SCIENCE

Published by the **American Association for the Advancement of Science (AAAS),** *Science* serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Membership/Circulation
Director: Michael Spinella
Deputy Director: Marlene Zendell
Member Services: Rebecca Dickerson, *Manager*; Mary Curry, *Supervisor*; Pat Butler, Helen Williams, Laurie Baker, *Representatives*
Marketing: Dee Valencia, *Manager*; Jane Pennington, *Europe Manager*; Hilary Baar, *Associate*; Angela Mumeka, *Coordinator*
Research: Renuka Chander, *Manager*
Business and Finance: Jacquelyn Roberts, *Manager*; Robert Smariga, *Assistant Manager*
Administrative Assistant: Nina Araujo de Kobes
***Science* Member Services**
Marion, Ohio: 800-347-6969;
Washington, DC: 202-326-6417
Other AAAS Programs: 202-326-6400

Advertising and Finance
Associate Publisher: Beth Rosner
Advertising Sales Manager: Susan A. Meredith
Recruitment Advertising Manager: Janis Crowley
Advertising Business Manager: Deborah Rivera-Wienhold
Finance: Randy Yi, *Senior Analyst;* Shawn Williams, *Analyst*
Marketing: John Meyers, *Manager;* Allison Pritchard, *Associate*
Traffic Manager: Tina Turano
Recruitment: Terri Seiter, *Assistant Manager*; Pamela Sams, *Production Associate*; Debbie Cummings, Celeste Miller, Rachael Wilson, *Sales*
Reprints Manager: Corrine Harris
Permissions Manager: Arlene Ennis
Sales Associate: Carol Maddox

PRODUCT ADVERTISING SALES: East Coast/E. Canada: Richard Teeling, 201-904-9774, FAX 201-904-9701 • **Midwest/Southeast:** Elizabeth Mosko, 312-665-1150, FAX 312-665-2129 • **West Coast/W. Canada:** Neil Boylan, 415-673-9265, FAX 415-673-9267 • **UK, Scandinavia, France, Italy, Belgium, Netherlands:** Andrew Davies, (44) 457-838-519, FAX (44) 457-838-898 • **Germany/Switzerland/Austria:** Tracey Peers, (44) 270-760-108, FAX (44) 270-759-597 • **Japan:** Mashy Yoshikawa, (3) 3235-5961, FAX (3) 3235-5852
RECRUITMENT ADVERTISING SALES: US: 202-326-6555, FAX 202-682-0816 • **Europe:** Gordon Clark, (44) 81539-5211, FAX (44) 0223-302068 • **Australia/New Zealand:** Keith Sandell, (61) 02-922-2977, FAX (61) 02-922-1100
Send materials to *Science* Advertising, 1333 H Street, NW, Washington, DC 20005.

Information for Contributors appears on pages 37–39 of the 7 January 1994 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005.
Internet addresses: science_editors@aaas.org (for general editorial queries); science_letters@aaas.org (for letters to the editor); science_reviews@aaas.org (for returning manuscript reviews); membership@aaas.org (for member services); science_classifieds@aaas.org (for submitting classified advertisements)

LETTERS

Fostering Young Investigators

In discussing whether the National Institutes of Health (NIH) shortchanges clinicians Eliot Marshall (News & Comment, 1 July, p. 20) cites several possible contributors to apparent declines in funding clinical research. One crucial factor he does not mention is the increasing difficulty clinicians face obtaining protected time for research. As changes in health care economics threaten the financial stability of academic medical centers (*1*), young clinicians are under increasing pressure to "earn their keep" by generating patient care revenues (*2*). At the same time, fiscal constraints also result in reduced numbers of faculty with concommitant increases in teaching and administrative responsibilities. What little time remains for research is further fragmented by patient-related emergencies, increasing numbers of phone calls from managed care reviewers, and the need to stay current with clinical advances. Thus, the young clinician rarely has substantial uninterrupted blocks of time to develop and maintain skills in clinical or laboratory research, synthesize background information into a creative hypothesis, formulate and submit coherent grant proposals and, if funded, carry the research to fruition. The overall productivity of young clinician-investigators is further decreased relative to their Ph.D. peers because they are less likely to attract graduate students or postdoctoral fellows to their research programs. Thus, even when M.D.'s are skilled in research methodologies, statistics, and grant writing, additional obstacles make it difficult to obtain funding and conduct patient-related research.

These roadblocks are sufficiently great that increasing attention has been given to developing promotion criteria with minimal expectations of research for "clinician-educators" (*3*). To overcome such barriers will require a greater degree of collaboration between academic medical centers and NIH if we are to protect research time for young M.D.'s and foster the growth of beginning investigators who are capable of combining careers in research and in clinical care.

