0 (0)                          | 0.050            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF CHEMOKINE PRODUCTION        | 49                  | 3 (6.1)           | 3 (6.1)                      | 0 (0)                          | 0.046            | <0.0001 | 0.0108                     |
| GO REGULATION OF ACUTE INFLAMMATORY RESPONSE          | 74                  | 4 (5.4)           | 4 (5.4)                      | 0 (0)                          | 0.045            | <0.0001 | 0.0108                     |
| GO REGULATION OF LIPID CATABOLIC PROCESS              | 52                  | 3 (5.8)           | 3 (5.8)                      | 0 (0)                          | 0.044            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF EXTRINSIC APOPTOTIC SIGN... | 98                  | 4 (4.1)           | 4 (4.1)                      | 0 (0)                          | 0.035            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF LIPID METABOLIC PROCESS     | 80                  | 3 (3.8)           | 3 (3.8)                      | 0 (0)                          | 0.031            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF CYTOKINE SECRETION          | 96                  | 3 (3.1)           | 3 (3.1)                      | 0 (0)                          | 0.027            | <0.0001 | 0.0108                     |
| GO REGULATION OF EXTRINSIC APOPTOTIC SIGNALING PAT... | 153                 | 4 (2.6)           | 4 (2.6)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0108                     |
| GO CELLULAR RESPONSE TO ACID CHEMICAL                 | 175                 | 4 (2.3)           | 4 (2.3)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0108                     |
| GO NEGATIVE REGULATION OF APOPTOTIC SIGNALING PATH... | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.019            | <0.0001 | 0.0108                     |
| GO RESPONSE TO MOLECULE OF BACTERIAL ORIGIN           | 320                 | 6 (1.9)           | 6 (1.9)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0108                     |
| GO REGULATION OF INFLAMMATORY RESPONSE                | 291                 | 5 (1.7)           | 5 (1.7)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF CYTOKINE PRODUCTION         | 369                 | 5 (1.4)           | 5 (1.4)                      | 0 (0)                          | 0.013            | <0.0001 | 0.0108                     |
| GO INFLAMMATORY RESPONSE                              | 451                 | 6 (1.3)           | 6 (1.3)                      | 0 (0)                          | 0.013            | <0.0001 | 0.0108                     |
| GO RESPONSE TO BACTERIUM                              | 502                 | 6 (1.2)           | 6 (1.2)                      | 0 (0)                          | 0.012            | <0.0001 | 0.0108                     |
| GO REGULATION OF RESPONSE TO WOUNDING                 | 412                 | 5 (1.2)           | 5 (1.2)                      | 0 (0)                          | 0.012            | <0.0001 | 0.0108                     |
| GO REGULATION OF IMMUNE EFFECTOR PROCESS              | 426                 | 5 (1.2)           | 5 (1.2)                      | 0 (0)                          | 0.011            | <0.0001 | 0.0108                     |
| GO POSITIVE REGULATION OF IMMUNE SYSTEM PROCESS       | 833                 | 8 (1)             | 8 (1)                        | 0 (0)                          | 0.009            | <0.0001 | 0.0108                     |
| GO RESPONSE TO BIOTIC STIMULUS                        | 863                 | 8 (0.9)           | 8 (0.9)                      | 0 (0)                          | 0.009            | <0.0001 | 0.0108                     |
| GO REGULATION OF DEFENSE RESPONSE                     | 757                 | 7 (0.9)           | 7 (0.9)                      | 0 (0)                          | 0.009            | <0.0001 | 0.0108                     |
| GO RESPONSE TO LIPID                                  | 887                 | 8 (0.9)           | 8 (0.9)                      | 0 (0)                          | 0.009            | <0.0001 | 0.0108                     |
| GO REGULATION OF CYTOKINE PRODUCTION                  | 561                 | 5 (0.9)           | 5 (0.9)                      | 0 (0)                          | 0.009            | <0.0001 | 0.0108                     |
| GO DEFENSE RESPONSE                                   | 1197                | 10 (0.8)          | 10 (0.8)                     | 0 (0)                          | 0.008            | <0.0001 | 0.0108                     |
| GO REGULATION OF IMMUNE SYSTEM PROCESS                | 1369                | 9 (0.7)           | 9 (0.7)                      | 0 (0)                          | 0.006            | <0.0001 | 0.0108                     |
| GO REGULATION OF CELL DEATH                           | 1472                | 9 (0.6)           | 9 (0.6)                      | 0 (0)                          | 0.006            | <0.0001 | 0.0108                     |
| GO RESPONSE TO OXYGEN CONTAINING COMPOUND             | 1385                | 8 (0.6)           | 8 (0.6)                      | 0 (0)                          | 0.006            | <0.0001 | 0.0108                     |
| GO RESPONSE TO EXTERNAL STIMULUS                      | 1798                | 10 (0.6)          | 10 (0.6)                     | 0 (0)                          | 0.005            | <0.0001 | 0.0108                     |
| GO REGULATION OF RESPONSE TO STRESS                   | 1468                | 8 (0.5)           | 8 (0.5)                      | 0 (0)                          | 0.005            | <0.0001 | 0.0108                     |
| GO IMMUNE SYSTEM PROCESS                              | 1932                | 9 (0.5)           | 9 (0.5)                      | 0 (0)                          | 0.005            | <0.0001 | 0.0108                     |
| GO LIPID STORAGE                                      | 27                  | 3 (11.1)          | 3 (11.1)                     | 0 (0)                          | 0.070            | 0.0002  | 0.0155                     |
| GO REGULATION OF ENDOTHELIAL CELL DEVELOPMENT         | 12                  | 2 (16.7)          | 2 (16.7)                     | 0 (0)                          | 0.069            | 0.0002  | 0.0155                     |
| GO REGULATION OF ESTABLISHMENT OF ENDOTHELIAL BARR... | 12                  | 2 (16.7)          | 2 (16.7)                     | 0 (0)                          | 0.069            | 0.0002  | 0.0155                     |
| GO REGULATION OF VITAMIN METABOLIC PROCESS            | 12                  | 2 (16.7)          | 2 (16.7)                     | 0 (0)                          | 0.069            | 0.0002  | 0.0155                     |
| GO REGULATION OF HETEROTYPIC CELL CELL ADHESION       | 18                  | 2 (11.1)          | 2 (11.1)                     | 0 (0)                          | 0.057            | 0.0002  | 0.0155                     |
| GO REGULATION OF EXTRINSIC APOPTOTIC SIGNALING PAT... | 46                  | 3 (6.5)           | 3 (6.5)                      | 0 (0)                          | 0.048            | 0.0002  | 0.0155                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO POSITIVE REGULATION OF CYTOKINE BIOSYNTHETIC PR... | 58                  | 3 (5.2)           | 3 (5.2)                      | 0 (0)                          | 0.041            | 0.0002  | 0.0155                     |

**Table 106:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO SECRETORY GRANULE   | 353                 | 5 (1.4)           | 5 (1.4)                      | 0 (0)                          | 0.014            | <0.0001 | 0.0195                     |
| GO SECRETORY VESICLE   | 463                 | 5 (1.1)           | 5 (1.1)                      | 0 (0)                          | 0.011            | <0.0001 | 0.0195                     |
| GO EXTRACELLULAR SPACE | 1339                | 8 (0.6)           | 8 (0.6)                      | 0 (0)                          | 0.006            | <0.0001 | 0.0195                     |
| GO BLOOD MICROPARTICLE | 118                 | 3 (2.5)           | 3 (2.5)                      | 0 (0)                          | 0.022            | 0.0002  | 0.0292                     |

