



Federation of American Societies for Experimental Biology

— *Quality Life Through Research* —

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Computational Biology
American College of Sports Medicine
Biomedical Engineering Society
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American Federation for Medical
Research

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May 14, 2010

Judith H. Greenberg, Ph.D.
Director, Division of Genetics and Developmental Biology
National Institute of General Medical Sciences
Building 45 - Natcher Building, 2AS25J
45 Center Drive
Bethesda, MD 20892

Dear Dr. Greenberg:

On behalf of the Federation of American Societies for Experimental Biology (FASEB), I am writing to share our comments on the National Institute of General Medical Sciences (NIGMS) strategic plan for training and career development. FASEB values NIGMS's long-standing commitment to training the next generation of biomedical researchers, and we share your interest in ensuring that our nation's training programs meet current scientific needs, anticipate emerging opportunities, and contribute to building a capable and diverse research workforce.

FASEB believes that the goal of NIGMS training programs should be to prepare trainees for careers in the biomedical sciences, including for positions in research, science education, and science-related fields for which their research training makes them especially qualified. Scientific training should be broad-based, enabling students to pursue a wide range of scientific questions and transition among research areas as opportunities emerge. It should also incorporate training in teaching and mentoring and preparation in professional skills, such as leadership, management, and communication.

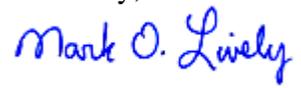
NIGMS could encourage effective training in all of these areas by expanding programs to help trainees and established investigators acquire training and mentoring skills, requiring institutions to provide teacher and mentor training to students and postdocs supported on training grants, and providing funding for institutions to develop professional skills workshops. In addition, NIGMS policy should allow all trainees—regardless of their source of funding—to devote time to these activities in the course of their research training.

It is important for funding agencies and institutions to assess the effectiveness of their training and career development efforts. We encourage NIGMS to continue to evaluate its programs, including the impact they have on increasing the diversity of the biomedical research workforce. In addition, NIGMS should help institutions measure the impact of their programs by developing instruments to measure program success and providing them with funding to conduct program assessments.

We have provided a more detailed response to the questions posed by NIGMS on the following pages. Thank you for the opportunity to provide input on this important

initiative, and please do not hesitate to contact me if FASEB can be of further assistance.

Sincerely,

A handwritten signature in blue ink that reads "Mark O. Lively". The signature is written in a cursive, flowing style.

Mark O. Lively, Ph.D.
FASEB President

FASEB Comments on National Institute of General Medical Sciences
Strategic Plan for Training and Career Development

1. What constitutes "success" in biomedical research training from the perspectives of an individual trainee, an institution, and society?

Consistent with its mission to support research that increases understanding of life processes and lays the foundation for advances in disease diagnosis, treatment, and prevention, the goal of National Institute of General Medical Sciences (NIGMS) research training programs should be to prepare trainees for careers in the biomedical sciences. Successful programs provide students and postdoctoral scholars with the knowledge, skills, and abilities to advance to the next phase of their research training or to compete successfully for research positions. Many NIGMS trainees will go on to become NIH-funded, independent investigators. There are, however, many other valuable ways to contribute to the biomedical research enterprise, including through research positions in the private sector, such as in pharmaceutical and medical device companies; government laboratories; and not-for-profit organizations. Measures of success should take into account research participation and contributions in all sectors.

Careers in science education and training, particularly at the undergraduate, graduate, and postdoctoral levels, should also be valued outcomes of NIGMS training programs. The success of our nation's research enterprise depends on the availability of highly skilled researchers. Educating, training, and mentoring the next generation of biomedical scientists is, therefore, an essential component of our research mission and is consistent with NIGMS's goal "to ensure the vitality and continued productivity of the research enterprise."

Successful outcomes for trainees should also include securing positions in science-related careers for which their research training makes them especially qualified, such as in research administration, science communication and outreach, and patent law. Although preparation for non-research careers may not be the primary goal of NIGMS training programs, these activities are integral to the overall success of the enterprise. Training programs should provide graduate students and postdoctorates with opportunities to explore these options and facilitate the development of the skills needed to transition into these jobs.

2. What can NIGMS do to encourage an optimal balance of breadth and depth in research training?

Broad-based knowledge of biomedical science and competency in a range of technical skills, including those necessary to contribute to translational research, will enable trainees to study a wider range of scientific questions and transition from one research area to another as opportunities emerge. Particularly for graduate students, critical analysis, substantive participation in hypothesis driven, experimental science of the type most commonly supported by individual investigator awards, and increasing emphasis on quantitative methods are key components of effective training.

While the development of scientific and technical skills should be the main focus of NIGMS training programs, graduate students and postdocs should have opportunities to acquire training in teaching and mentoring and to cultivate professional skills, such as leadership, management, and

communication. Education in these areas will help to create a pool of highly trained and flexible scientific talent that can be deployed in a wide range of research and research-related fields.

Industrial internships, such as those made available to students supported on the NIGMS Biotechnology Predoctoral Training program, are one way that trainees can broaden their scientific and technical skill sets. NIGMS could explore the feasibility of expanding such programs or encourage institutions to develop similar opportunities for their trainees. NIGMS could encourage training in teaching, mentoring, and professional skills by developing a mechanism through which institutions could apply for funding to initiate courses and workshops on topics not covered in traditional graduate school curricula. In addition, FASEB encourages NIGMS to allow students and postdocs supported on both training and research grants to dedicate some time to these activities even if they are not the main focus of the research projects on which the trainees are supported.

