

Diane Lipscombe, PhD, President, Society for Neuroscience

202-962-4000 – Email: advocacy@sfn.org

Subcommittee on Labor, Health, and Human Services, Education and Related Agencies

U.S. House of Representatives Appropriations Committee

In Support of FY20 Appropriations for the National Institutes of Health

Ms. Chair and members of the Subcommittee, I am Diane Lipscombe, President of the Society for Neuroscience (SfN) and it is my honor to present this testimony on behalf of the Society in strong support of at least a \$2.5 billion increase in funding for the National Institutes of Health (NIH), to \$41.6 billion, for FY20, including the release of the 21st Century Cures funding. I am offering this testimony in my capacity as President of SfN, an association, now entering its 50th year, of nearly 37,000 neuroscientists from all 50 states and around the world.

As a neuroscience researcher and Director at The Carney Institute for Brain Science at Brown University, I see the importance of federal funding for neuroscience research daily. In my laboratory, funding from NINDS and NIMH advances our understanding of brain function in normal and disease states, including chronic pain and psychiatric illnesses. Sharing the tools developed in our lab, and our discoveries, speeds the development of new therapies to address unmet clinical needs. Basic research is essential to find ways to diagnose, treat, and cure neurological and psychiatric disorders. This requires contributions from many fields including biology, engineering, mathematics, and medicine; and continuing to attract young scientists is necessary to maintain momentum and our lead position in biomedical research and discovery.

SfN knows the power of the research continuum and that basic scientists generate clinical innovations leading to translational uses impacting public health. Basic research is the foundation upon which all health advances are built, and the future of this research depends on

reliable, sustained funding from Congress. SfN is grateful to Congress for recent appropriation increases to NIH. Growing the NIH budget from \$30.1 billion to \$39.1 billion over four years is the sustained effort that is needed, returning economic and health benefits for years to come.

SfN stands with the biomedical research community seeking an increase in NIH funding of at least \$2.5 billion above the final FY19 level, including the release of the 21st Century Cures funding. Moreover, SfN urges Congress to provide relief from the draconian cuts set to take effect as a result of the Budget Control Act (BCA). By raising the BCA caps, Congress can ensure that we do not backslide on previous support for scientific research and discoveries. Concurrently, our funding request continues the support provided by this Committee and ensures predictability and stability to scientists relying on federal funding.

Equally important to providing a reliable increase in federal funding for biomedical research is completing appropriations by September 30. Your success in completing NIH appropriations prior to the start of the fiscal year for FY19 translated to a tremendous benefit to scientific progress. Reliance on Continuing Resolutions (CR) in place of regular appropriations has critical implications for science, as CRs severely restrict NIH's ability to fund basic neuroscience research. For some SfN members, particularly early career researchers, this meant waiting for a final decision on FY18 funding before knowing if their highly meritorious grant applications would be funded. These uncertainties have real and negative impacts on the research being done in the lab by undermining the positive benefits that the research enterprise provides to this country, and by disincentivizing our best young scientists from pursuing research careers.

As a neuroscientist previously funded by the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, I appreciate Congress's support, as it prioritizes technology development to learn about human brain function from children to adults.

While only a part of the neuroscience research landscape, the BRAIN Initiative is crucial for future discoveries and innovative solutions. By including funding in the 21st Century Cures Act, only part of the BRAIN Initiative's needed funding, Congress is advancing this endeavor. However, using those funds to supplant regular appropriations is counterproductive. There is no substitute for robust, sustained, and predictable funding for NIH-supported research.

The more we know about the basic mechanisms that underlie brain function, the faster we will advance clinical and translational solutions for neurological disorders. In this field, we apply a range of powerful technologies and animal models not used elsewhere in the research pipeline that have the potential for broad impact. Our discoveries, sometimes unexpected, advance basic knowledge of brain function and reveal new therapeutic targets to treat brain disorders affecting millions of people around the world.

As the leading scientific society seeking to understand the brain and nervous system, SfN has great impact and reach within and across disciplines. We host one of the largest annual scientific meetings, disseminate discoveries through highly-rated scientific journals, offer extensive educational programming to raise public awareness of brain research, and engage policymakers in the tremendous progress made in neuroscience research. We are extremely encouraged by the pace of discovery in neuroscience and the promise it offers for future treatments of neurological disorders. Some recent, exciting advancements include the following:

The Impacts of Neuroscience Research

Treatments for patients with movement disorders

One breakthrough in neuroscience, thanks to federal funding from NINDS, benefits patients with Spinal Muscular Atrophy (SMA), the most common genetic disorder linked to infant death worldwide. SMA impacts the brain stem and spinal cord and hinders the ability to

achieve motor milestones and mobility. Recent clinical trials using a new therapy is recovering motor movements in infants with SMA, improving their head control, crawling, walking, and sitting. This form of therapy may also benefit those suffering from motor dysfunctions, such as Parkinson's, Lou Gehrig's, and Huntington's diseases. The basic research critical for this treatment goes back 25 years, but its potential impact will likely extend far into the future.

Regulation of neuronal communication

My research seeks to understand how neurons communicate with each other. Brain function is defined by neurons communicating information from cell to cell, and from one brain region to another. Communication between neurons is carried across spaces called synapses by neurotransmitters. The number of neurotransmitters available to transmit these signals is controlled by "gatekeepers," which ensure appropriate size responses. Many therapeutic drugs used in the clinic act on these molecular gatekeepers to dial up or down the flow of communication in the brain. I describe the basic properties of gatekeepers and show how they are generated in specific neurons of the brain and nervous system. My work is basic in nature, but these findings are used to inform the development of new therapeutics for treating major neurological diseases, including chronic pain, migraine, epilepsy, and neuropsychiatric disorders.

Imaging to understand brain function and disease

The BRAIN Initiative has generated new tools and technologies that researchers can use to visualize brain activity, including watching networks of brain cells interact to control behavior. Such advances will allow us to describe both normal brain function and understand what goes wrong in brain disease. Until now, most methods used to visualize a functioning brain caused severe tissue damage. Two-photon excitation microscopy revolutionized neuroscience in its ability to view neuronal activity in a living brain tissue with very limited tissue damage. This

technique also allows us to look at the brain in much more detail with high resolution to detect the points of connection—synapses—as signals move from one part of the brain to the other. This, and other powerful imaging approaches, are being combined to follow and detect abnormal neuronal communication in the brain with unparalleled resolution. If we can localize abnormal activity to specific brain regions, we can devise methods to correct abnormalities in communications between neurons, features of several neurological disorders.

Summary and Conclusion

NIH funding is critical for the future of biomedical research and for training young researchers at the bench, as well as a major driver of the United States economy. While our nation is the global leader, other countries are also investing increasing amounts into biomedical research. Congress must continue to support basic research in order to fuel scientific discoveries, maintain our preeminence as a leader in the field, and continue to drive the United States' economy into the future. Nearly one in five US adults live with mental illness, early childhood stress has lasting impacts through adulthood, and the growth of age-related neurological disorders is still increasing. The only way to change the trajectory of neurological and psychiatric disorders is to increase federal government investment in biomedical research.

SfN strongly supports at least \$41.6 billion for the National Institutes of Health for FY20, including the release of the 21st Century Cures Act funding. Like the Subcommittee, SfN also supports continuing regular order and avoiding disruptive interruptions to biomedical research.

On behalf of SfN, I would like to thank Congress for its commitment and continued support of neuroscience research. Congress, the NIH, and the scientific research community must continue to collaborate to assist those suffering from diseases, disorders, and injuries of the brain and nervous system. Thank you for this opportunity to testify.