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Prepared for the

House Committee on Appropriations
Subcommittee on Labor, Health and Human Services, Education, and Related Agencies
Representative Tom Cole, Chairman
Representative Rosa DeLauro, Ranking Member

On

FY 2016 Appropriations for the National Institutes of Health

Chairman Cole, Ranking Member DeLauro, and distinguished members of the Subcommittee, thank you for the opportunity to testify on behalf of the National Institutes of Health (NIH). My name is Joseph Haywood and I appear before you today in my capacity as the President the Federation of American Societies for Experimental Biology (FASEB), an umbrella organization representing 27 scientific societies, representing more than 120,000 life scientists and engineers. FASEB respectfully requests a minimum of $32 billion in fiscal year (FY) 2016 for NIH within the Department of Health and Human Services. We estimate that with a budget of $32 billion (an increase of $1.69 billion), NIH could support 522 new research project grants at current funding levels with commensurate growth for other vital agency programs.

NIH has produced an outstanding legacy of discoveries that have improved health, saved lives, and generated new knowledge. Many of these advances arose from scientists investigating questions designed to explain fundamental molecular, cellular, and biological mechanisms. Research supported by NIH has also expanded our understanding of the molecular roots of various cancers and led to important insights into how microbial communities affect a range of chronic diseases including obesity and diabetes. In addition, research supported by NIH led to the development of innovative technologies and created entirely new global industries that are a critical component of our nation's economic growth.

Investment in biomedical research funded by NIH has supported discoveries that lowered death and disability from polio, heart disease, and cancer, prolonging life and reducing suffering. New scientific breakthroughs have given us the opportunity to dramatically accelerate desperately needed progress on therapies for thousands of diseases and conditions. A study published by the National Academy of Sciences found that the key enabling discovery that led to the development of 16 out of 21 drugs with the highest therapeutic impacts was made as a result of federally supported research.

NIH-funded research is continuing to produce the insights that are needed for tomorrow's improvements in health and clinical care. Recent discoveries include:

- *Engineering Immune Cells to Improve Cancer Treatment Options*: Researchers funded by NIH continue to make progress on immunotherapy which uses the human immune system to fight cancer. Promising results have been reported from several small clinical trials testing adoptive cell transfer (ACT) on patients with acute lymphoblastic leukemia. ACT is a technique that engineers an individual's immune cells to identify and kill

tumors. Another form of ACT involves the addition of special receptors, chimeric antigen receptors, to T cells in order to change or improve their specificity.

- *Creating Organs on a Chip:* A new experimental technology supported through investigator-initiated research uses a series of micro-chambers, fluids, and human cells to simulate a person's internal organs. One example, lung-on-a-chip, mimics the site of oxygen exchange in the lungs, and is being developed to study lung inflammation and infection. Other organs-on-a-chip such as kidney, liver, and heart are also in development. An artery-on-a-chip was created that effectively imitates the molecular and flow conditions of early plaque development in coronary arteries. This chip was used to gauge the disease risk of individuals with high blood lipids and coronary artery plaque, and proved to be an accurate predictor of the extent of disease.

- *Developing an Artificial Pancreas*: NIH-funded researchers have developed an artificial pancreas that is capable of monitoring blood sugar and delivering appropriate amounts of hormones to control fluctuations in levels. A sensor implanted under an individual's skin measures his or her blood sugar and transmits the information to a smartphone application that determines the amount of insulin necessary. An implantable pump provides the insulin. This device is a critical tool for individuals with type-1 diabetes who must constantly monitor their blood sugar levels to prevent hypoglycemia and other life-threatening complications.

Stable, Predictable Funding Is Critical to Sustain Discovery

Stable and predictable increases in federal funding for research supported by NIH are necessary to take advantage of unprecedented opportunities to improve quality of life, address the rising costs of caring for our aging population, and protect us from new and emerging diseases. As NIH Director Francis S. Collins, MD, PhD, wrote in a recent viewpoint for the Journal of the American Medical Association, "The 21st century is the century of biology. The nation that invests in biomedical research will reap untold rewards in its economy and the health of its people."[1]

Appropriations for NIH have failed to keep up with inflation since 2003, reducing the agency's capacity to support research by nearly 23 percent. The fact that the NIH budget has not kept pace with rising costs also led to a 34 percent decrease in the number of R01-equivalent awards – the primary mechanism for supporting investigator-initiated research – between 2003 and 2013. In addition, the number of investigators with NIH funding for six consecutive years declined from 10,030 in the FY 2000-2005 period to 9,127 in FY 2008-2013, a reduction of 11 percent.[2]

Basic research discoveries and their subsequent translation to clinical applications can take multiple years of collaboration. Budgets that are uncertain and vary in grant support from year to year make such planning difficult. The loss of personnel and scientific expertise may have long-term consequences as highly trained researchers seek employment in other fields.

Congress took an important step in the right direction by providing desperately needed increases for NIH in the FY 2014 and FY 2015 omnibus appropriations bills. However, the additional

[1] Collins, F. (2015, January 13). Exceptional Opportunities in Medical Science: A View From the National Institutes of Health. *Journal of the American Medical Association*.
[2] Data Hound (Berg J). Minding the Gap. *Data Hound Blog, Sciencetopia.* May 15, 2014.

funding did not restore the lost purchasing power or fully replace money that was cut in 2013 due to sequestration.

To prevent further erosion of the nation's capacity for biomedical research, and as a first installment of a multi-year program of sustainable increases, FASEB recommends an appropriation of at least $32.0 billion for NIH in FY 2016. Beyond next year, a five year commitment to increases in federal investment in research and development of at least five percent annually would substantially "bend the curve" and ensure that our leadership in science and technology would not be eclipsed in the next four years. This goal is roughly similar to the recommendation of the American Academy of Arts and Sciences which called for the U.S. to strive to exceed "a sustainable real growth rate of at least 4 percent in the federal investment in basic research, approximating the average growth rate sustained between 1975 and 1992."[3] It would also restore the constant dollar losses in NIH funding that the agency has experienced since 2003.

Thank you for the opportunity to offer FASEB's support and funding recommendation for NIH.

[3] American Academy of Arts and Sciences, Restoring the Foundation: The Vital Role of Research in Preserving the American Dream, Cambridge, Mass, 2014.