3. What can NIGMS do to encourage an appropriate balance between research productivity and successful outcomes for the mentor's trainees?

Effective training and mentoring of students and postdoctorates is compatible with maintaining a productive research laboratory; funding agencies, institutions, and investigators all have a role to play in ensuring that research and training goals are achieved. Like research, training and mentoring should be considered valuable, professional activities; these efforts should be recognized by institutions and rewarded in their tenure and promotion processes. NIGMS could encourage effective training by requiring that NIGMS-funded investigators have a plan for training and mentoring graduate students and postdocs supported on their research grants. Responsibility for developing guidelines as to what constitutes an appropriate plan and reviewing them should rest with institutions. Plans should, however, address how trainees will acquire scientific knowledge and technical skills relevant to their disciplines, as well as training in leadership, management, communication, professional conduct, and responsible conduct of research. The National Postdoctoral Association's *Core Competencies* expands on the skills and abilities trainees should acquire,¹ and FASEB's *Statement on Including Postdoctoral Mentoring Plans in Research Grant Applications*² describes how NIGMS could implement this type of mentoring policy. In addition, our *Individual Development Plan for Postdoctoral Fellows*³ (IDP) provides a useful framework for helping trainees to identify and achieve their research training and career goals. NIGMS should encourage investigators to incorporate IDPs into their mentoring activities.

NIGMS could also promote successful outcomes for trainees by developing mechanisms to help current and future scientists become better trainers and mentors. Programs such as the Institutional Research and Academic Career Development Awards provide valuable opportunities for postdocs to acquire teacher training. NIGMS should consider expanding this program or providing additional opportunities for both trainees and established investigators to acquire teaching and mentoring experience. FASEB recommends that NIGMS provide funding to institutions and professional societies to develop training and mentoring programs and require institutions to provide this training to students and postdocs supported on training grants. NIGMS could encourage institutions to develop programs for faculty by recognizing the value of these activities in the review of training

¹ <http://www.nationalpostdoc.org/competencies>

² <http://www.faseb.org/portals/0/pdfs/opa/QReports/July-Sept08/MentoringRGrants.pdf>

³ <http://www.faseb.org/portals/0/pdfs/opa/idp.pdf>

grants. For example, the availability of workshops to help faculty improve their teaching and mentoring could be evaluated as one component of an applicant institution's overall training environment. For educational programs to be effective, trainees and their mentors must have the flexibility to participate in them: NIGMS policy should allow trainees and their mentors to dedicate time to training and mentoring activities while supported on research grants.

4. What can NIGMS do through its training programs to promote and encourage greater diversity in the biomedical research workforce?

FASEB applauds NIGMS for its commitment to increasing diversity in the biomedical research workforce. Initiatives such as the Minority Access to Research Careers program are valuable sources of support for organizational efforts, like those at FASEB, aimed at increasing the number of highly trained underrepresented biomedical and behavioral scientists. We strongly encourage NIGMS to maintain support for these programs. In an effort to optimize its efforts to enhance workforce diversity, FASEB recommends that NIGMS continue to evaluate the impact that all of its training programs have on increasing diversity in biomedical research and research related careers. Outcome measures should focus on the impact that programs have on retaining individuals from underrepresented groups in biomedical research at all levels (e.g., graduate, postdoctoral, and independent investigator) and on the scientific and professional contributions they make during their careers.

Mentoring is an important component of efforts to enhance diversity in the scientific workforce. Yet, for some mentors and trainees, it can be difficult to relate to some individuals whose experiences differ from their own. NIGMS should work with institutions and professional societies to develop educational resources and programs to optimize mentoring relationships regardless of the backgrounds of mentors and mentees. NIGMS could also provide support to these organizations to facilitate the development of broader mentoring communities that enable trainees to connect with potential mentors and role models beyond their academic institutions.

NIGMS could improve workforce diversity by developing mechanisms to help institute-funded scientists balance family responsibilities with the demands of a career in research. It would be particularly helpful to provide funding for researchers to hire additional laboratory personnel at times when they must take leaves of absence for care giving responsibilities (e.g., child care or elder care). The Claflin Distinguished Scholar Awards program established at Massachusetts General Hospital could serve as a model for an NIGMS-wide initiative.⁴

5. Recognizing that students have different career goals and interests, should NIGMS encourage greater flexibility in training, and if so, how?

As described in our response to the second question, research training should provide participants with the flexibility to pursue a broad array of research and related careers. Core competencies for biomedical researchers should include broad-based knowledge of biomedical science, technical expertise, and training in leadership, management, communication, and responsible conduct of research. NIGMS should offer funding to institutions to develop courses on topics not typically

⁴ <http://www2.massgeneral.org/facultydevelopment/cfd/claflin.html>

included in graduate school curricula, and it should encourage investigators to work with all of their trainees to create IDPs. The process of constructing an IDP will encourage trainees to explore a variety of career options and develop a plan for pursuing the path that is right for them.

6. What should NIGMS do to ensure that institutions monitor, measure, and continuously improve the quality of their training efforts?

NIGMS should establish benchmarks for assessing the effectiveness of research training programs and develop instruments to measure whether or not training programs are meeting those goals. Benchmarks should include, for example, the pursuit of careers in research and related fields, including science education, science policy/administration, and science outreach. These instruments should also provide an opportunity for trainees themselves to evaluate the programs in which they participate. NIGMS should provide institutions with funding to conduct assessments, and training grant renewals should depend, in part, on whether or not grantees meet the benchmarks established by the agency.