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## The BRAIN Initiative and the Need for Animal Research

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Leaders from the National Institutes of Health ([NIH \(http://www.nih.gov/\)](http://www.nih.gov/)) on February 26 presented exciting updates on the [Brain Research through Advancing Innovative Neurotechnologies® \(https://www.braininitiative.nih.gov/pdf/BRAIN\\_brochure\\_508C.pdf\)](https://www.braininitiative.nih.gov/pdf/BRAIN_brochure_508C.pdf) (BRAIN) Initiative in a congressional briefing sponsored by the [American Brain Coalition \(http://www.americanbraincoalition.org/\)](http://www.americanbraincoalition.org/), the [American Academy of Neurology \(https://www.aan.com/\)](https://www.aan.com/), and the [Society for Neuroscience \(http://www.sfn.org/\)](http://www.sfn.org/) in cooperation with the [Congressional Neuroscience Caucus \(http://www.americanbraincoalition.org/page/CongrNeurosciCaucus\)](http://www.americanbraincoalition.org/page/CongrNeurosciCaucus). The briefing, titled, “Launching into the Next Phase of the NIH BRAIN Initiative,” featured [Dr. Joshua A. Gordon \(https://www.nimh.nih.gov/about/director/index.shtml\)](https://www.nimh.nih.gov/about/director/index.shtml), Director of the National Institute of Mental

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Health ([NIMH \(https://www.nimh.nih.gov/index.shtml\)](https://www.nimh.nih.gov/index.shtml)), and [Dr. Walter J. Koroshetz \(https://www.ninds.nih.gov/About-NINDS/Who-We-Are/Directors-Corner\)](https://www.ninds.nih.gov/About-NINDS/Who-We-Are/Directors-Corner), Director of the National Institute of Neurological Disorders and Stroke ([NINDS \(https://www.ninds.nih.gov/\)](https://www.ninds.nih.gov/)). They gave an engaging presentation to inform attendees about the most recent discoveries resulting from the BRAIN Initiative, and how these discoveries are meeting the [seven high priority areas \(https://www.braininitiative.nih.gov/about/7priority.htm\)](https://www.braininitiative.nih.gov/about/7priority.htm) of the Initiative. Throughout the hour-long presentation, both Directors repeatedly underscored the need for animal research in the Initiative – and the discoveries and applications emanating from animal research.

The BRAIN Initiative was announced by the Obama administration in [2013 \(https://obamawhitehouse.archives.gov/the-press-office/2013/04/02/fact-sheet-brain-initiative\)](https://obamawhitehouse.archives.gov/the-press-office/2013/04/02/fact-sheet-brain-initiative) with the goal of “accelerating the development and applications of new technologies that will enable researchers to produce dynamic pictures of the brain” that will inform about brain functioning, behavior, and eventually, the development of treatments for brain disorders. Neuropsychiatric disorders, in particular, are a leading source of disease burden and cost in the U.S.

Gordon and Koroshetz wasted no time in highlighting the valuable role of animal models in the discoveries and applications produced by the BRAIN Initiative. One of those notable achievements was the development of the CLARITY technique which has enabled high-resolution imaging of the brain at the cellular level.

Mouse models were instrumental in developing the [CLARITY \(https://en.wikipedia.org/wiki/CLARITY\)](https://en.wikipedia.org/wiki/CLARITY) technique for visualizing the structure of individual neurons by making brain tissue transparent. This is accomplished by using acrylamide-based hydrogels built from within, and linked to, brain tissue. CLARITY allows for highly detailed images of the protein and nucleic structure of the brain, which will be crucial in elucidating how diseases, disorders, or traumas result in different structures compared to healthy brain tissue.

This technique is now being used by BRAIN Initiative-funded researchers to generate circuit diagrams in the brain that can show resolution from the whole brain down to the [synapse \(https://en.wikipedia.org/wiki/Synapse\)](https://en.wikipedia.org/wiki/Synapse) level. Currently, it can only be used in post-mortem human brains, but the methodology lays the foundation for the development of the technique in living people.

During the Q & A session that followed the presentation, I asked Gordon and Koroshetz how they might respond to people who might claim that federally-funded animal research is [a waste of taxpayer money \(https://speakingofresearch.com/2017/09/22/jane-goodall-and-white-coat-waste-are-wrong-about-nicotine-addiction-research/\)](https://speakingofresearch.com/2017/09/22/jane-goodall-and-white-coat-waste-are-wrong-about-nicotine-addiction-research/), particularly as it pertains to the BRAIN Initiative. Gordon replied, “Certainly, we need to understand the human brain to understand and treat human disorders, but there is no way to get there technologically without studying animals.” To understand the brain in total, he said, **the only way is to study animals**. Importantly, he emphasized the need for relying on animals only when necessary, and for treating them with great care and respect. “To advance the trajectory of knowledge, of science, and of care, we need to use each animal as appropriate,” Gordon said. Koroshetz offered another perspective: “Certain systems are so evolutionarily conserved that we can learn a huge amount by studying animals – about pain circuits, breathing circuits, and more.” Ultimately, both agreed, the use of animals in the BRAIN Initiative depends on the question one is asking, but without them this project cannot succeed.

*The full version of this post was published at [Speaking of Research \(https://speakingofresearch.com/2018/03/01/congressional-neuroscience-caucus-briefing-on-the-brain-initiative-emphasizes-need-for-animal-research/\)](https://speakingofresearch.com/2018/03/01/congressional-neuroscience-caucus-briefing-on-the-brain-initiative-emphasizes-need-for-animal-research/) on March 1, 2018.*

Image: Chung & Deisseroth, 2013

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