Genetics Society of America

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Testimony of the Genetics Society of America
IN SUPPORT of increased funding for the National Institutes of Health

Before the Senate Committee on Appropriations
Subcommittee on Labor, Health, and Human Services, Education, and Related Activities

Submitted April 15, 2016

Thank you for the opportunity for the Genetics Society of America (GSA) to provide our perspective on the fiscal year (FY) 2017 appropriations for the National Institutes of Health (NIH). GSA recommends a minimum of $35 billion for NIH to continue its mission to further biomedical research.

GSA is a professional scientific society with more than 5,500 members from all 50 states working to deepen our understanding of the living world by advancing the field of genetics, from the molecular to the population level. Members of our community rely on support from the NIH to answer underlying biological questions that are the foundation for biomedical innovation. Whether termed foundational, fundamental, or basic research, these studies are critical to expanding our knowledge of the biological world around us. Indeed, the NIH recognized the importance of fundamental research in its agency-wide strategic plan[1] and in a recent letter from Director Francis Collins and other NIH leaders published in *Science* magazine[2]. Funding NIH at a minimum of $35 billion for FY 2017 will allow the agency to increase its support for the fundamental research necessary to further biomedical breakthroughs.

Many of our members utilize model organisms in their research, which allow for extensive experimentation without the ethical implications of human subject research. Traditionally, the term "model organism" included systems such as fruit flies, roundworms, mice, yeast, and bacteria; but it now encompasses a growing collection of other systems including plants, zebrafish, frogs, and more—with new ones being developed regularly to study biological phenomena and disease states. Indeed, advances in technology have enhanced

[1] NIH-wide Strategic Plan http://www.nih.gov/sites/default/files/about-nih/strategic-plan-fy2016-2020-508.pdf
[2] http://science.sciencemag.org/content/351/6280/1405.1.full.

scientists' ability to use a diverse array of biological systems to advance understanding of the mechanisms of life.

Fundamental research supported by the NIH has led to ground-breaking discoveries in our field and beyond. For example, research into the mechanisms of bacterial immunity funded by NIH led to the development of CRISPR/Cas9, the breakthrough technology which has accelerated the potential for gene editing[1]. As a result, researchers now have an unprecedented ability to study biological processes at the molecular level in a growing array of experimental systems, and a new universe for biotechnological applications is now open for exploration. In another example, ongoing studies in the genetics of mosquitoes are currently informing public health discussions around containing and ameliorating the threat of the Zika virus in U.S. The scientific evidence from these fundamental research projects created a body of evidence upon which officials can build more targeted studies to determine whether genetically engineered mosquitoes will impede the spread of the Zika virus[3].

Because humans share much of their basic biology with all living systems, we believe that robust and expanded support for model organisms—from invertebrates and plants to microbes and mammals—is an essential part of this pursuit of foundational knowledge. One of the most effective ways to advance progress in biomedical research is to understand the fundamental biology of model systems. Time and time again, model organisms have led the way in advancing biological understanding to enable cures and treatments for human disease. Green fluorescent protein (GFP), a Nobel Prize-winning tool that allows scientists to observe biological processes in living animals that were once invisible to researchers was developed in worms. Model organisms are now routinely engineered to express GFP to study the activity of specific genes to understand cancer and other diseases[1]. Similarly, the 2009 Nobel Prize for the discovery of the enzyme telomerase—which is critically important in cellular aging and integral to cancer cell proliferation—was first identified in the unicellular ciliate organism and yeast. Furthermore, several Nobel Prizes have been awarded for work in fruit flies, including for fundamental discoveries of the mechanisms of inheritance and embryonic development.

Sustainable funding for the National Institutes of Health is critical to ensure that these types of investigator-initiated projects, which have implications for society at large, continue to be supported. An increase of $3.0 billion for FY 2017 would enable NIH to fund more fundamental research projects while still providing increases to other critical portions of the

[3] http://www.nytimes.com/2016/03/12/business/test-of-zika-fighting-genetically-altered-mosquitoes-gets-tentative-fda-approval.html

agency's portfolio. If the percentage of the new funding used for R01 grants is the same as in prior years, NIH could fund more than 2,200 additional R01 grants—any number of which could yield the next biomedical breakthrough.

A significant fraction of the GSA membership are trainees—undergraduates, graduate students and postdoctoral scholars—who are concerned about the future of research funding and its implications for their careers. NIH has renewed its commitment to recruit and retain these early career scientists in order to cultivate an outstanding biomedical research workforce[1]. The requested funding increase would ensure that undergraduate and graduate students and postdoctoral scholars advance to research careers, making strides in science and technology that will allow the U.S. to remain a world leader in STEM advances.

Finally, we wish to emphasize the importance of sustainable support for research infrastructure. Biological databases, stock centers, and other shared research resources are essential for maintaining consistency across different research laboratories and are vital to scientists nationwide. For example, genomic databases speed innovation by providing accelerated access to well-curated data that can be used to validate new techniques. They also serve as searchable data repositories that allow scientists to connect their research findings and identify collaborators rapidly. Further, research databases function as a central place for data sharing, improving research transparency, and positively impacting research reproducibility. We believe that sustained public support for these community resources is essential and allows them to operate on an open access model, thus assuring that all researchers have the tools they need for discovery.

We appreciate the opportunity to provide input into your deliberations about NIH appropriations. We are happy to provide any additional information about the impact of NIH funding on our community and the advancement of genetics research. Please contact GSA's Executive Director, Adam P. Fagen, PhD (AFagen@genetics-gsa.org) or GSA's Policy and Communications Manager, Chloe N. Poston, PhD (CPoston@genetics-gsa.org) with any questions.

Genetics Society of America

ABOUT GSA: Founded in 1931, the Genetics Society of America (GSA) is a professional scientific society with more than 5,500 members worldwide working to deepen our understanding of the living world by advancing the field of genetics, from the molecular to the population level. GSA promotes research and fosters communication through a

number of GSA-sponsored conferences including regular meetings that focus on particular model organisms. GSA publishes two peer-edited scholarly journals: *GENETICS*, which has published high quality original research across the breadth of the field since 1916, and *G3: Genes|Genomes|Genetics*, an open-access journal launched in 2011 to disseminate high quality foundational research in genetics and genomics. The Society also has a deep commitment to education and fostering the next generation of scholars in the field—as well as helping to enhance public understanding of genetics and model organism research. For more information about GSA, please visit www.genetics-gsa.org. Also follow GSA on Facebook at facebook.com/GeneticsGSA and on Twitter @GeneticsGSA.