



Genetics Society of America

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Jon R. Lorsch, PhD
Director
National Institute of General Medical Sciences
National Institutes of Health
45 Center Drive, MSC 6200
Bethesda, MD 20892

Dear Dr. Lorsch:

The Genetics Society of America (GSA) is pleased to have this opportunity to provide input into the 2014–2018 Strategic Planning process for the National Institute of General Medical Sciences (NIGMS). With over 5,000 individual members from all 50 states and nearly 50 countries, the GSA is the largest science society dedicated to the promotion of basic research in genetics and fostering the next generation of geneticists. Our members span the breadth of the discipline and include a large number of researchers pursuing fundamental research using a variety of model organisms across all domains of life. The GSA mission thus overlaps significantly with that of the NIGMS, and not surprisingly, the NIGMS is a major funder of research conducted by GSA members and of training current and future GSA members. As such, the NIGMS Strategic Plan is of major interest to the GSA. In the attached “GSA White Paper on the NIGMS 2014 Strategic Plan,” the GSA provides input on two core missions of the NIGMS: research and training.

This white paper was drafted by a committee of GSA members (see below) selected for their perspectives as well as diversity of career stage, gender, and organisms of study. The draft was then vetted and polished by the GSA Executive Committee and approved by the full GSA Board of Directors. As such, this document represents the collective opinion of the Society and is not the product of any single individual. The key recommendations in this white paper are as follows:

Research mission:

- Increase the percentage of the NIGMS budget committed to the R01 funding mechanism.
- Put a “sunset clause” on non-investigator-based initiatives.
- Evaluate programs within the Division of Training, Workforce Development, and Diversity for ways of sustaining these efforts through the R01 funding mechanism.
- Provide bridge funding for highly meritorious investigators in order to minimize damage to research teams caused by an 8–12 month gap in funding.
- Prioritize funding of early stage investigators so that we do not lose a generation of talented scientists.
- Fund community resource centers such as the Bloomington Drosophila Stock Center and Fungal Genetics Stock Center.

Training mission:

- Develop a system within the F32 funding mechanism to provide postdoctoral fellowship support to underrepresented minority scientists.
- Extend the eligibility clock for K99/R00 awards by 12 months for those adding children to their families or dealing with other family medical issues during the postdoctoral period.
- Do not penalize graduate training programs based on time-to-degree if students are receiving extra training that promotes their career development.

On behalf of the GSA Board and the Society's more than 5,000 members, I thank you for considering our input.

Sincerely,



Vicki Chandler, PhD
President, Genetics Society of America

cc: Francis Collins, MD, Director, National Institutes of Health

Authoring Committee for White Paper on Needs in Genetics Research

- Roger Innes, PhD, Professor of Biology, Indiana University (*Chair*)
- Nels Elde, PhD, Assistant Professor of Human Genetics and Mario R. Capecchi Endowed Chair in Genetics, University of Utah
- David W. Hall, PhD, Associate Professor of Genetics, University of Georgia
- Denise Montell, PhD, Duggan Professor of Molecular, Cellular and Developmental Biology, University of California, Santa Barbara
- Anne Villeneuve, PhD, Professor of Genetics and of Developmental Biology, Stanford University



White Paper on the NIGMS 2014 Strategic Plan
Genetics Society of America
March 2014

This white paper is submitted to the National Institute of General Medical Sciences (NIGMS) on behalf of the Genetics Society of America (GSA) and its more than 5,000 researchers and educators worldwide working to deepen our understanding of the living world by advancing the field of genetics, from the molecular to the population level.

Research mission:

Since its inception, NIGMS has been a staunch advocate of supporting investigator-initiated fundamental research in the biomedical sciences, distinguishing itself from other institutes of the National Institutes of Health (NIH) by *NOT* investing heavily in top-down research initiatives. This philosophy has paid off handsomely, with 80 former and current NIGMS grantees having received a Nobel Prize, including yeast geneticist Randy Schekman just this past year. Quoting from Dr. Schekman's 2013 [Nobel Banquet Speech](#):

This year's Laureates in the natural sciences reflect the value of curiosity-driven inquiry, unfettered by top-down management of goals and methods. Government funding of basic research in the US started after WWII with a transformative report "Science: Endless Frontiers," written by Vannevar Bush, the science advisor to Presidents Roosevelt and Truman. He wrote, "Scientific progress on a broad front results from the free play of free intellects, working on subjects of their own choice, in the manner dictated by their curiosity for exploration of the unknown.... Freedom of inquiry must be preserved under any plan for government support of science..."

And yet we find a growing tendency for government to want to manage discovery with expansive so-called strategic science initiatives at the expense of the individual creative exercise we celebrate today. Louis Pasteur recognized this tension long before the trend towards managed science. He wrote, "There does not exist a category of science to which one can give the name applied science. There are sciences and the application of science, bound together as the fruit of the tree which bears it."