**Table 107:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC AT DX DN      | 191                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0375                     |
| GSE18791 UNSTIM VS NEWCATSLE VIRUS DC 10H DN          | 198                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0375                     |
| GSE13485 DAY3 VS DAY7 YF17D VACCINE PBMC DN           | 199                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0375                     |
| GSE29615 CTRL VS LAIV FLU VACCINE PBMC UP             | 189                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0375                     |
| GSE9988 LPS VS CTRL TREATED MONOCYTE UP               | 189                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0375                     |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 8H DN             | 193                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 12H DN            | 194                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE22886 NAIVE CD8 TCELL VS NEUTROPHIL DN             | 194                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR DN           | 197                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE9988 ANTI TREM1 VS LPS MONOCYTE DN                 | 197                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE10325 MYELOID VS LUPUS MYELOID DN                  | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE13484 UNSTIM VS YF17D VACCINE STIM PBMC DN         | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.019            | <0.0001 | 0.0375                     |
| GSE43955 10H VS 30H ACT CD4 TCELL UP                  | 202                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.018            | <0.0001 | 0.0375                     |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 16H DN            | 188                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.020            | 0.0002  | 0.065                      |
| GSE9988 ANTI TREM1 VS LOW LPS MONOCYTE DN             | 192                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.019            | 0.0002  | 0.065                      |
| GSE9988 ANTI TREM1 VS ANTI TREM1 AND LPS MONOCYTE ... | 186                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0005  | 0.0758                     |
| GSE2706 R848 VS R848 AND LPS 2H STIM DC DN            | 188                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0006  | 0.0758                     |
| GSE2706 UNSTIM VS 2H R848 DC DN                       | 190                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0004  | 0.0758                     |
| GSE30971 CTRL VS LPS STIM MACROPHAGE WBP7 HET 2H U... | 190                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0007  | 0.0758                     |
| GSE9988 LPS VS VEHICLE TREATED MONOCYTE UP            | 189                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0007  | 0.0758                     |
| GSE9960 HEALTHY VS GRAM POS SEPSIS PBMC DN            | 193                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE17974 IL4 AND ANTI IL12 VS UNTREATED 6H ACT CD4... | 193                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE22886 NAIVE BCELL VS NEUTROPHIL DN                 | 197                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE22886 NAIVE TCELL VS NEUTROPHIL DN                 | 197                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE1432 CTRL VS IFNG 1H MICROGLIA DN                  | 197                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE36392 TYPE 2 MYELOID VS EOSINOPHIL IL25 TREATED... | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0005  | 0.0758                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE13485 DAY1 VS DAY7 YF17D VACCINE PBMC DN           | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE17721 LPS VS CPG 1H BMDC DN                        | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE19198 6H VS 24H IL21 TREATED TCELL DN              | 198                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE21360 PRIMARY VS TERTIARY MEMORY CD8 TCELL DN      | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE21774 CD62L POS CD56 BRIGHT VS CD62L NEG CD56 D... | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE17721 CTRL VS PAM3CSK4 4H BMDC DN                  | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE18281 SUBCAPSULAR VS CENTRAL CORTICAL REGION OF... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE35825 UNTREATED VS IFNG STIM MACROPHAGE UP         | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE46606 IRF4 KO VS WT UNSTIM BCELL DN                | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE17721 LPS VS CPG 12H BMDC UP                       | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE34205 HEALTHY VS FLU INF INFANT PBMC DN            | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE34392 ST2 KO VS WT DAY8 LCMV EFFECTOR CD8 TCELL... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0758                     |
| GSE17721 CPG VS GARDIQUIMOD 12H BMDC DN               | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0003  | 0.0758                     |
| GSE16522 ANTI CD3CD28 STIM VS UNSTIM MEMORY CD8 TC... | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE26488 CTRL VS PEPTIDE INJECTION HDAC7 DELTAP TG... | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0004  | 0.0758                     |
| GSE22140 GERMFREE VS SPF MOUSE CD4 TCELL UP           | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0005  | 0.0758                     |
| GSE24142 DN2 VS DN3 THYMOCYTE UP                      | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE9006 TYPE 1 DIABETES AT DX VS 4MONTH POST DX PB... | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE22140 HEALTHY VS ARTHRITIC GERMFREE MOUSE CD4 T... | 203                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0758                     |
| GSE29615 CTRL VS DAY7 LAIV FLU VACCINE PBMC UP        | 184                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0008  | 0.0779                     |
| GSE42724 NAIVE BCELL VS PLASMA BLAST UP               | 192                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.014            | 0.0008  | 0.0779                     |
| GSE2706 UNSTIM VS 8H R848 DC DN                       | 194                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0008  | 0.0779                     |
| GSE41176 UNSTIM VS ANTI IGM STIM BCELL 1H UP          | 195                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0008  | 0.0779                     |
| GSE14000 UNSTIM VS 4H LPS DC DN                       | 197                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.014            | 0.0008  | 0.0779                     |

**Table 108:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                   | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG APOPTOSIS                  | 89                  | 3 (3.4)           | 3 (3.4)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0186                     |
| KEGG HEMATOPOIETIC CELL LINEAGE | 85                  | 3 (3.5)           | 3 (3.5)                      | 0 (0)                          | 0.030            | 0.0003  | 0.0279                     |

**Table 109:** Enriched MSigDB KEGG Pathways (PBMC, Trivalent Influenza Vaccine, Day 3). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| plasma cells and B cells, immunoglobulins (M156.0) | 30                  | 6 (20)            | 6 (20)                       | 0 (0)                          | 0.091            | <0.0001 | 0.0115                     |
| plasma cells, immunoglobulins (M156.1)             | 22                  | 5 (22.7)          | 5 (22.7)                     | 0 (0)                          | 0.085            | <0.0001 | 0.0115                     |
| enriched in neutrophils (I) (M37.1)                | 47                  | 6 (12.8)          | 6 (12.8)                     | 0 (0)                          | 0.072            | <0.0001 | 0.0115                     |

**Table 110:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.



| Gene Set Name                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                    | 15                  | 3 (20)            | 3 (20)                       | 0 (0)                          | 0.056            | <0.0001 | 0.0517                     |
| GO GAS TRANSPORT                       | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.052            | <0.0001 | 0.0517                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.051            | <0.0001 | 0.0517                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS | 30                  | 3 (10)            | 3 (10)                       | 0 (0)                          | 0.043            | <0.0001 | 0.0517                     |
| GO BICARBONATE TRANSPORT               | 44                  | 3 (6.8)           | 3 (6.8)                      | 0 (0)                          | 0.036            | <0.0001 | 0.0517                     |
| GO PROTEIN HETEROOLIGOMERIZATION       | 113                 | 4 (3.5)           | 4 (3.5)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0517                     |
| GO RESPONSE TO TOXIC SUBSTANCE         | 241                 | 5 (2.1)           | 5 (2.1)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0517                     |
| GO PROTEIN COMPLEX ASSEMBLY            | 1132                | 8 (0.7)           | 8 (0.7)                      | 0 (0)                          | 0.007            | <0.0001 | 0.0517                     |
| GO PROTEIN COMPLEX BIOGENESIS          | 1132                | 8 (0.7)           | 8 (0.7)                      | 0 (0)                          | 0.007            | <0.0001 | 0.0517                     |
| GO RECEPTOR MEDIATED ENDOCYTOSIS       | 213                 | 4 (1.9)           | 4 (1.9)                      | 0 (0)                          | 0.016            | 0.0002  | 0.0846                     |
| GO PROTEIN OLIGOMERIZATION             | 432                 | 5 (1.2)           | 5 (1.2)                      | 0 (0)                          | 0.011            | 0.0002  | 0.0846                     |

**Table 111:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HEMOGLOBIN COMPLEX             | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.059            | <0.0001 | 0.0146                     |
| GO ENDOCYTIC VESICLE LUMEN        | 17                  | 3 (17.6)          | 3 (17.6)                     | 0 (0)                          | 0.054            | <0.0001 | 0.0146                     |
| GO VESICLE LUMEN                  | 106                 | 4 (3.8)           | 4 (3.8)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0146                     |
| GO BLOOD MICROPARTICLE            | 118                 | 4 (3.4)           | 4 (3.4)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0146                     |
| GO CYTOSOLIC PART                 | 220                 | 4 (1.8)           | 4 (1.8)                      | 0 (0)                          | 0.015            | 0.0004  | 0.0467                     |
| GO ANCHORED COMPONENT OF MEMBRANE | 149                 | 3 (2)             | 3 (2)                        | 0 (0)                          | 0.016            | 0.0008  | 0.0779                     |

