

Submitted on behalf of the American Physiological Society

The American Physiological Society (APS) thanks the committee for focusing on the critical role that federal investment plays in driving innovation. Research funded by the National Institutes of Health (NIH) and the National Science Foundation (NSF) provides a foundation for the development of new drugs, treatments and technologies. The federal government is the primary funding source for discovery research through competitive grants awarded by the NIH and NSF. Although the private sector partners with academic researchers to develop research findings into new treatments and technologies, industry relies upon federally funded research to identify where innovation opportunities can be found. This system of public-private partnership has been critical to U.S. leadership in the biomedical sciences. However, this position of leadership is at risk as other nations, including China, increase their investments in research and development. The NSF's 2014 Science and Engineering Indicators¹ shows that when gross expenditures on R&D are measured as a percentage of the gross domestic product, the rate of investment in the US has remained fairly constant over the last thirty years, while other nations including China, Japan and South Korea have increased their investments significantly.

Cutting-edge research at the NIH and NSF

Biomedical research carried out with support from the NIH contributes to our understanding of health and disease, which allows all Americans to look forward to a healthier future. As a result of improved health care, Americans in the 21st century are living longer and healthier lives than ever before. However, chronic conditions such as cardiovascular disease, diabetes, respiratory illnesses, Alzheimer's and cancer continue to impose a heavy burden in the United States and around the world. As the U.S. population ages, the prevalence and cost of these diseases will increase exponentially. The NIH invests heavily in basic research to understand the physiological mechanisms at work in health and disease. This knowledge is crucial to the development of safe and effective interventions and prevention strategies.

While the NIH focuses on basic and applied biomedical research, the NSF is the major source of support for non-medical biological research, including integrative, comparative, and evolutionary biology, as well as interdisciplinary biological research. It has been shown time and time again that the knowledge gained through basic biological research is the foundation for more applied studies that sustain the health of animals, humans and ecosystems.

Exciting new initiatives are underway at the NIH and NSF to advance science, including the multi-agency Brain Research through Advancing Innovative Neurotechnologies ("BRAIN") initiative. The BRAIN initiative will bring together researchers from diverse disciplines to tackle major gaps in current knowledge about the brain and brain diseases. Important projects like this require significant resources. Because they are proposed at a time of constrained budgets, they will further diminish funding for investigator-initiated grants. The current system of allowing investigators to develop and propose ideas that are then evaluated by their peers and selected for funding based on their merit has fostered a research enterprise that is second to none. Increasing the budgets for the NIH and NSF would provide funding for large projects as described above, while also providing resources for individual scientists to pursue creative new avenues of research.

At both the NIH and the NSF the majority of funding is awarded through competitive, merit-based peer review, ensuring that the best possible projects are supported. These agencies have an exemplary record of accomplishment in terms of funding research that produces results with far-reaching potential. To date 212 Nobel Laureates were supported by the NSF, and 144 by the NIH.

NSF and NIH train the next generation of innovators

In addition to supporting research, the NSF and NIH must also address workforce issues to ensure that our nation's researchers are ready to meet the challenges they will face in the future. The pressures placed on the research enterprise after years of sub-inflationary budget increases were severely compounded by sequestration cuts in FY 2013.

We believe that NSF is uniquely suited to foster science education programs of the highest quality, and we recommend that Congress continue to provide federal funds for science education through the NSF. The APS is proud to have partnered with NSF in programs to provide training opportunities and career development activities to enhance the participation of underrepresented minorities in science.

Scientists in the early stages of their careers face a particular set of challenges as they work to establish themselves during a time of dwindling resources. To address some of these problems, the NIH is continuing its commitment to fund new investigators at approximately the same rate as established investigators. The NIH is also developing three new efforts to ensure a diverse and sustainable future biomedical workforce. The National Research Mentoring Network (NRMN) and the Building Infrastructure Leading to Diversity (BUILD) initiative are complementary programs that will develop innovative new mentorship programs to engage individuals from diverse backgrounds and help them prepare to succeed in biomedical research careers. The Coordination and Evaluation Center (CEC) will play a role in coordinating and assessing NRMN and BUILD, providing program-wide goals and tools to assess progress. These efforts are critical to helping young scientists launch their careers. However, to sustain a talented workforce the NIH needs predictable and sustainable budget growth. If the current funding crisis is not resolved, the continued loss of senior researchers will begin to erode the pool of experienced mentors for early career scientists on which the BUILD and NRMN programs rely.

The APS is a professional society dedicated to fostering research and education as well as the dissemination of scientific knowledge concerning how the organs and systems of the body work. The Society was founded in 1887 and now has more than 10,000 member physiologists. APS members conduct NIH- and NSF-supported research at colleges, universities, medical schools, and other public and private research institutions across the U.S., as well as in the life sciences industry.

¹<http://www.nsf.gov/statistics/seind14/content/chapter-4/chapter-4.pdf>