

Written Statement
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Subcommittee on Labor, Health and Human Services, Education and Related Agencies
Appropriations Committee
In Support of FY23 Appropriations for the National Institutes of Health

Chair DeLauro, Ranking Member Cole, and members of the Subcommittee, on behalf of the Society for Neuroscience (SfN), we are honored to present this testimony in support of robust appropriations for biomedical research at the National Institutes of Health (NIH). SfN urges you to provide at least \$49 billion, a \$4 billion increase over FY22, in funding for the NIH for FY23, including the full release of funding for the NIH Innovation Account for 21st Century Cures programs and \$680 million for the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. As both a researcher and a Professor in the Department of Biology at Brandeis University, I understand the critical importance of federal funding for neuroscience research in the United States. My own research identified the ability of brain circuits to “tune themselves” to maintain the appropriate level of excitability, which is critical for healthy brain function.

My research group, supported by NIH funding, made fundamental discoveries in how neurons self-adjust their excitability, making it easier or harder to send electrical messages to other neurons. Over the past two decades, we have unearthed a family of mechanisms that allow for this unique flexibility called “homeostatic plasticity,” so neurons can change the rate they send messages and protect communication in the face of outside disturbances. Our work has many wide-reaching implications: We are studying how learning and memory suffer when these mechanisms malfunction; We are exploring how being awake or asleep affects these mechanisms; and we are investigating how states of being too excitable or not excitable enough contribute to disorders like epilepsy and autism spectrum disorder. Basic research, like my own, is paramount to understanding the brain at a level deep enough to develop treatments and interventions for diseases and disorders.

SfN believes strongly in the research continuum: basic science leads to clinical innovations, which leads to translational uses impacting the public’s health. Basic science is the foundation upon which all health advances are built. To cure diseases, we need to understand them through fundamental discovery-based research. However, basic research depends on reliable, sustained funding from the federal government. SfN is grateful to Congress for its investments in biomedical research and increases for NIH over the last six years. Growing the NIH budget over \$9 billion in that period is exactly the sustained effort that is needed, and your continued support will pay dividends for years to come.

The Importance of the Research Continuum

NIH funding for basic research is critical for facilitating groundbreaking discoveries and for training researchers at the bench. For the United States to remain the leader in biomedical research, Congress must continue to support basic research that fuels discoveries as well as the economy. The deeper our grasp of basic science, the more successful those focused on clinical and translational research will be. We use a wide range of experimental and animal models not used elsewhere in the research pipeline. These opportunities create discoveries – sometimes unexpected discoveries – expanding knowledge of biological processes, often at the molecular

level. This level of discovery reveals new targets for research to treat all kinds of brain disorders affecting millions of people in the United States and beyond.

NIH basic research funding is also a key economic driver of science in the United States through funding universities and research organizations across the country. Federal investments in scientific research fuel the nation's pharmaceutical, biotechnology and medical device industries. The private sector utilizes basic scientific discoveries funded through NIH to improve health and foster a sustainable trajectory for America's research and development enterprise. Basic science generates the knowledge needed to uncover the mysteries behind human diseases, which leads to private sector development of new treatments and therapeutics. Industry typically does not fund research on this important first step given the long-term path of basic science and pressure for shorter-term return on investments. Congressional investment in basic science is irreplaceable on the pathway for development of drugs, biologics, devices, and other treatments for brain-related diseases and disorders.

For example, in January 2022, NIH launched Phase 1 of Neuromod Prize to increase the development of neuromodulation therapies. Neuromodulation treatments act directly on peripheral nerves to improve organ function and have the potential to treat a variety of conditions, including heart failure. The Neuromod Prize is part of the SPARC (Stimulating Peripheral Activity to Relieve Conditions) NIH initiative. With SPARC, NIH will combine early-stage research and clinical applications to provide targeted treatments for multiple organ functions.