**Table 112:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 6 (3.3)           | 6 (3.3)                      | 0 (0)                          | 0.027            | <0.0001 | 0.0212                     |
| GSE29615 CTRL VS LAIV FLU VACCINE PBMC UP             | 189                 | 6 (3.2)           | 6 (3.2)                      | 0 (0)                          | 0.027            | <0.0001 | 0.0212                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 6 (3.2)           | 6 (3.2)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0212                     |
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC AT DX DN      | 191                 | 6 (3.1)           | 6 (3.1)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0212                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 5 (2.9)           | 5 (2.9)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0212                     |
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 5 (2.8)           | 5 (2.8)                      | 0 (0)                          | 0.023            | <0.0001 | 0.0212                     |
| GSE29615 CTRL VS DAY7 LAIV FLU VACCINE PBMC UP        | 184                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.023            | <0.0001 | 0.0212                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0212                     |
| GSE17301 ACD3 ACD28 VS ACD3 ACD28 AND IFNA5 STIM C... | 194                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0212                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE IL4 STIM DN        | 197                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0212                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 2H UP            | 180                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0212                     |
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 180                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0212                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 12H UP           | 182                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0212                     |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0212                     |
| GSE17301 CTRL VS 48H ACD3 ACD28 IFNA2 STIM CD8 TCE... | 198                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE28726 NAIVE VS ACTIVATED CD4 TCELL DN              | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL YOU... | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE15750 DAY6 VS DAY10 EFF CD8 TCELL UP               | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE15750 DAY6 VS DAY10 TRAF6KO EFF CD8 TCELL UP       | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE28726 NAIVE CD4 TCELL VS NAIVE VA24NEG NKTCELL ... | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL OLD... | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE36476 CTRL VS TSST ACT 72H MEMORY CD4 TCELL YOU... | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE369 SOCS3 KO VS IFNG KO LIVER DN                   | 203                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0212                     |
| GSE32901 NAIVE VS TH17 NEG CD4 TCELL DN               | 123                 | 3 (2.4)           | 3 (2.4)                      | 0 (0)                          | 0.018            | 0.0002  | 0.0348                     |
| GSE24634 IL4 VS CTRL TREATED NAIVE CD4 TCELL DAY7 ... | 195                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.017            | 0.0002  | 0.0348                     |
| GSE24634 TREG VS TCONV POST DAY7 IL4 CONVERSION UP    | 196                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0002  | 0.0348                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE DN                 | 196                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0002  | 0.0348                     |
| GOLDRATH EFF VS MEMORY CD8 TCELL UP                   | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0002  | 0.0348                     |
| GSE6269 E COLI VS STREP PNEUMO INF PBMC DN            | 164                 | 3 (1.8)           | 3 (1.8)                      | 0 (0)                          | 0.015            | 0.0004  | 0.0629                     |
| GSE20727 CTRL VS ROS INHIBITOR TREATED DC DN          | 191                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.013            | 0.0004  | 0.0629                     |
| KAECH DAY8 EFF VS MEMORY CD8 TCELL UP                 | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.012            | 0.0004  | 0.0629                     |
| GSE32901 NAIVE VS TH17 NEG CD4 TCELL UP               | 168                 | 3 (1.8)           | 3 (1.8)                      | 0 (0)                          | 0.015            | 0.0006  | 0.0713                     |
| GSE14415 NATURAL TREG VS TCONV DN                     | 181                 | 3 (1.7)           | 3 (1.7)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0713                     |
| GSE19941 LPS VS LPS AND IL10 STIM IL10 KO MACROPHA... | 182                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.014            | 0.0006  | 0.0713                     |
| GSE22886 NAIVE BCELL VS NEUTROPHIL DN                 | 197                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0006  | 0.0713                     |
| GSE2405 HEAT KILLED LYSATE VS LIVE A PHAGOCYTOPHIL... | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0005  | 0.0713                     |
| GSE411 UNSTIM VS 100MIN IL6 STIM MACROPHAGE UP        | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0005  | 0.0713                     |
| GSE3337 4H VS 16H IFNG IN CD8POS DC UP                | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0006  | 0.0713                     |
| GSE7219 WT VS NIK NFKB2 KO LPS AND ANTI CD40 STIM ... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0006  | 0.0713                     |
| KAECH DAY8 EFF VS DAY15 EFF CD8 TCELL UP              | 201                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0006  | 0.0713                     |
| GSE39556 CD8A DC VS NK CELL UP                        | 202                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.012            | 0.0005  | 0.0713                     |
| GSE13547 2H VS 12 H ANTI IGM STIM BCELL UP            | 173                 | 3 (1.7)           | 3 (1.7)                      | 0 (0)                          | 0.014            | 0.0007  | 0.0722                     |
| GSE13485 CTRL VS DAY7 YF17D VACCINE PBMC UP           | 179                 | 3 (1.7)           | 3 (1.7)                      | 0 (0)                          | 0.014            | 0.0008  | 0.0722                     |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC UP        | 184                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0722                     |
| GSE45365 HEALTHY VS MCMV INFECTION CD11B DC DN        | 190                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.013            | 0.0008  | 0.0722                     |
| GSE2405 S AUREUS VS UNTREATED NEUTROPHIL DN           | 198                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0008  | 0.0722                     |
| GSE23568 CTRL VS ID3 TRANSDUCED CD8 TCELL DN          | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0722                     |
| GSE32164 ALTERNATIVELY ACT M2 VS CMYC INHIBITED MA... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0722                     |
| GSE360 L DONOVANI VS M TUBERCULOSIS DC DN             | 199                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0722                     |
| GSE36476 CTRL VS TSST ACT 40H MEMORY CD4 TCELL OLD... | 200                 | 3 (1.5)           | 3 (1.5)                      | 0 (0)                          | 0.013            | 0.0007  | 0.0722                     |

**Table 113:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 3 (21.4)          | 3 (21.4)                     | 0 (0)                          | 0.057            | <0.0001 | 0.0232                     |
| GO OXYGEN BINDING                                     | 47                  | 4 (8.5)           | 4 (8.5)                      | 0 (0)                          | 0.047            | <0.0001 | 0.0232                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 3 (7.3)           | 3 (7.3)                      | 0 (0)                          | 0.037            | <0.0001 | 0.0232                     |
| GO ANTIOXIDANT ACTIVITY                               | 69                  | 3 (4.3)           | 3 (4.3)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0232                     |

| Gene Set Name              | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO TETRAPYRROLE BINDING    | 133                 | 4 (3)             | 4 (3)                        | 0 (0)                          | 0.023            | 0.0002  | 0.0265                     |
| GO IRON ION BINDING        | 162                 | 4 (2.5)           | 4 (2.5)                      | 0 (0)                          | 0.020            | 0.0002  | 0.0265                     |
| GO OXIDOREDUCTASE ACTIVITY | 712                 | 6 (0.8)           | 6 (0.8)                      | 0 (0)                          | 0.008            | 0.0002  | 0.0265                     |

**Table 114:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 5). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| plasma cells, immunoglobulins (M156.1)             | 22                  | 14 (63.6)         | 14 (63.6)                    | 0 (0)                          | 0.135            | <0.0001 | 0.0173                     |
| plasma cells and B cells, immunoglobulins (M156.0) | 30                  | 10 (33.3)         | 10 (33.3)                    | 0 (0)                          | 0.086            | <0.0001 | 0.0173                     |
| enriched in B cells (II) (M47.1)                   | 36                  | 4 (11.1)          | 4 (11.1)                     | 0 (0)                          | 0.031            | 0.0003  | 0.0346                     |

**Table 115:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name             | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO IMMUNOGLOBULIN COMPLEX | 6                   | 2 (33.3)          | 2 (33.3)                     | 0 (0)                          | 0.020            | <0.0001 | 0.0584                     |

