FASEB
Quality Life Through Research

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Federation of American Societies for Experimental Biology
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Testimony of
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On
FY 2012 Appropriations for the National Science Foundation
Submitted to the
Senate Committee on Appropriations
Subcommittee on Commerce, Justice, Science, and Related Agencies
Senator Barbara Mikulski, Chair
Senator Kay Bailey Hutchison, Ranking Member

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The Federation of American Societies for Experimental Biology (FASEB) respectfully requests an appropriation of $7.80 billion for the National Science Foundation (NSF) in fiscal year (FY) 2012. This is the same funding level contained in the President's FY 2012 budget request and recommended by the bipartisan *America COMPETES Reauthorization Act of 2010*.

As a Federation of 23 scientific societies, FASEB represents more than 100,000 life scientists and engineers, making it the largest coalition of biomedical research associations in the United States. FASEB's mission is to advance health and welfare by promoting progress and education in biological and biomedical sciences, including the research funded by NSF, through service to its member societies and collaborative advocacy. FASEB enhances the ability of scientists and engineers to improve—through their research—the health, well-being, and productivity of all people.

NSF is the only federal research agency dedicated to supporting basic research and education across all fields of science and engineering. With just four percent of the federal research and development budget, NSF funds over 60 percent of non-biomedical life science research at academic institutions in fields such as mathematics, geosciences, computer science, and social sciences. NSF also plays a significant role in advancing biological research; forty-two Nobel Prizes have been awarded to NSF-funded scientists for contributions in physiology or medicine. One of these Nobel Prizes was awarded for work that led to the development of magnetic resonance imaging (MRI), which is now a key diagnostic tool in hospitals around the world. NSF-funded research truly creates the foundation from which new technologies and therapeutics emerge.

Through its rigorous peer-review that enables experts to identify only the best and most promising research to be funded, NSF has a history of identifying scientific talent early and funding some of science's most important discoveries. For example, a team of researchers led by a NSF-funded synthetic biologist has genetically engineered yeast to produce a precursor to artemisinin, an effective anti-malaria drug. Before this scientific breakthrough, a slow and expensive process was required to extract the chemical from its natural source, the sweet wormwood plant. Researchers hope that scaled-up production of yeast-derived artemisinin will eventually provide an adequate and affordable supply of the drug to people worldwide. Using this groundbreaking technique, yeast and bacteria may soon be

employed to synthesize other therapeutics, such as vaccines. Another example of NSF-funded research with medical applications is the use of robotics, information technology, and biomedicine to develop devices that revolutionize surgical procedures. Robotic arms remotely controlled through a system of levers and 3D high-resolution images of the operative site are enabling surgeons to execute more precise movements, reducing the physical impact of operations on patients, and shortening recovery time. The increased accuracy of robotically-enhanced surgery has the potential to improve the effectiveness of treatments, such as the removal of cancerous tumors from the eye.

NSF is also committed to achieving excellence in science, technology, engineering, and math education at all levels. The agency supports a wide variety of initiatives aimed at preparing science teachers, developing innovative curricula, and engaging students in the process of scientific discovery. One of many NSF programs to prepare future scientists, the Graduate Research Fellowship Program (GRFP) annually awards approximately 2,000 three-year fellowships to outstanding graduate students pursuing advanced degrees in science, technology, engineering, or mathematics. NSF graduate research fellows are making important scientific contributions, including research to improve preclinical testing of artificial heart valves and a study to understand how neuronal networks enable the brain to carry out its problem-solving functions. Past recipients of NSF GRFP awards have gone on to become leading scientists and Nobel Prize winners. In this way, NSF helps foster creative thinking in science, engineering, and mathematics by supporting the next generation of researchers. Moreover, by funding research projects and education initiatives at institutions across the country, NSF ensures that future generations will be able to meet the technical demands of 21st century jobs.

There is wide agreement that the nation's future is inextricably linked to its capacity for innovation. The U.S. needs an educated populace, a cadre of world-class scientists and engineers, and a well-developed research infrastructure capable of supporting competitively funded research projects. Recent investment in NSF programs has resulted in new projects, increased graduate training, and an expanded capacity for innovation. Reduction of that effort would mean that fewer university researchers would receive support for critical research and education projects, jeopardizing the jobs of many scientists, engineers, and technical personnel. The NSF budget has both immediate and long-term consequences for the nation's economy, security, and quality of life. Strong and sustained investment in NSF will enable the transformational research and training essential to the future success and competitiveness of the U.S. Furthermore, because of the collaborative work of science agencies and the increasingly interdisciplinary nature of scientific research, support for the federal research and development portfolio has never been more important to the nation's prosperity.

Thank you for the opportunity to offer FASEB's support for NSF.

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