Brain Research through Advancing Innovative Neurotechnologies ® (BRAIN)
Multi-Council Working Group (MCWG) Meeting
May 22nd, 2020

On May 22nd, 2020, the National Institutes of Health (NIH) Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative Multi-Council Working Group (MCWG) met to discuss the impact of COVID-19 on the NIH and BRAIN-funded research, updates on BRAIN 2.0, and concept clearances for future BRAIN funding opportunities.

In opening remarks, Joshua Gordon, PhD, Director of the National Institute of Mental Health (NIMH) and co-chair of the MCWG, introduced the new NIH BRAIN programmatic Team D organizational structure, which will now be separated into technology dissemination ("Team D") and training and diversity ("Team TD") efforts. Dr. Gordon then reminded the group of the upcoming virtual BRAIN Initiative Investigator's Meeting on June 1-2nd, 2020 and Samantha White, PhD, Chief of the National Institute of Neurological Disorders and Stroke (NINDS) Scientific and Public Engagement branch of the Office of Neuroscience Communications and Engagement (ONCE), gave an overview of the event. Next, Walter Koroshetz, MD, Director of the NINDS and co-chair of the MCWG, highlighted four recent BRAIN-funded studies that used exciting technological breakthroughs, such as novel imaging tools and computational models, to link brain activity to internal states and behavior. Dr. Koroshetz concluded by discussing COVID-19 impacts on NIH and BRAIN research activities and COVID-19 funding opportunities for BRAIN researchers. He also overviewed large NIH-wide efforts to develop vaccines, therapeutics, and tests for the virus, including the Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) framework and Rapid Acceleration of Diagnostics (RADx) initiative. Lastly, Dr. Koroshetz noted that the fiscal impacts of the virus on BRAIN are uncertain, but that large program planning is underway.

John Ngai, PhD, Director of the NIH BRAIN Initiative, provided an update on BRAIN 2.0 and overviewed five suggested transformative projects. He detailed three projects, including plans to compile a cell-type specific armamentarium, human brain cell atlas, and mouse brain connectome. Dr. Ngai noted that science was a major driver of BRAIN 2.0 project selection and that budget was a main factor in planning project development. To conclude, Dr. Ngai mentioned plans for upcoming workshops focused on microconnectivity analysis, brain implant technologies, non-invasive human imaging, tools for cell-type access, and translational circuit therapies.

Two concept clearances for future funding opportunities developed by BRAIN Team A were presented. Team A oversees two NIH BRAIN Initiative priority areas: *Cell Type/Discovering Diversity* and *Circuit Diagrams/Maps at Multiple Scales*. Douglas Kim, PhD, Health Scientist Administrator at NIMH, described a concept on scaling up and disseminating resources for brain cell type-specific access and manipulation across species. This concept builds upon current BRAIN Initiative Cell Census Network (BICCN) projects and will improve current methods used to access specific cell-types, which are cumbersome and largely dependent on transgenic lines. Dr. Kim also noted plans to develop an armamentarium for nonhuman-primates and humans and pointed out challenges, such as translating viral-based technologies to these species. Meeting participants suggested establishing consensus guidelines early on to aid in streamlining the classification of newly defined cell types. Additionally, the group noted the importance of considering non-viral molecular approaches, reagent validation, and data management and dissemination.

Ruben Alvarez, PhD, Health Scientist Administrator at the NIMH, presented a second concept clearance, which focused on using next generation technologies to better understand brain microconnectivity. The goal is to develop and validate technologies for creating whole brain wiring diagrams of the mammalian

brain, which are currently expensive and not easily scalable. Technology development projects include comparing different imaging modalities (*e.g.*, EM, expansion light microscopy, X-ray tomography), integrating connectomes across scales, assessing the benefits of using living versus post-mortem brain tissue, and others. Dr. Alvarez also mentioned that this concept will support interagency partnerships between the NIH, Department of Energy (DOE), National Science Foundation (NSF), and Intelligence Advanced Research Projects Activity (IARPA). Meeting participants noted that in addition to neurons, non-neuronal cells should also be included when creating and analyzing connectomes. They also mentioned that this concept will be a hugely collaborative effort between the NIH and other partners and necessitate expertise from data scientists and experts in artificial intelligence.

The meeting proceeded with a closed session of the MCWG members and federal staff to discuss funding plans for FY20 awards. The next MCWG meeting will be held on Friday, August 21st, 2020, and a videocast will be available for live viewing and later archived.