**Table 116:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 17 (9.5)          | 17 (9.5)                     | 0 (0)                          | 0.066            | <0.0001 | 0.0139                     |
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 16 (8.7)          | 16 (8.7)                     | 0 (0)                          | 0.061            | <0.0001 | 0.0139                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 10 (5.8)          | 10 (5.8)                     | 0 (0)                          | 0.039            | <0.0001 | 0.0139                     |
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 180                 | 10 (5.6)          | 10 (5.6)                     | 0 (0)                          | 0.038            | <0.0001 | 0.0139                     |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 9 (4.8)           | 9 (4.8)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0139                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 7 (3.7)           | 7 (3.7)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0139                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 7 (3.7)           | 7 (3.7)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0139                     |
| GSE20727 CTRL VS ROS INHIBITOR TREATED DC DN          | 191                 | 7 (3.7)           | 7 (3.7)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0139                     |
| GSE10325 LUPUS CD4 TCELL VS LUPUS BCELL DN            | 184                 | 6 (3.3)           | 6 (3.3)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0139                     |
| GSE369 SOCS3 KO VS IFNG KO LIVER DN                   | 203                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.021            | <0.0001 | 0.0139                     |
| GSE4984 UNTREATED VS GALECTIN1 TREATED DC DN          | 175                 | 5 (2.9)           | 5 (2.9)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0139                     |
| GSE7509 UNSTIM VS IFNA STIM IMMATURE DC UP            | 177                 | 5 (2.8)           | 5 (2.8)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0139                     |
| GSE29618 BCELL VS MONOCYTE UP                         | 180                 | 5 (2.8)           | 5 (2.8)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE29618 BCELL VS MDC DAY7 FLU VACCINE UP             | 182                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE29618 BCELL VS MDC UP                              | 184                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE29618 BCELL VS MONOCYTE DAY7 FLU VACCINE UP        | 184                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE12845 IGD POS VS NEG BLOOD BCELL DN                | 186                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE3982 MEMORY CD4 TCELL VS BCELL DN                  | 193                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE22886 NAIVE BCELL VS BM PLASMA CELL DN             | 195                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0139                     |
| GSE3982 BCELL VS NKCELL UP                            | 198                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0139                     |
| GSE23502 WT VS HDC KO MYELOID DERIVED SUPPRESSOR C... | 200                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0139                     |
| GSE7219 WT VS NIK NFKB2 KO LPS AND ANTI CD40 STIM ... | 200                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.017            | <0.0001 | 0.0139                     |
| GSE15750 DAY6 VS DAY10 TRAF6KO EFF CD8 TCELL UP       | 201                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0139                     |
| GSE41867 DAY6 VS DAY8 LCMV ARMSTRONG EFFECTOR CD8 ... | 201                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0139                     |
| GSE12003 4D VS 8D CULTURE MIR223 KO BM PROGENITOR ... | 164                 | 4 (2.4)           | 3 (1.8)                      | 1 (0.6)                        | 0.016            | <0.0001 | 0.0139                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 2H UP            | 180                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0139                     |
| GSE13547 CTRL VS ANTI IGM STIM BCELL 12H UP           | 182                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0139                     |
| GSE11386 NAIVE VS MEMORY BCELL UP                     | 183                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0139                     |
| GSE10325 BCELL VS MYELOID UP                          | 186                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE10325 CD4 TCELL VS BCELL DN                        | 185                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE12366 GC BCELL VS PLASMA CELL DN                   | 186                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE13411 IGM MEMORY BCELL VS PLASMA CELL DN           | 190                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE16266 LPS VS HEATSHOCK AND LPS STIM MEF UP         | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE22432 CDC VS COMMON DC PROGENITOR UP               | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| KAECH DAY8 EFF VS MEMORY CD8 TCELL UP                 | 202                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | <0.0001 | 0.0139                     |
| GSE32901 NAIVE VS TH17 NEG CD4 TCELL DN               | 123                 | 4 (3.3)           | 4 (3.3)                      | 0 (0)                          | 0.019            | 0.0002  | 0.0217                     |
| GSE32164 ALTERNATIVELY ACT M2 VS CMYC INHIBITED MA... | 200                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.017            | 0.0002  | 0.0217                     |
| GSE22886 IGG IGA MEMORY BCELL VS BM PLASMA CELL DN    | 190                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE22886 NAIVE BCELL VS BLOOD PLASMA CELL DN          | 194                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE28449 WT VS LRF KO GERMINAL CENTER BCELL UP        | 196                 | 4 (2)             | 3 (1.5)                      | 1 (0.5)                        | 0.014            | 0.0002  | 0.0217                     |
| GOLDRATH NAIVE VS EFF CD8 TCELL DN                    | 198                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE25088 WT VS STAT6 KO MACROPHAGE IL4 STIM DN        | 197                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE37605 C57BL6 VS NOD FOXP3 IRES GFP TREG DN         | 198                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE30962 ACUTE VS CHRONIC LCMV PRIMARY INF CD8 TCE... | 199                 | 4 (2)             | 3 (1.5)                      | 1 (0.5)                        | 0.014            | 0.0002  | 0.0217                     |
| KAECH NAIVE VS DAY8 EFF CD8 TCELL DN                  | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0002  | 0.0217                     |
| GSE15750 DAY6 VS DAY10 EFF CD8 TCELL UP               | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0003  | 0.0298                     |
| GSE1925 CTRL VS IFNG PRIMED MACROPHAGE UP             | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0003  | 0.0298                     |
| GSE21379 WT VS SAP KO CD4 TCELL DN                    | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0003  | 0.0298                     |
| GSE33425 CD161 HIGH VS INT CD8 TCELL DN               | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.014            | 0.0003  | 0.0298                     |
| GSE13547 2H VS 12 H ANTI IGM STIM BCELL UP            | 173                 | 4 (2.3)           | 4 (2.3)                      | 0 (0)                          | 0.015            | 0.0004  | 0.0368                     |

**Table 117:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO IMMUNOGLOBULIN RECEPTOR BINDING | 7                   | 2 (28.6)          | 2 (28.6)                     | 0 (0)                          | 0.020            | <0.0001 | 0.0929                     |

**Table 118:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 6). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| plasma cells, immunoglobulins (M156.1)             | 22                  | 10 (45.5)         | 10 (45.5)                    | 0 (0)                          | 0.135            | <0.0001 | 0.0115                     |
| plasma cells and B cells, immunoglobulins (M156.0) | 30                  | 7 (23.3)          | 7 (23.3)                     | 0 (0)                          | 0.082            | <0.0001 | 0.0115                     |
| enriched in B cells (II) (M47.1)                   | 36                  | 4 (11.1)          | 4 (11.1)                     | 0 (0)                          | 0.043            | <0.0001 | 0.0115                     |

**Table 119:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE29614 DAY3 VS DAY7 TIV FLU VACCINE PBMC DN         | 179                 | 12 (6.7)          | 12 (6.7)                     | 0 (0)                          | 0.052            | <0.0001 | 0.0271                     |
| GSE29614 CTRL VS DAY7 TIV FLU VACCINE PBMC DN         | 183                 | 11 (6)            | 11 (6)                       | 0 (0)                          | 0.047            | <0.0001 | 0.0271                     |
| GSE29617 DAY3 VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 180                 | 10 (5.6)          | 10 (5.6)                     | 0 (0)                          | 0.043            | <0.0001 | 0.0271                     |
| GSE29617 CTRL VS DAY7 TIV FLU VACCINE PBMC 2008 DN    | 187                 | 8 (4.3)           | 8 (4.3)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0271                     |
| GSE29614 CTRL VS TIV FLU VACCINE PBMC 2007 DN         | 172                 | 6 (3.5)           | 6 (3.5)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0271                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M... | 188                 | 6 (3.2)           | 6 (3.2)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0271                     |
| GSE4984 UNTREATED VS GALECTIN1 TREATED DC DN          | 175                 | 5 (2.9)           | 5 (2.9)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0271                     |
| GSE10325 LUPUS CD4 TCELL VS LUPUS BCELL DN            | 184                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0271                     |
| GSE45365 WT VS IFNAR KO BCELL MCMV INFECTION DN       | 188                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0271                     |
| GSE3982 MEMORY CD4 TCELL VS BCELL DN                  | 193                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0271                     |
| GSE22886 NAIVE BCELL VS BM PLASMA CELL DN             | 195                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0271                     |
| GSE5589 WT VS IL10 KO LPS STIM MACROPHAGE 180MIN D... | 150                 | 4 (2.7)           | 4 (2.7)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0271                     |
| GSE29618 BCELL VS MDC DAY7 FLU VACCINE UP             | 182                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0271                     |
| GSE10325 CD4 TCELL VS BCELL DN                        | 185                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.017            | <0.0001 | 0.0271                     |
| GSE10325 BCELL VS MYELOID UP                          | 186                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0271                     |
| GSE13411 PLASMA CELL VS MEMORY BCELL UP               | 190                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0271                     |
| GSE22886 IGG IGA MEMORY BCELL VS BM PLASMA CELL DN    | 190                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.016            | <0.0001 | 0.0271                     |
| GSE22432 CDC VS COMMON DC PROGENITOR UP               | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.015            | <0.0001 | 0.0271                     |
| GSE13547 CTRL VS ANTI IGM STIM ZFX KO BCELL 2H UP     | 162                 | 4 (2.5)           | 4 (2.5)                      | 0 (0)                          | 0.018            | 0.0002  | 0.0443                     |
| GSE29618 BCELL VS MONOCYTE UP                         | 180                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.017            | 0.0002  | 0.0443                     |
| GSE3982 BCELL VS NKCELL UP                            | 198                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.016            | 0.0002  | 0.0443                     |
| GSE41867 DAY6 VS DAY8 LCMV ARMSTRONG EFFECTOR CD8 ... | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.015            | 0.0002  | 0.0443                     |
| GSE22886 NAIVE VS IGG IGA MEMORY BCELL DN             | 193                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.016            | 0.0003  | 0.0635                     |
| GSE17721 CTRL VS PAM3CSK4 6H BMDC UP                  | 201                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.015            | 0.0004  | 0.0812                     |
| GSE32901 NAIVE VS TH17 NEG CD4 TCELL DN               | 123                 | 3 (2.4)           | 3 (2.4)                      | 0 (0)                          | 0.017            | 0.0005  | 0.0974                     |

**Table 120:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 7). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                      | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| enriched in neutrophils (I) (M37.1)                | 47                  | 10 (21.3)         | 10 (21.3)                    | 0 (0)                          | 0.103            | <0.0001 | 0.0069                     |
| plasma cells, immunoglobulins (M156.1)             | 22                  | 7 (31.8)          | 7 (31.8)                     | 0 (0)                          | 0.093            | <0.0001 | 0.0069                     |
| plasma cells and B cells, immunoglobulins (M156.0) | 30                  | 6 (20)            | 6 (20)                       | 0 (0)                          | 0.071            | <0.0001 | 0.0069                     |
| TLR and inflammatory signaling (M16)               | 43                  | 6 (14)            | 6 (14)                       | 0 (0)                          | 0.062            | <0.0001 | 0.0069                     |

| Gene Set Name                                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| recruitment of neutrophils (M132)                 | 10                  | 3 (30)            | 3 (30)                       | 0 (0)                          | 0.045            | <0.0001 | 0.0069                     |
| antiviral IFN signature (M75)                     | 22                  | 4 (18.2)          | 4 (18.2)                     | 0 (0)                          | 0.051            | 0.0003  | 0.0173                     |
| enriched in activated dendritic cells (II) (M165) | 35                  | 4 (11.4)          | 4 (11.4)                     | 0 (0)                          | 0.044            | 0.0008  | 0.0395                     |

