Complete list of identified broad research needs identified at the workshop

* Improved tools and model systems for drug discovery and development
* Increased utilization of existing tools and model systems for mechanistic research
* Deep metabolic and neurocognitive phenotyping in human studies
* Improved biomarkers for use in human studies
* Increased utilization of existing biomarkers for human studies
* Improved human neuroimaging technologies
* Detailed metabolomics analysis of individual brain regions in both diabetes and dementia, using techniques such as imaging mass spectrometry
* Increased utilization of existing, novel human neuroimaging technologies
* Longitudinal human studies assessing cognition, metabolism and diet
* Human studies manipulating diet to determine causality and identify specific aspects of foods (e.g. macronutrients such as saturated fatty acids) that negatively impact brain and brain function
* An operational definition of “brain insulin resistance” and tools for measuring brain insulin signaling *in vivo*
* Better understanding of insulin action on astroglial versus neuronal cells as this relates to altered brain function in diabetes
* Development of a protocol to define and measure a “brain health index” for persons with metabolic dysfunction
* Need for harmonization and standardization across measures and protocols
* Combined human, animal, and cell culture studies
* Increased attention to gut-brain signaling, microbiome, and the relationship to obesity, metabolic disease, and neurocognitive dysfunction
* Evaluation of weight loss and diet for reversing or improving cognition
* Interdisciplinary teams collaborating on research at the intersection of metabolism and brain dysfunction
* Engaging and maintaining junior researchers in the field