The GSA whole-heartedly agrees with Dr. Schekman's comments and urges the NIGMS to reaffirm its commitment to investigator-initiated basic research. Quoting from the [2008–2012 NIGMS Strategic Plan](#):

As history has proven time and again, basic research is an engine of progress. The knowledge that grows from fundamental exploration is essential. The future of America's health depends on it, as does the nation's global economic competitiveness. NIGMS strongly commits to continuing to invest in discovery by using a variety of vehicles to support basic research... . Investigator-initiated research project grants—mostly R01s—will continue to remain the main focus of the overall NIGMS research portfolio.

The GSA strongly supports this commitment, and indeed, **we believe that the single highest priority for the NIGMS should be to increase the percentage of its budget committed to R01 funding.**

Our rationale for making this recommendation is to stem the decline in R01 funding rates observed over the last 10 years. According to NIGMS data, from 2000 to 2003, the percentage of R01 applications funded each year was 37–38%, with nearly a 100% funding rate for applications with a percentile score of 23 or better. Funding rates began to decline in 2004, and by 2013, the funding rate was 19.9%, which represents a 47% reduction in the success rate of applicants. Even more problematic is that the required score needed to be confident of funding in 2013 was the 14th percentile.

Low funding rates have several negative implications. First, less research is being performed and fewer scientists are able to maintain functioning research labs. Second, it reduces investigator morale because funding decisions require distinguishing among excellent proposals, making decisions seem capricious. Third, it reduces the likelihood that creative—but high risk—research will be funded, making investigators propose “safer” projects. Fourth, it hinders establishment of new research labs, making it more difficult for early stage investigators to launch successful careers. Fifth, it raises the importance of funding for hiring and promotion, reducing the importance of research quality in these decisions.

These low and decreasing funding rates are destabilizing the scientific enterprise, creating intolerable stress levels for people, and discouraging the best and brightest young people from becoming scientists. Even established investigators are submitting numerous proposals before obtaining funding. Spending this amount of time on grant writing reduces time spent in the lab completing experiments and training students, and thus has a major negative impact on productivity. In addition, some established investigators who have been productive over many decades are being forced to consider retiring early or entering some other “second” career due to lack of funding. The scientific enterprise is at risk of losing critical expertise that took decades to develop. In James Rothman's recent [Nobel Lecture](#), he drew an ominous parallel to the brain drain that Europe experienced during World War II. It took only five years for those hostile conditions (admittedly far more hostile) to drive the best physicists out of Europe to the United States, resulting in a

permanent shift. The United States is now at risk of losing its longstanding status as the best place in the world for biomedical research.

In the absence of increased budgets, it is perhaps not possible to fix all the problems. However, one important way for the NIGMS to achieve more stable and sustainable R01 success rates is to shift funding priorities away from non-investigator-initiated funding programs, such as large-scale research initiatives. **The GSA supports NIGMS's proposal to put a "sunset clause" on such initiatives** (as described in your NIGMS Feedback Loop Blog post of [September 24, 2013](#)). We agree that such top-down funding programs are appropriate only for stimulating attention in a given area, not as an ongoing commitment to big science. Although these initiatives make up only 7.3% of the current NIGMS budget, transfer of a portion of these funds to the R01 pool could have a significant impact in diversifying NIGMS' portfolio.

In addition to the large-scale research initiatives, perhaps there are other areas in the NIGMS where funds could be diverted to R01 grants. For example, **we urge the NIGMS to take a close look at the programs within the Division of Training, Workforce Development, and Diversity (DTWDD)**. Are these funding initiatives accomplishing their desired goals? Is there any duplication of effort within DTWDD—or between DTWDD and similar programs in other institutes and centers? Is there a mechanism by which some of these funds could be moved into R01 funding in a manner that would contribute to workforce development and diversity?

Beyond increasing the pool of funds available for R01 grants, the GSA has several recommendations that relate to the current tight budget environment with regard to research. The first is to **continue to provide bridge funding for highly meritorious investigators in order to minimize damage to research teams caused by an 8–12 month gap in funding**. Lower funding rates mean the number of unfunded highly meritorious proposals has increased, many of which represent projects that NIH has invested in for years. When these teams lose funding, highly trained personnel must be let go, which means that if the project is funded in the next round, it will take much more than eight months to get back up to speed. This represents a significant cost in research productivity. Setting aside funds to bridge this eight-month gap for projects likely to be funded in the next round represents a wise investment.

A second recommendation is to **continue to prioritize funding of early stage investigators so that we do not lose a generation of talented scientists**. The current low funding rates are especially stressful for pre-tenure faculty members whose future employment is often dependent on obtaining research funding. Most assistant professors submit numerous proposals before obtaining funding. Spending most of their time on grant writing has a major negative impact on productivity. This is particularly costly to the research enterprise as the assistant professor period coincides with the time when many scientists are at their peak in terms of creativity. Time lost to grant writing—and the pressure to not take risks— translates into lost opportunities. The combination of low productivity and late (or non-existent) funding is a recipe for denial of tenure and ultimately a loss of talent.