**Table 121:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RESPONSE TO INTERFERON ALPHA                   | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.039            | <0.0001 | 0.0233                     |
| GO CELLULAR RESPONSE TO FATTY ACID                | 51                  | 4 (7.8)           | 4 (7.8)                      | 0 (0)                          | 0.037            | <0.0001 | 0.0233                     |
| GO RESPONSE TO TYPE I INTERFERON                  | 67                  | 4 (6)             | 4 (6)                        | 0 (0)                          | 0.033            | <0.0001 | 0.0233                     |
| GO LEUKOCYTE CHEMOTAXIS                           | 116                 | 5 (4.3)           | 4 (3.4)                      | 1 (0.9)                        | 0.029            | <0.0001 | 0.0233                     |
| GO RESPONSE TO FATTY ACID                         | 83                  | 4 (4.8)           | 4 (4.8)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0233                     |
| GO CELL CHEMOTAXIS                                | 161                 | 5 (3.1)           | 4 (2.5)                      | 1 (0.6)                        | 0.023            | <0.0001 | 0.0233                     |
| GO CELLULAR RESPONSE TO ACID CHEMICAL             | 175                 | 5 (2.9)           | 4 (2.3)                      | 1 (0.6)                        | 0.022            | <0.0001 | 0.0233                     |
| GO POSITIVE REGULATION OF VASCULATURE DEVELOPMENT | 133                 | 4 (3)             | 3 (2.3)                      | 1 (0.8)                        | 0.021            | <0.0001 | 0.0233                     |
| GO CYTOKINE MEDIATED SIGNALING PATHWAY            | 448                 | 10 (2.2)          | 9 (2)                        | 1 (0.2)                        | 0.020            | <0.0001 | 0.0233                     |
| GO INFLAMMATORY RESPONSE                          | 451                 | 10 (2.2)          | 9 (2)                        | 1 (0.2)                        | 0.020            | <0.0001 | 0.0233                     |
| GO CELLULAR RESPONSE TO CYTOKINE STIMULUS         | 602                 | 12 (2)            | 11 (1.8)                     | 1 (0.2)                        | 0.018            | <0.0001 | 0.0233                     |
| GO RESPONSE TO CYTOKINE                           | 710                 | 12 (1.7)          | 11 (1.5)                     | 1 (0.1)                        | 0.016            | <0.0001 | 0.0233                     |
| GO DEFENSE RESPONSE                               | 1197                | 19 (1.6)          | 18 (1.5)                     | 1 (0.1)                        | 0.015            | <0.0001 | 0.0233                     |
| GO DEFENSE RESPONSE TO OTHER ORGANISM             | 483                 | 8 (1.7)           | 8 (1.7)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0233                     |
| GO REGULATION OF IMMUNE EFFECTOR PROCESS          | 426                 | 7 (1.6)           | 7 (1.6)                      | 0 (0)                          | 0.015            | <0.0001 | 0.0233                     |
| GO IMMUNE RESPONSE                                | 1052                | 14 (1.3)          | 13 (1.2)                     | 1 (0.1)                        | 0.013            | <0.0001 | 0.0233                     |
| GO RESPONSE TO BIOTIC STIMULUS                    | 863                 | 11 (1.3)          | 10 (1.2)                     | 1 (0.1)                        | 0.012            | <0.0001 | 0.0233                     |
| GO RESPONSE TO EXTERNAL STIMULUS                  | 1798                | 17 (0.9)          | 16 (0.9)                     | 1 (0.1)                        | 0.009            | <0.0001 | 0.0233                     |
| GO CELLULAR RESPONSE TO ORGANIC SUBSTANCE         | 1848                | 17 (0.9)          | 15 (0.8)                     | 2 (0.1)                        | 0.009            | <0.0001 | 0.0233                     |
| GO IMMUNE SYSTEM PROCESS                          | 1932                | 17 (0.9)          | 16 (0.8)                     | 1 (0.1)                        | 0.009            | <0.0001 | 0.0233                     |
| GO LIPID STORAGE                                  | 27                  | 3 (11.1)          | 3 (11.1)                     | 0 (0)                          | 0.036            | 0.0002  | 0.0443                     |
| GO GRANULOCYTE MIGRATION                          | 74                  | 3 (4.1)           | 2 (2.7)                      | 1 (1.4)                        | 0.023            | 0.0003  | 0.0582                     |
| GO RESPONSE TO VIRUS                              | 248                 | 5 (2)             | 4 (1.6)                      | 1 (0.4)                        | 0.017            | 0.0003  | 0.0582                     |
| GO INNATE IMMUNE RESPONSE                         | 589                 | 7 (1.2)           | 6 (1)                        | 1 (0.2)                        | 0.011            | 0.0003  | 0.0582                     |
| GO RESPONSE TO ACID CHEMICAL                      | 320                 | 5 (1.6)           | 4 (1.2)                      | 1 (0.3)                        | 0.013            | 0.0004  | 0.0716                     |
| GO IMMUNE EFFECTOR PROCESS                        | 456                 | 6 (1.3)           | 6 (1.3)                      | 0 (0)                          | 0.012            | 0.0004  | 0.0716                     |
| GO DEFENSE RESPONSE TO VIRUS                      | 165                 | 4 (2.4)           | 4 (2.4)                      | 0 (0)                          | 0.018            | 0.0005  | 0.0862                     |
| GO CHEMOKINE MEDIATED SIGNALING PATHWAY           | 71                  | 3 (4.2)           | 2 (2.8)                      | 1 (1.4)                        | 0.023            | 0.0006  | 0.0931                     |
| GO POSITIVE REGULATION OF ERK1 AND ERK2 CASCADE   | 169                 | 4 (2.4)           | 2 (1.2)                      | 2 (1.2)                        | 0.018            | 0.0006  | 0.0931                     |
| GO HOMEOSTATIC PROCESS                            | 1333                | 10 (0.8)          | 10 (0.8)                     | 0 (0)                          | 0.007            | 0.0006  | 0.0931                     |
| GO DENDRITIC CELL CHEMOTAXIS                      | 16                  | 2 (12.5)          | 2 (12.5)                     | 0 (0)                          | 0.027            | 0.0007  | 0.0979                     |
| GO NEGATIVE REGULATION OF GLUCOSE TRANSPORT       | 17                  | 2 (11.8)          | 2 (11.8)                     | 0 (0)                          | 0.027            | 0.0007  | 0.0979                     |
| GO DENDRITIC CELL MIGRATION                       | 21                  | 2 (9.5)           | 2 (9.5)                      | 0 (0)                          | 0.025            | 0.0008  | 0.0979                     |
| GO REGULATION OF ACUTE INFLAMMATORY RESPONSE      | 74                  | 3 (4.1)           | 3 (4.1)                      | 0 (0)                          | 0.023            | 0.0008  | 0.0979                     |
| GO NEGATIVE REGULATION OF LIPID METABOLIC PROCESS | 80                  | 3 (3.8)           | 3 (3.8)                      | 0 (0)                          | 0.022            | 0.0008  | 0.0979                     |
| GO LEUKOCYTE MIGRATION                            | 258                 | 5 (1.9)           | 4 (1.6)                      | 1 (0.4)                        | 0.016            | 0.0007  | 0.0979                     |
| GO TAXIS                                          | 463                 | 6 (1.3)           | 5 (1.1)                      | 1 (0.2)                        | 0.012            | 0.0008  | 0.0979                     |

| Gene Set Name                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO REGULATION OF IMMUNE SYSTEM PROCESS | 1369                | 10 (0.7)          | 8 (0.6)                      | 2 (0.1)                        | 0.007            | 0.0008  | 0.0979                     |