Another example of NIH's success in funding neuroscience is the BRAIN Initiative. While only one part of the research landscape in neuroscience, the BRAIN Initiative has been critical in promoting future discoveries across neuroscience and related scientific disciplines. By including funding in 21st Century Cures, Congress helped maintain the momentum of this endeavor. Note, however, using those funds to supplant regular appropriations is counterproductive. There is no substitute for robust, sustained, and predictable funding for NIH. SfN appreciates Congress' ongoing investment in the BRAIN Initiative and urges its full funding in FY23. Some recent exciting advancements in NIH funded neuroscience research include the following:

Covid-19 and its impact on adolescent mental health & drug use

Since March 2020, Covid-19 has had a profound impact on our lives, physically and mentally. Adolescence is a challenging transition period, and researchers recognized the need to determine the impact of the pandemic on early adolescent's mental health. Using data from the Adolescent Brain Cognitive Development (ABCD) study, researchers fitted machine learning models that considered factors for adolescent psychological distress and emotional wellbeing during the Covid-19 pandemic. Factors that predicted adolescent psychological distress during the pandemic included being female, pre-pandemic internalizing symptoms, and sleep problems. They also found healthy habits (exercise, better sleep) and social support reduced detrimental effects of the pandemic on adolescent mental health. This study stresses the importance of mental health in vulnerable populations to complement investigations into the physical manifestations of the pandemic.

While adolescent mental health challenges have increased during the pandemic, adolescent drug use significantly decreased in 2021 since the start of the Covid-19 pandemic. These results come from the Monitoring the Future survey, funded by the National Institute of Drug Abuse. Since 1975, the Monitoring the Future has recorded drug and alcohol intake of adolescents across the

United States at three time periods: lifetime, past year, and past month use. Findings from the survey show 10th and 12th graders alcohol, marijuana, nicotine, and illicit drug use decreased significantly from 2020 to 2021. This decrease was the largest 1-year decrease recorded in the Monitoring the Future survey since 1975. The results taken from the survey demonstrate how the pandemic has impacted drug use in adolescents. It will be interesting to see how adolescent drug use changes from 2021-2022, with the continuation of the pandemic.

Congress & NIH Must Support Access to Models Necessary for Neuroscience Discovery

SfN urges the Committee to appropriate funding for biomedical research without restriction on the use of animal models. Adequate NIH funding is necessary to advancing our understanding of the brain; however, full realization of this funding's promise requires appropriate access to research models, including non-human primates and other animal models. Animal research is highly regulated to ensure the ethical and responsible care and treatment of the animals. SfN and its members take their legal and ethical obligations related to this research very seriously. While SfN recognizes the goal of the reduction, refinement, and eventual replacement of nonhuman primate models in biomedical research, much more research and time is needed before such a goal is attainable. Premature replacement of non-human primate and other animal models may delay or prevent the discovery of treatments and cures—not only for neurological diseases like Alzheimer's disease, addiction, and traumatic brain injury, but also for communicable diseases and countless other conditions. There are currently no viable alternatives available for studying biomedical systems that advance our understanding of the brain and nervous system; or when seeking treatments for diseases and disorders like depression, addiction, Parkinson's Disease, and emotional responses. This research is critically important and has the opportunity to benefit countless people around the world. SfN urges Congress to work with the NIH to ensure this important well-regulated research can continue.

Funding in Regular Order

SfN joins the biomedical research community supporting an increase in NIH funding to at least \$49 billion for existing NIH institutes and centers, a \$4 billion increase over FY22. This increase is consistent with those provided by this committee for the past few years and provides certainty to the field of science, allowing for the exploitation of more scientific opportunity, more training of the next generation of scientists, more economic growth and more improvements in the public's health. Equally as important as providing a reliable increase in funding for biomedical research is ensuring funding is approved before the end of the fiscal year. Your success in 2018 in completing appropriations prior to the start of the fiscal year was a tremendous benefit to research. Continuing Resolutions have significant consequences on research, including restricting NIH's ability to fund new grants and to fully fund continuation grants. For some of our members, this means waiting for a final decision to be made on funding before knowing if their perfectly scored grant will be realized, or operating a lab with 90 percent of the awarded funding until appropriations are final. All of the positive benefits research provides in this country may be negatively impacted by these real time considerations. SfN strongly supports the appropriation of NIH funding in a timely manner, which avoids delays in approving new research grants or causes reductions in funding for already approved research funding. Meeting the example Congress set in 2018 would be another substantial benefit to science.

SfN thanks the subcommittee for its continued support of biomedical research and looks forward to working with you to ensure the United States remains the global leader in neuroscience

research and discovery. Collaboration among Congress, the NIH, and the scientific research community has created great benefits for not only the United States but also for people around the globe suffering from brain-related diseases and disorders. On behalf of the Society for Neuroscience, we urge you to continue your strong support of biomedical research.