NIH Doubles Investment in BRAIN Initiative

The National Institutes of Health (NIH) announced on October 13 details of the third round of grants to support the goals of the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, bringing total NIH fiscal year 2016 investment to more than $150 million. "In only 3 years we've already seen exciting new advances in neuroscience research come out of the BRAIN Initiative," said Walter J. Koroshetz, MD, director of the National Institute of Neurological Disorders and Stroke.

This round of funding includes more than 100 new awards totaling more than $70 million that will go to more than 170 investigators at 60 institutions. These awards expand NIH efforts to develop new tools and technologies to understand neural circuit function and capture dynamic views of the brain in action. "This year, more projects will be based, at least in part, on data from humans," said Joshua Gordon, MD, PhD, director of the National Institute of Mental Health. "Some of these projects are aimed at fine-tuning brain stimulation and other promising technologies for the treatment of mental illnesses."

In 2013, President Obama launched the BRAIN Initiative as a large-scale effort to equip researchers with insights needed to treat a broad spectrum of brain disorders, including but not limited to Alzheimer disease (AD), schizophrenia, autism, epilepsy, and traumatic brain injury. "There are very few effective cures for neurological and neuropsychiatric disorders," said Koroshetz. "By pushing the boundaries of fundamental neuroscience research, NIH BRAIN Initiative scientists are providing the insights researchers will need to develop 21st-century treatments."

The NIH component of the BRAIN Initiative is guided by the long-term scientific plan outlined in 2014 in *BRAIN 2025: A Scientific Vision* (https://www.braininitiative.nih.gov/pdf/BRAIN2025_508C.pdf), which emphasized early investment in basic neuroscience research. The latest grants awarded in the BRAIN Initiative are classified by NIH in the following categories:

Tools for cells and circuits: Researchers will devise new tools and methods for rapidly identifying cells and genes that control certain brain circuits, including using ultrasound waves to turn circuits on and off.

Large-scale recording and modulation—new technologies: Researchers will explore creative ways to monitor and manipulate brain activity, including creating large-scale flexible probes for recording activity deep inside the brain.

Large-scale recording and modulation—optimization: These grants will help researchers enhance current methods of monitoring and manipulating brain activity, including activating neurons by using genes from luminescent plankton.

Large-scale recording and modulation—new concepts and early-stage research: Researchers will devise novel ways to monitor and manipulate brain activity, including creating a "neural dust" system made of tiny electric sensors for wirelessly recording brain activity.

Next-generation human imaging: Researchers will test new ideas and methods for scanning brain activity, including attempting to distinguish between neuronal and glial activity.

Next-generation human invasive devices: Researchers will test new methods for using deep-brain stimulation to treat a variety of disorders, including stroke, Parkinson disease, and obsessive compulsive disorder.

Noninvasive neuromodulation: Researchers will create new noninvasive brain stimulation techniques and test ways of using existing devices to treat a variety of disorders. These projects include one that will create a cap that uses ultrasound waves to precisely control different parts of the brain and another that will enhance limb stimulation techniques to rehabilitate movement in stroke patients.

Understanding neural circuits: Researchers will explore new techniques for analyzing large amounts of data about the human brain and use invasive techniques to analyze human brains under a variety of conditions. Examples include creation of computer programs for detecting and diagnosing AD and autism and experiments in which electrical brain activity will be monitored while people speak and read.

Technology dissemination and training: Researchers will use tools developed by BRAIN Initiative projects to investigate a wide range of new applications, including testing out a highly precise method for blocking epileptic seizures.

A complete list of new BRAIN Initiative grants is available at braininitiative.nih.gov/funding/fundedAwards.htm.