**Table 122:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                          | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE22886 NAIVE BCELL VS NEUTROPHIL DN                  | 197                 | 14 (7.1)          | 14 (7.1)                     | 0 (0)                          | 0.058            | <0.0001 | 0.0092                     |
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC AT DX DN       | 191                 | 12 (6.3)          | 12 (6.3)                     | 0 (0)                          | 0.050            | <0.0001 | 0.0092                     |
| GSE22886 NAIVE TCELL VS NEUTROPHIL DN                  | 197                 | 12 (6.1)          | 12 (6.1)                     | 0 (0)                          | 0.049            | <0.0001 | 0.0092                     |
| GSE29615 CTRL VS LAIV FLU VACCINE PBMC UP              | 189                 | 8 (4.2)           | 8 (4.2)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0092                     |
| GSE22886 NAIVE CD8 TCELL VS NEUTROPHIL DN              | 194                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.033            | <0.0001 | 0.0092                     |
| GSE22886 NEUTROPHIL VS MONOCYTE UP                     | 195                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.032            | <0.0001 | 0.0092                     |
| GSE3982 DC VS NEUTROPHIL DN                            | 198                 | 8 (4)             | 6 (3)                        | 2 (1)                          | 0.032            | <0.0001 | 0.0092                     |
| GSE13485 DAY3 VS DAY7 YF17D VACCINE PBMC DN            | 199                 | 8 (4)             | 7 (3.5)                      | 1 (0.5)                        | 0.032            | <0.0001 | 0.0092                     |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC UP         | 184                 | 7 (3.8)           | 7 (3.8)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0092                     |
| GSE29615 CTRL VS DAY7 LAIV FLU VACCINE PBMC UP         | 184                 | 7 (3.8)           | 7 (3.8)                      | 0 (0)                          | 0.029            | <0.0001 | 0.0092                     |
| GSE22886 NAIVE CD4 TCELL VS NEUTROPHIL DN              | 196                 | 7 (3.6)           | 7 (3.6)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0092                     |
| GSE360 L DONOVANI VS M TUBERCULOSIS DC DN              | 199                 | 7 (3.5)           | 6 (3)                        | 1 (0.5)                        | 0.028            | <0.0001 | 0.0092                     |
| GSE13484 UNSTIM VS YF17D VACCINE STIM PBMC DN          | 200                 | 7 (3.5)           | 6 (3)                        | 1 (0.5)                        | 0.028            | <0.0001 | 0.0092                     |
| GSE34392 ST2 KO VS WT DAY8 LCMV EFFECTOR CD8 TCELL...  | 200                 | 7 (3.5)           | 7 (3.5)                      | 0 (0)                          | 0.028            | <0.0001 | 0.0092                     |
| GSE19401 PLN VS PEYERS PATCH FOLLICULAR DC DN          | 201                 | 7 (3.5)           | 6 (3)                        | 1 (0.5)                        | 0.028            | <0.0001 | 0.0092                     |
| GSE14000 UNSTIM VS 4H LPS DC DN                        | 197                 | 6 (3)             | 5 (2.5)                      | 1 (0.5)                        | 0.024            | <0.0001 | 0.0092                     |
| GSE40685 TREG VS FOXP3 KO TREG PRECURSOR DN            | 197                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.024            | <0.0001 | 0.0092                     |
| GSE13485 CTRL VS DAY3 YF17D VACCINE PBMC DN            | 198                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.024            | <0.0001 | 0.0092                     |
| GSE14000 UNSTIM VS 4H LPS DC TRANSLATED RNA DN         | 198                 | 6 (3)             | 5 (2.5)                      | 1 (0.5)                        | 0.024            | <0.0001 | 0.0092                     |
| GSE10325 MYELOID VS LUPUS MYELOID DN                   | 199                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.024            | <0.0001 | 0.0092                     |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC DN         | 199                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.024            | <0.0001 | 0.0092                     |
| GSE19888 ADENOSINE A3R INH VS ACT WITH INHIBITOR P...  | 200                 | 6 (3)             | 5 (2.5)                      | 1 (0.5)                        | 0.024            | <0.0001 | 0.0092                     |
| GSE7218 IGM VS IGG SIGNAL THOUGH ANTIGEN BCELL DN      | 169                 | 5 (3)             | 4 (2.4)                      | 1 (0.6)                        | 0.022            | <0.0001 | 0.0092                     |
| GSE13485 CTRL VS DAY3 YF17D VACCINE PBMC UP            | 175                 | 5 (2.9)           | 5 (2.9)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0092                     |
| GSE17974 IL4 AND ANTI IL12 VS UNTREATED 24H ACT CD...  | 181                 | 5 (2.8)           | 4 (2.2)                      | 1 (0.6)                        | 0.021            | <0.0001 | 0.0092                     |
| GSE2706 R848 VS R848 AND LPS 2H STIM DC DN             | 188                 | 5 (2.7)           | 4 (2.1)                      | 1 (0.5)                        | 0.021            | <0.0001 | 0.0092                     |
| GSE29164 CD8 TCELL VS CD8 TCELL AND IL12 TREATED M...  | 188                 | 5 (2.7)           | 5 (2.7)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0092                     |
| GSE29615 CTRL VS DAY3 LAIV IFLU VACCINE PBMC UP        | 189                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0092                     |
| GSE2706 UNSTIM VS 2H R848 DC DN                        | 190                 | 5 (2.6)           | 4 (2.1)                      | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE4748 CYANOBACTERIUM LP SLIKE VS LPS AND CYANOBAC... | 190                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE18791 CTRL VS NEWCASTLE VIRUS DC 8H DN              | 193                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE41176 UNSTIM VS ANTI IGM STIM BCELL 1H UP           | 195                 | 5 (2.6)           | 4 (2.1)                      | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE9006 1MONTH VS 4MONTH POST TYPE 1 DIABETES DX P...  | 195                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE36888 UNTREATED VS IL2 TREATED STAT5 AB KNOCKIN...  | 196                 | 5 (2.6)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE25123 WT VS PPARG KO MACROPHAGE UP                  | 198                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE3982 CTRL VS LPS 48H DC DN                          | 198                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE3982 NEUTROPHIL VS NKCELL UP                        | 198                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE42021 CD24HI VS CD24LOW TREG THYMUS DN              | 198                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE9988 ANTI TREM1 VS LPS MONOCYTE DN                  | 197                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE36392 TYPE 2 MYELOID VS EOSINOPHIL IL25 TREATED... | 199                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE18281 SUBCAPSULAR VS CENTRAL CORTICAL REGION OF... | 200                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE32986 CURDLAN LOWDOSE VS CURDLAN HIGHDOSE STIM ... | 200                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE33424 CD161 INT VS NEG CD8 TCELL UP                | 200                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE42021 TREG VS TCONV PLN UP                         | 200                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.020            | <0.0001 | 0.0092                     |
| GSE7548 NAIVE VS DAY7 PCC IMMUNIZATION CD4 TCELL D... | 200                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE8835 CD4 VS CD8 TCELL CLL PATIENT UP               | 200                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.020            | <0.0001 | 0.0092                     |
| GSE13485 CTRL VS DAY7 YF17D VACCINE PBMC DN           | 202                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0092                     |
| GSE19198 1H VS 6H IL21 TREATED TCELL DN               | 201                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.019            | <0.0001 | 0.0092                     |
| GSE22140 GERMFREE VS SPF MOUSE CD4 TCELL DN           | 201                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.019            | <0.0001 | 0.0092                     |
| GSE26030 TH1 VS TH17 DAY5 POST POLARIZATION UP        | 201                 | 5 (2.5)           | 4 (2)                        | 1 (0.5)                        | 0.019            | <0.0001 | 0.0092                     |

**Table 123:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index. Top 50 results are listed.

| Gene Set Name                               | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|---------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| KEGG CYTOKINE CYTOKINE RECEPTOR INTERACTION | 263                 | 6 (2.3)           | 5 (1.9)                      | 1 (0.4)                        | 0.019            | <0.0001 | 0.0186                     |

**Table 124:** Enriched MSigDB KEGG Pathways (PBMC, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                            | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| REACTOME INTERFERON ALPHA BETA SIGNALING | 62                  | 4 (6.5)           | 4 (6.5)                      | 0 (0)                          | 0.034            | <0.0001 | 0.0674                     |

**Table 125:** Enriched MSigDB Reactome Pathways (PBMC, Trivalent Influenza Vaccine, Day 8). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                          | 15                  | 3 (20)            | 3 (20)                       | 0 (0)                          | 0.125            | <0.0001 | 0.0465                     |
| GO GAS TRANSPORT                             | 19                  | 3 (15.8)          | 3 (15.8)                     | 0 (0)                          | 0.107            | <0.0001 | 0.0465                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS       | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.103            | <0.0001 | 0.0465                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS       | 30                  | 3 (10)            | 3 (10)                       | 0 (0)                          | 0.077            | <0.0001 | 0.0465                     |
| GO BICARBONATE TRANSPORT                     | 44                  | 3 (6.8)           | 3 (6.8)                      | 0 (0)                          | 0.057            | <0.0001 | 0.0465                     |
| GO REACTIVE OXYGEN SPECIES METABOLIC PROCESS | 96                  | 4 (4.2)           | 4 (4.2)                      | 0 (0)                          | 0.038            | <0.0001 | 0.0465                     |
| GO RESPONSE TO HYDROGEN PEROXIDE             | 109                 | 3 (2.8)           | 3 (2.8)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0465                     |
| GO PROTEIN HETEROOLIGOMERIZATION             | 113                 | 3 (2.7)           | 3 (2.7)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0465                     |
| GO RECEPTOR MEDIATED ENDOCYTOSIS             | 213                 | 3 (1.4)           | 3 (1.4)                      | 0 (0)                          | 0.013            | <0.0001 | 0.0465                     |
| GO RESPONSE TO INORGANIC SUBSTANCE           | 484                 | 3 (0.6)           | 3 (0.6)                      | 0 (0)                          | 0.006            | <0.0001 | 0.0465                     |
| GO DETOXIFICATION                            | 76                  | 3 (3.9)           | 3 (3.9)                      | 0 (0)                          | 0.035            | 0.0002  | 0.0665                     |



| Gene Set Name                             | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO RESPONSE TO REACTIVE OXYGEN SPECIES    | 191                 | 3 (1.6)           | 3 (1.6)                      | 0 (0)                          | 0.015            | 0.0002  | 0.0665                     |
| GO RESPONSE TO TOXIC SUBSTANCE            | 241                 | 3 (1.2)           | 3 (1.2)                      | 0 (0)                          | 0.012            | 0.0002  | 0.0665                     |
| GO RESPONSE TO OXIDATIVE STRESS           | 352                 | 3 (0.9)           | 3 (0.9)                      | 0 (0)                          | 0.008            | 0.0002  | 0.0665                     |
| GO PROTEIN OLIGOMERIZATION                | 432                 | 3 (0.7)           | 3 (0.7)                      | 0 (0)                          | 0.007            | 0.0003  | 0.0821                     |
| GO ENDOCYTOSIS                            | 483                 | 3 (0.6)           | 3 (0.6)                      | 0 (0)                          | 0.006            | 0.0003  | 0.0821                     |
| GO RESPONSE TO OXYGEN CONTAINING COMPOUND | 1385                | 4 (0.3)           | 4 (0.3)                      | 0 (0)                          | 0.003            | 0.0003  | 0.0821                     |

