Genetics Society of America

9650 Rockville Pike, Bethesda, MD 20814-3998
Phone: (301) 634-7300 • Fax: (301) 634-7079
society@genetics-gsa.org
www.genetics-gsa.org

September 26, 2014

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

RE: Response to Request for Information Soliciting Input for the NIGMS Strategic Planning Process (NOT-GM-14-129)

Dear Dr. Lorsch:

The Genetics Society of America (GSA) is pleased to have the opportunity to respond to the request for information (RFI) from the National Institute of General Medical Sciences (NIGMS) on the strategic planning process to guide the institute's decision making over the next five years.

As you know, GSA has already provided input into your discussions by way of the "GSA White Paper on the NIGMS Strategic Plan" that we sent to you earlier this year (enclosed). We understand this White Paper was helpful in guiding some of the institute's thinking, and we are glad to see many of the recommendations from the White Paper reflected in NIGMS' draft goals and objectives.

Our Society also submitted formal comments in response to the RFI on the proposal for the Maximizing Investigators' Research Award (MIRA) program this past month (enclosed); some of the themes in our MIRA comments have broader applicability to other aspects of the strategic plan. We have attached both the White Paper and our MIRA comments to this letter so that they will help inform your continuing discussions on the strategic plan.

Although we are generally in agreement with NIGMS' draft goals and objectives document, there was one important topic that we did not see included: enhancing peer review. In particular, we would encourage NIGMS to elevate the need to think strategically about ways to recruit the most talented researchers to serve as peer reviewers. Because only a small number of individuals carefully review each proposal submitted for funding, each review carries significant weight. The ability to fairly evaluate the promise of proposed research—whether an individual project or a larger research program—requires experienced reviewers with broad perspective. GSA thinks there are opportunities for NIGMS and NIH to provide additional incentives that will help convince effective and experienced reviewers to serve on study sections. We encourage you to include enhancing peer

review as an important goal for the strategic plan, and we are happy to work with you to discuss specific ideas that would contribute to this goal.

Beyond this additional recommendation, GSA is generally supportive of the strategic goals and objectives identified in the draft NIGMS document.

We especially appreciate NIGMS asserting the essential role of investigator-initiated research to drive fundamental scientific discoveries (Goal 1). Indeed, the GSA White Paper suggests that the "single highest priority for the NIGMS should be to increase the percentage of its budget committed to R01 funding." We agree with limiting institute support for non-investigator-initiated activities and to engage in careful consideration of any such commitments.

GSA supports the need to develop a highly skilled, creative, and diverse biomedical research workforce (Goal 2). We welcome the call to assess NIGMS research training programs and policies as one way to ensure that limited resources are being spent in the most effective manner. GSA is eager to help support NIGMS in promoting high quality training that prepares the next generation for a range of scientific careers. And we encourage NIGMS to continue to broaden the eligibility for its training programs to best meet the needs of a diverse range of trainees.

GSA is glad to see a clear recognition of the need for research infrastructure, including resources important to individual research communities (Goal 3). The GSA membership depends upon essential national resources as well as databases and stock centers that address the needs of researchers working with particular model organisms. As such, we endorse the necessity for NIGMS to continue play a leading role in developing, maintaining, and evaluating such resources.

We appreciate that NIGMS has stressed the importance of reaching out to the scientific community and the public to emphasize the value of continued investment in basic biomedical research (Goal 4). GSA has encouraged our members to participate in these activities and looks forward to continuing to work with NIGMS to help explain the value of basic discovery research to a broad audience.

Finally, GSA recognizes the need for NIGMS to recruit and retain high-quality professionals and utilize efficient business practices to foster success in achieving scientific progress (Goal 5). As one example, GSA has been vocal about the need to loosen restrictions on federal employee travel, as we believe they are having a detrimental impact on the ability of your staff to be full participants in scientific exchange at professional conferences and other venues.

Thank you again for the opportunity for GSA to offer input into your discussions. We welcome the chance for continued engagement on these and other issues.

Sincerely,

Vicki L. Chandler, PhD
President

Michael Lynch, PhD
Immediate Past President

Jasper Rine, PhD
Vice-President / President-Elect

Enclosures

Genetics Society of America

ABOUT GSA: Founded in 1931, the Genetics Society of America (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.

Genetics Society of America

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.
- 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.

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Genetics Society of America Response to NIGMS Request for Information
Maximizing Investigators' Research Award (MIRA)
August 15, 2014

Request for Information • Input Form

Responses are limited to 500 words per topic. All responses must be submitted by August 15, 2014.

1. The merits of this funding program for established and early stage investigators.

The Genetics Society of America (GSA) appreciates efforts to enhance the efficiency of the research funding system, including the opportunity for investigators to spend more time conducting research and less time writing proposals. As strong proponents of investigator-initiated basic research, GSA especially values the opportunity offered by the MIRA program for PIs to be able to pursue promising new research directions without being bound by specific aims proposed in advance. We share NIGMS' hope that the freedom offered by MIRAs, coupled with longer funding periods, would encourage investigators to pursue more ambitious scientific projects, especially those with longer time horizons. The revised review criteria for MIRAs, which emphasize a "holistic evaluation of the investigator's track record and the overall potential importance of the proposed research program," should help focus peer review on the most important elements of the proposed research program and its likelihood of advancing the field. We support the expectation that PIs will commit at least 50 percent research effort to a MIRA-funded program, which will ensure that PIs remain engaged in the proposed work rather than be spread too thinly across a large number of separate projects. Finally, GSA appreciates the stability afforded by not terminating a MIRA grant immediately if renewal is unsuccessful.