Lastly, we urge the NIGMS to **continue to fund community resource centers such as the Bloomington Drosophila Stock Center, Fungal Genetics Stock Center, and associated databases.** The long-term and consistent support of stock centers and organism-specific databases by the former National Center for Research Resources has been a crucial component of the strength and success of biomedical research in the United States and assures its future vigor. As a measure of this success, in the past 10 years, Nobel Prizes have been awarded to eight GSA members for their work in model organism research, which depends upon these crucial community resources. Centralized stock centers and databases provide optimal resource sharing that maximizes the return on the investments made by NIH, particularly through R01-supported, investigator-initiated research. These community resources provide “off-the-shelf” research tools and thus increase the efficiency and speed of hypothesis-driven research supported by NIH R01 grants. In addition, NIH support for the stock centers and databases allows them to operate on an open access model, thus assuring that all researchers have the tools they need for discovery. Lastly, the stock centers and databases serve to preserve strains of research organisms and associated data that have been generated by R01-funded efforts well beyond the length of the original grant. We are emphasizing the importance of stock centers and databases here because several stock centers of importance to GSA members are now facing damaging cutbacks—and even closure—due to withdrawal or dramatic reduction of funding by federal research agencies including the National Science Foundation (NSF). The loss of NSF support for stock centers will have a serious negative impact on the productivity of NIH-funded research if alternative funding mechanisms are not identified.

Training mission:

Training the next generation of researchers is a core mission of the NIGMS. We note, however, that NIH does not currently have a postdoctoral fellowship program targeted to the support of underrepresented minorities. Although there is a strong emphasis within institutional graduate training grants to recruit minority graduate students, there is no continuing support for the career development of these students when they move on to postdoctoral positions. **The GSA recommends that NIGMS develop a system within the F32 funding mechanism to provide postdoctoral fellowship support to underrepresented minority scientists.**

We also ask that NIGMS revisit policies governing eligibility for K99/R00 Pathway to Independence Awards. Our understanding is that NIH has recently adopted a strict eligibility requirement for applicants to be within four years of a PhD. However, this policy does not take into consideration the fact the post-PhD period coincides with a time when many scientists grow their families. We are concerned that a strict four-year eligibility window may exclude many promising scientists from applying, especially women. This would clearly go against the NIGMS goal of expanding the biomedical workforce, and in particular, in increasing the number of women scientists in faculty positions. Although specific NIH institutes and centers will extend the four-year eligibility by the amount of leave time taken for childbirth or other family medical issues, this eligibility adjustment is insufficient. **The GSA recommends that the eligibility clock for K99/R00 awards be extended by 12**

months for those adding children to their families or dealing with other family medical issues during the postdoctoral period, as is done for the tenure clock at most institutions.

In the discussion about the importance of R01 funding, we want to make it clear that we are not proposing to reduce funding of Institutional Training Grants in order to increase funding for R01 grants support. Such a transfer effectively amounts to a zero sum game that would likely reduce the ability of NIGMS to promote improvements in graduate student training.

Related to the issue of promoting broad, cross-disciplinary graduate student training, the GSA is concerned about NIGMS efforts to shorten time-to-degree. While we concur, in principle, that the PhD training period has become longer than optimal, in some cases this increased time is needed for students to obtain specific training for their career aspirations. For example, time taken out of an academic lab to pursue an internship in an industrial or government lab—or to take additional courses in pedagogy or entrepreneurship—may be extremely valuable to a given student and would likely justify an extension of six months in the PhD training period. Likewise, some students pursuing a cross-disciplinary training plan, e.g., a student with a computational background pursuing a PhD in experimental science, may require longer time-to-degree to acquire background and skills needed to cross discipline boundaries. **We would not want to see training programs penalized for an extended time-to-degree in specific cases where additional specialized training will best serve both students' career aspirations and the goal of the NIGMS to support interdisciplinary proficiency in future PhD scientists.** In addition, we have concerns that any strict limits on time-to-degree could have unintended consequences for the very nature of doctoral training. For example, strict limits might encourage advisors and students to choose to do more incremental work or contribute to an on-going project instead of starting a project from scratch.

The importance of NIGMS to the genetics community cannot be overstated. We thank you for considering our comments.

Summary of Recommendations

Research mission:

- Increase the percentage of the NIGMS budget committed to the R01 funding mechanism.
- Put a “sunset clause” on non-investigator based initiatives.
- Evaluate programs within the Division of Training, Workforce Development, and Diversity for ways of sustaining these efforts through the R01 funding mechanism.
- Provide bridge funding for highly meritorious investigators in order to minimize damage to research teams caused by a 8-12 month gap in funding.
- Prioritize funding of early stage investigators so that we do not lose a generation of talented scientists.
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- Extend the eligibility clock for K99/R00 awards by 12 months for those adding children to their families or dealing with other family medical issues during the postdoctoral period.
- Do not penalize graduate training programs based on time-to-degree if students are receiving extra training that promotes their career development.



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ABOUT GSA: Founded in 1931, the [Genetics Society of America](http://www.genetics-gsa.org) (GSA) is a professional scientific society with more than 5,000 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. For more information about GSA, please visit www.genetics-gsa.org. Also follow GSA on Facebook at facebook.com/GeneticsGSA and on Twitter [@GeneticsGSA](https://twitter.com/GeneticsGSA).