**Table 126:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                        | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|--------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HEMOGLOBIN COMPLEX                | 12                  | 3 (25)            | 3 (25)                       | 0 (0)                          | 0.143            | <0.0001 | 0.0117                     |
| GO ENDOCYTIC VESICLE LUMEN           | 17                  | 3 (17.6)          | 3 (17.6)                     | 0 (0)                          | 0.115            | <0.0001 | 0.0117                     |
| GO VESICLE LUMEN                     | 106                 | 3 (2.8)           | 3 (2.8)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0117                     |
| GO BLOOD MICROPARTICLE               | 118                 | 3 (2.5)           | 3 (2.5)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0117                     |
| GO ENDOCYTIC VESICLE                 | 255                 | 3 (1.2)           | 3 (1.2)                      | 0 (0)                          | 0.011            | <0.0001 | 0.0117                     |
| GO CYTOSOLIC SMALL RIBOSOMAL SUBUNIT | 43                  | 2 (4.7)           | 2 (4.7)                      | 0 (0)                          | 0.038            | 0.0002  | 0.0195                     |
| GO SMALL RIBOSOMAL SUBUNIT           | 67                  | 2 (3)             | 2 (3)                        | 0 (0)                          | 0.026            | 0.0003  | 0.0219                     |
| GO CYTOSOLIC PART                    | 220                 | 3 (1.4)           | 3 (1.4)                      | 0 (0)                          | 0.013            | 0.0003  | 0.0219                     |
| GO CYTOPLASMIC VESICLE PART          | 600                 | 3 (0.5)           | 3 (0.5)                      | 0 (0)                          | 0.005            | 0.001   | 0.0649                     |
| GO CYTOSOLIC RIBOSOME                | 110                 | 2 (1.8)           | 2 (1.8)                      | 0 (0)                          | 0.017            | 0.0013  | 0.0759                     |

**Table 127:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 3 (21.4)          | 3 (21.4)                     | 0 (0)                          | 0.130            | <0.0001 | 0.0186                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 3 (7.3)           | 3 (7.3)                      | 0 (0)                          | 0.060            | <0.0001 | 0.0186                     |
| GO OXYGEN BINDING                                     | 47                  | 3 (6.4)           | 3 (6.4)                      | 0 (0)                          | 0.054            | <0.0001 | 0.0186                     |
| GO ANTIOXIDANT ACTIVITY                               | 69                  | 3 (4.3)           | 3 (4.3)                      | 0 (0)                          | 0.038            | <0.0001 | 0.0186                     |
| GO TETRAPYRROLE BINDING                               | 133                 | 3 (2.3)           | 3 (2.3)                      | 0 (0)                          | 0.021            | <0.0001 | 0.0186                     |
| GO IRON ION BINDING                                   | 162                 | 3 (1.9)           | 3 (1.9)                      | 0 (0)                          | 0.018            | 0.0002  | 0.031                      |

**Table 128:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 9). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                       | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| enriched in neutrophils (I) (M37.1) | 47                  | 14 (29.8)         | 14 (29.8)                    | 0 (0)                          | 0.206            | <0.0001 | 0.0346                     |

**Table 129:** Enriched Blood Transcription Modules (PBMC, Trivalent Influenza Vaccine, Day 10). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|----------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORT                          | 15                  | 4 (26.7)          | 4 (26.7)                     | 0 (0)                          | 0.087            | <0.0001 | 0.0517                     |
| GO GAS TRANSPORT                             | 19                  | 4 (21.1)          | 4 (21.1)                     | 0 (0)                          | 0.080            | <0.0001 | 0.0517                     |
| GO HYDROGEN PEROXIDE CATABOLIC PROCESS       | 20                  | 3 (15)            | 3 (15)                       | 0 (0)                          | 0.058            | <0.0001 | 0.0517                     |
| GO BICARBONATE TRANSPORT                     | 44                  | 4 (9.1)           | 4 (9.1)                      | 0 (0)                          | 0.053            | <0.0001 | 0.0517                     |
| GO HYDROGEN PEROXIDE METABOLIC PROCESS       | 30                  | 3 (10)            | 3 (10)                       | 0 (0)                          | 0.048            | <0.0001 | 0.0517                     |
| GO RECEPTOR INTERNALIZATION                  | 50                  | 3 (6)             | 3 (6)                        | 0 (0)                          | 0.037            | <0.0001 | 0.0517                     |
| GO REACTIVE OXYGEN SPECIES METABOLIC PROCESS | 96                  | 4 (4.2)           | 4 (4.2)                      | 0 (0)                          | 0.032            | <0.0001 | 0.0517                     |
| GO RECEPTOR MEDIATED ENDOCYTOSIS             | 213                 | 6 (2.8)           | 6 (2.8)                      | 0 (0)                          | 0.025            | <0.0001 | 0.0517                     |
| GO DEFENSE RESPONSE                          | 1197                | 10 (0.8)          | 10 (0.8)                     | 0 (0)                          | 0.008            | <0.0001 | 0.0517                     |

**Table 130:** Enriched MSigDB Biological Processes (PBMC, Trivalent Influenza Vaccine, Day 10). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                     | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-----------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO HEMOGLOBIN COMPLEX             | 12                  | 4 (33.3)          | 4 (33.3)                     | 0 (0)                          | 0.093            | <0.0001 | 0.0195                     |
| GO ENDOCYTIC VESICLE LUMEN        | 17                  | 3 (17.6)          | 3 (17.6)                     | 0 (0)                          | 0.061            | <0.0001 | 0.0195                     |
| GO BLOOD MICROPARTICLE            | 118                 | 5 (4.2)           | 5 (4.2)                      | 0 (0)                          | 0.034            | <0.0001 | 0.0195                     |
| GO ANCHORED COMPONENT OF MEMBRANE | 149                 | 4 (2.7)           | 4 (2.7)                      | 0 (0)                          | 0.022            | 0.0003  | 0.035                      |
| GO EXTRACELLULAR SPACE            | 1339                | 10 (0.7)          | 10 (0.7)                     | 0 (0)                          | 0.007            | 0.0003  | 0.035                      |
| GO CYTOSOLIC PART                 | 220                 | 4 (1.8)           | 4 (1.8)                      | 0 (0)                          | 0.016            | 0.0009  | 0.0876                     |