2. The likelihood that established and early stage investigators would apply for NIGMS MIRAs.

The Genetics Society of America (GSA) believes that the additional stability offered by the MIRA program will be attractive to many investigators. However, we worry that some researchers will be hesitant to lose the safety net they currently receive from multiple overlapping grants. In addition, funding from the MIRA program is also likely to be less than the sum of multiple NIGMS awards to a single investigator, which may provide a further disincentive for the most successful PIs to apply for an NIGMS MIRA.

There are also many investigators whose research interests may be sufficiently diverse to encompass several seemingly unrelated projects. These different research strands are often synergistic in unexpected ways, bringing together approaches and expertise from different fields—and helping advance science. Because of this breadth, however, it is unlikely that these projects could be brought together in a single MIRA proposal that could be evaluated fairly by a single peer review committee.

Although GSA is strongly committed to the advancement of early stage investigators (ESIs), we do not believe that the MIRA program is the right mechanism. We question whether most beginning investigators will have developed a sufficiently broad research program to be competitive for such funding. Even the most promising ESIs will not have a sufficient track record for a grant mechanism that is largely focused on past achievement. Should NIGMS wish to make the program available to ESIs, it should be made clear that they will not be expected to have achieved as much as more established investigators, and the solicitation should provide more specificity concerning evaluation criteria.

3. Concerns about the NIGMS MIRA proposal.

While the Genetics Society of America (GSA) appreciates the effort to increase the efficiency and effectiveness of the funding system, we do not believe the MIRA program will lead to significant change in the major challenges faced by many members of our community: the low funding rates and the largely stochastic nature of the current review progress.

GSA is concerned that the program could concentrate NIGMS resources to a small number of investigators at a limited number of institutions. While the goal of the program is to increase the efficiency of supporting those who would succeed under the current funding environment, we want to make sure that NIGMS continues to provide robust support to a broad range of researchers. For example, we are concerned that PIs with smaller research programs may be less competitive for MIRAs. GSA encourages NIGMS to continue to provide substantial support for non-MIRA funding programs, especially those likely to be least competitive for MIRAs.

As much as GSA appreciates the benefit of reducing the amount of time spent on grant writing, we also see a value in this process. Many PIs understand the intrinsic value of the intellectual rigor that goes into producing the detailed proposals that are part of the present system, and indeed many good ideas emerge from that concentrated thought and planning. Indeed, it is not uncommon for investigators to have a "eureka moment" when preparing proposals, inspired by a need to impress a critical study section and to think carefully about the details of the proposed research.

The impact of the MIRAs in supporting a laboratory's research program will be complicated by the ability of other public and private funding agencies to provide grant support independent of the MIRAs. How will NIGMS consider these other sources of support at the time of application? Will the institute adjust funding levels during the award period for additional grants that begin or end?

It is also unclear how NIGMS plans to appropriately calibrate funding levels when specific aims are not included in the proposal.

4. Suggestions for changes to improve the NIGMS MIRA proposal or associated processes.

The Genetics Society of America (GSA) suggests that NIGMS provide additional information about how funding levels will be adjusted to reflect changes in productivity. In particular, NIGMS should provide additional information about the criteria that NIGMS program staff will use to adjust funding levels and clarify the role of staff, study sections, and Council in these decisions. We also suggest more detail about how NIGMS will provide enough assurance to investigators that funding will not be cut quickly, while also allowing the flexibility to respond to changes in productivity and the uncertainty of available funding—and guidance on how long NIGMS will provide support before funds are cut entirely.

We encourage NIGMS to provide additional specificity on how success of the MIRA program will be evaluated, especially in comparison to other funding mechanisms that include the status quo. We encourage NIGMS to focus on the quality and creativity of the supported research and to avoid use of irrelevant statistics such as journal impact factors. We also suggest that NIGMS examine the applicant and awardee pools to ensure that the program is appropriately attractive to investigators across the full breadth of the biomedical research community.

The review process will be even more important for the MIRA program because of the larger size and longer period of support. But it will also be different from typical review processes, as reviewers will be asked to assess the promise of an application without as much detail on the proposed research. To that end, it will be essential to recruit experienced reviewers to serve on study sections for the MIRA program. There are several public- and private-sector funding mechanisms that focus on similarly broad assessments of achievement and promise, such as those that support people rather than specific projects; we encourage NIGMS to consider the criteria and review processes these entities use. We also suggest that NIGMS explore the use of creative incentives to induce more experienced investigators to return for additional service on study sections. GSA would be happy to work with you to suggest some ideas.

5. Additional comments.

While the Genetics Society of America (GSA) appreciates the motivation behind the proposed MIRA program—and thinks that it may be an effective mechanism for some investigators—we also emphasize that the program will not address the needs of many PIs. For that reason, it is important that NIGMS undertake MIRA as an experiment while ensuring that the bulk of NIGMS extramural support for the current system remains intact.

GSA further encourages NIGMS to provide more information about the number of expected awards to be made by the program and the percentage of extramural funds that would be dedicated to MIRA.

While the five-year funding period and relative stability offered by the MIRA program are improvements over the status quo, they are more akin to a time in the recent past when five-year awards were common and the James A. Shannon Director Award was available to provide merit-based bridge funding.

GSA appreciates the opportunity to provide input into the proposed MIRA program and looks forward to continuing to work with NIGMS and our sister societies to promote efficient and effective support for biomedical research.