**Table 131:** Enriched MSigDB Cellular Components (PBMC, Trivalent Influenza Vaccine, Day 10). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE9006 HEALTHY VS TYPE 1 DIABETES PBMC AT DX DN      | 191                 | 14 (7.3)          | 14 (7.3)                     | 0 (0)                          | 0.066            | <0.0001 | 0.0304                     |
| GSE29615 CTRL VS LAIV FLU VACCINE PBMC UP             | 189                 | 11 (5.8)          | 11 (5.8)                     | 0 (0)                          | 0.052            | <0.0001 | 0.0304                     |
| GSE13485 PRE VS POST YF17D VACCINATION PBMC UP        | 184                 | 9 (4.9)           | 9 (4.9)                      | 0 (0)                          | 0.043            | <0.0001 | 0.0304                     |
| GSE22886 NEUTROPHIL VS MONOCYTE UP                    | 195                 | 9 (4.6)           | 9 (4.6)                      | 0 (0)                          | 0.041            | <0.0001 | 0.0304                     |
| GSE13485 CTRL VS DAY7 YF17D VACCINE PBMC UP           | 179                 | 8 (4.5)           | 8 (4.5)                      | 0 (0)                          | 0.039            | <0.0001 | 0.0304                     |
| GSE29615 CTRL VS DAY7 LAIV FLU VACCINE PBMC UP        | 184                 | 8 (4.3)           | 8 (4.3)                      | 0 (0)                          | 0.038            | <0.0001 | 0.0304                     |
| GSE22886 NAIVE BCELL VS NEUTROPHIL DN                 | 197                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.036            | <0.0001 | 0.0304                     |
| GSE22886 NAIVE TCELL VS NEUTROPHIL DN                 | 197                 | 8 (4.1)           | 8 (4.1)                      | 0 (0)                          | 0.036            | <0.0001 | 0.0304                     |
| GSE3982 DC VS NEUTROPHIL DN                           | 198                 | 6 (3)             | 6 (3)                        | 0 (0)                          | 0.026            | <0.0001 | 0.0304                     |
| GSE13485 CTRL VS DAY3 YF17D VACCINE PBMC UP           | 175                 | 5 (2.9)           | 5 (2.9)                      | 0 (0)                          | 0.024            | <0.0001 | 0.0304                     |
| GSE29615 CTRL VS DAY3 LAIV IFLU VACCINE PBMC UP       | 189                 | 5 (2.6)           | 5 (2.6)                      | 0 (0)                          | 0.023            | <0.0001 | 0.0304                     |
| GSE22886 NEUTROPHIL VS DC UP                          | 197                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0304                     |
| GSE41176 UNSTIM VS ANTI IGM STIM TAK1 KO BCELL 24H... | 199                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.022            | <0.0001 | 0.0304                     |
| GSE13485 DAY7 VS DAY21 YF17D VACCINE PBMC DN          | 183                 | 4 (2.2)           | 4 (2.2)                      | 0 (0)                          | 0.019            | <0.0001 | 0.0304                     |
| GSE3982 EOSINOPHIL VS NEUTROPHIL DN                   | 192                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.018            | <0.0001 | 0.0304                     |
| GSE18281 SUBCAPSULAR VS CENTRAL CORTICAL REGION OF... | 200                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | <0.0001 | 0.0304                     |
| GSE3039 CD4 TCELL VS B2 BCELL UP                      | 201                 | 5 (2.5)           | 5 (2.5)                      | 0 (0)                          | 0.022            | 0.0002  | 0.0541                     |

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GSE34205 HEALTHY VS RSV INF INFANT PBMC DN            | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0002  | 0.0541                     |
| GSE34205 RSV VS FLU INF INFANT PBMC UP                | 190                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.018            | 0.0003  | 0.0731                     |
| GSE15930 NAIVE VS 48H IN VITRO STIM CD8 TCELL UP      | 198                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.018            | 0.0003  | 0.0731                     |
| GSE2405 0H VS 3H A PHAGOCYTOPHILUM STIM NEUTROPHIL... | 189                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.018            | 0.0004  | 0.0779                     |
| GSE22886 NAIVE CD8 TCELL VS NEUTROPHIL DN             | 194                 | 4 (2.1)           | 4 (2.1)                      | 0 (0)                          | 0.018            | 0.0004  | 0.0779                     |
| GSE3982 NEUTROPHIL VS BCELL UP                        | 196                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.018            | 0.0004  | 0.0779                     |
| GSE3039 NKT CELL VS ALPHAALPHA CD8 TCELL UP           | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0004  | 0.0779                     |
| GSE360 L DONOVANI VS M TUBERCULOSIS DC DN             | 199                 | 4 (2)             | 4 (2)                        | 0 (0)                          | 0.017            | 0.0004  | 0.0779                     |

**Table 132:** Enriched MSigDB Immunological Signatures (PBMC, Trivalent Influenza Vaccine, Day 10). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Gene Set Name                                         | Gene Set<br>Genes # | DE Genes<br>N (%) | Up-reg.<br>DE Genes<br>N (%) | Down-reg.<br>DE Genes N<br>(%) | Jaccard<br>Index | P-Value | FDR<br>Adjusted<br>P-Value |
|-------------------------------------------------------|---------------------|-------------------|------------------------------|--------------------------------|------------------|---------|----------------------------|
| GO OXYGEN TRANSPORTER ACTIVITY                        | 14                  | 4 (28.6)          | 4 (28.6)                     | 0 (0)                          | 0.089            | <0.0001 | 0.0186                     |
| GO OXYGEN BINDING                                     | 47                  | 5 (10.6)          | 5 (10.6)                     | 0 (0)                          | 0.065            | <0.0001 | 0.0186                     |
| GO OXIDOREDUCTASE ACTIVITY ACTING ON PEROXIDE AS A... | 41                  | 3 (7.3)           | 3 (7.3)                      | 0 (0)                          | 0.041            | <0.0001 | 0.0186                     |
| GO TETRAPYRROLE BINDING                               | 133                 | 5 (3.8)           | 5 (3.8)                      | 0 (0)                          | 0.031            | <0.0001 | 0.0186                     |
| GO IRON ION BINDING                                   | 162                 | 5 (3.1)           | 5 (3.1)                      | 0 (0)                          | 0.026            | <0.0001 | 0.0186                     |
| GO ANTIOXIDANT ACTIVITY                               | 69                  | 3 (4.3)           | 3 (4.3)                      | 0 (0)                          | 0.030            | 0.0002  | 0.031                      |

**Table 133:** Enriched MSigDB Molecular Functions (PBMC, Trivalent Influenza Vaccine, Day 10). Results are sorted by FDR adjusted p-value and Jaccard similarity index.

| Package Name | Version | Package Name         | Version  | Package Name    | Version |
|--------------|---------|----------------------|----------|-----------------|---------|
| nlme         | 3.1-131 | BiocParallel         | 1.10.1   | IRanges         | 2.10.3  |
| bitops       | 1.0-6   | RCurl                | 1.95-4.8 | cluster         | 2.0.6   |
| matrixStats  | 0.52.2  | magrittr             | 1.5      | Cairo           | 1.5-9   |
| pbkrtest     | 0.4-7   | GO.db                | 3.4.1    | UpSetR          | 1.3.3   |
| bit64        | 0.9-7   | GenomeInfoDbData     | 0.99.0   | gridExtra       | 2.3     |
| GenomeInfoDb | 1.12.2  | Matrix               | 1.2-10   | plyr            | 1.8.4   |
| tools        | 3.4.1   | Rcpp                 | 0.12.12  | stringr         | 1.2.0   |
| KernSmooth   | 2.23-15 | munsell              | 0.4.3    | gtools          | 3.5.0   |
| DBI          | 0.7     | S4Vectors            | 0.14.4   | R.utils         | 2.5.0   |
| BiocGenerics | 0.22.0  | stringi              | 1.1.5    | R.oo            | 1.21.0  |
| lazyeval     | 0.2.0   | SummarizedExperiment | 1.6.4    | R.methodsS3     | 1.7.1   |
| mgcv         | 1.8-17  | zlibbioc             | 1.22.0   | vegan           | 2.4-4   |
| colorspace   | 1.3-2   | blob                 | 1.1.0    | lattice         | 0.20-35 |
| nnet         | 7.3-12  | parallel             | 3.4.1    | permute         | 0.9-4   |
| bit          | 1.1-12  | gdata                | 2.18.0   | car             | 2.1-5   |
| compiler     | 3.4.1   | Biostrings           | 2.44.2   | pvclust         | 2.0-0   |
| chron        | 2.3-50  | splines              | 3.4.1    | sqldf           | 0.4-11  |
| quantreg     | 5.33    | GenomicFeatures      | 1.28.5   | RSQlite         | 2.0     |
| Biobase      | 2.36.2  | locfit               | 1.5-9.1  | gsubfn          | 0.6-6   |
| SparseM      | 1.77    | GenomicRanges        | 1.28.5   | proto           | 1.0.0   |
| DelayedArray | 0.2.7   | codetools            | 0.2-15   | gplots          | 3.0.1   |
| rtracklayer  | 1.36.4  | stats4               | 3.4.1    | MASS            | 7.3-47  |
| labeling     | 0.3     | XML                  | 3.98-1.9 | xtable          | 1.8-2   |
| caTools      | 1.17.1  | evaluate             | 0.10.1   | goseq           | 1.28.0  |
| scales       | 0.5.0   | nloptr               | 1.0.4    | geneLenDataBase | 1.12.0  |
| digest       | 0.6.12  | MatrixModels         | 0.4-1    | BiasedUrn       | 1.07    |
| Rsamtools    | 1.28.0  | gtable               | 0.2.0    | biomaRt         | 2.32.1  |
| minqa        | 1.2.4   | ggplot2              | 2.2.1    | edgeR           | 3.18.1  |
| XVector      | 0.16.0  | tibble               | 1.3.4    | limma           | 3.32.7  |
| pkgconfig    | 2.0.1   | GenomicAlignments    | 1.12.2   | knitr           | 1.17    |
| lme4         | 1.1-13  | AnnotationDbi        | 1.38.2   |                 |         |
| rlang        | 0.1.2   | memoise              | 1.1.0    |                 |         |

**Table 134:** List of R packages and versions used for the analyses presented in this report. R version 3.4.1 (2017-06-30) 'Single Candle'