Laura J. Fochtmann
Department of Psychiatry and Behavioral Science, State University of New York, Stony Brook, NY 11794–8101, USA

References

1. J. Y. Krakower, P. Jolly, R. Beran, *J. Am. Med. Assoc.* **270**, 1085 (1993); M. E. Whitcomb and W. O. Cleverly, *Acad. Med.* **68**, 729 (1993).
2. E. C. Cadman, *Ann. Intern. Med.* **120**, 401 (1994); A. Sadeghi-Nejad and M. M. Marquardt, *Am. J. Med.* **90**, 371 (1991).
3. J. Bickel, *Acad. Med.* **66**, 249 (1991); M. B. Jacobs, *ibid.* **68**, 126 (1993).

As a biomedical scientist under age 37, I do not find the National Research Council's findings about the low number of young scientists applying for NIH grants terribly surprising. I and many of my colleagues find ourselves trapped in a "catch 22" that has resulted from the current low levels of funding. Universities, suffering from shrinking budgets, are increasingly reluctant to hire young scientists who have no history of funding from NIH. Thus, many of us are forced into subservient non–tenure-track positions in which we are not eligible to apply for NIH funding. Without NIH funding we are ineligible for tenure-track positions at many universities, and without the university positions we are ineligible to apply for NIH funding.

If junior scientists who are currently ineligible for funding could submit grant applications for peer review, that might help them break out of this trap. If the application were deemed meritorious and fundable, the money could be held in reserve for a period of time to allow the junior scientist to find a suitable university position. Such a system would allow talented young scientists to demonstrate their abilities to generate ideas and place them in greater control of their own destinies. As the situation currently stands, many of us in the under 37 group are totally dependent on senior scientists acting as benevolent benefactors.

Robert M. Caudle
Neurobiology and Anesthesiology Branch, National Institute of Dental Research, National Institutes of Health, Bethesda, MD 20892, USA

The system by which science is conducted in the United States is in a state of crisis (*1*). This crisis has an impact on all scientists, but morale is especially poor among younger scientists and resentment over institutional inaction is building. Structural reform of funding and organizational policies are needed so that all scientists can contribute in a meaningful way to research and technology development. Because NIH

is a major sponsor of research in the United States, we believe it has a special role to play in promoting such change. We ask that

1) The total dollar amount for FIRST awards be increased even if this decreases awards for established researchers (FIRST awards should also be granted for teaching and technology development projects).

2) Young scientists be involved to a greater extent in the grant review process.

3) The yearly funding for individual investigators be capped so that more investigators are supported (funding requested beyond a certain level should be denied except in exceptional circumstances).

4) NIH create a small grant program that would emphasize rapid proposal review, encourage the formation of interdisciplinary research groups, and provide funding for new researchers and for exploratory studies.

5) NIH require career counseling to be part of each training grant.

6) NIH act to eliminate restrictions on principal investigator (PI) status (the increased opportunity for all Ph.D. scientists to initiate research projects with proper credit can only increase the quality of science).

7) Agreement to a code of professional ethics be a requirement for an individual receiving a grant (practices that unfairly impede the careers of other scientists should carry strong penalties, such as the loss of PI status).

8) Increased interaction between NIH and the private sector be encouraged in order to foster the development of new technology initiatives.

9) All NIH grantees be required to participate in some form of public education (such as taking a day to explain their work at local schools) in order to increase public awareness of the benefits of research to society.

The future quality of U.S. scientific research is at stake.

Barry J. Hardy
Physical Chemistry Laboratory,
Oxford University,
Oxford, OX1 3QZ United Kingdom
Steven Orzack
Department of Ecology and Evolution,
University of Chicago,
1101 East 57 Street,
Chicago, IL 60637, USA

References

1. B. J. Hardy, S. I. McDonough, S. Orzack, *Young Sci. Network Dig.* [online] **1523**, 1 June 1994 (item 7).

With respect to Marshall's article "Does NIH shortchange clinicians?" it has been my perception that this "shortchanging" began with a decline in support for educational enrichment programs accessible to medical schools. The cost and duration of basic medical education and the lock-step nature of medical education as maintained by most medical schools and academic health science centers denies potential physician-investigators a career track. Training is particularly lacking in opportunities for nonlaboratory types of research that are appealing to many Ph.D.'s. More physician-investigators need skills in systems science, information management, health services research, epidemiology, biostatistics, health law, and health economics and related areas. I realize that many programs exist outside NIH in health services research, but NIH's priorities, many of which are geared to the development of marketable interventions and technology, detract from studies that reduce costs and improve outcome at the physician-patient interface.

John S. Spratt
Health Sciences Center,
University of Louisville,
Louisville, KY 40202, USA

Roy Silverstein, president of the American Federation for Clinical Research, suggests that a special NIH study section be set up to give special attention to clinical proposals that fall just below the payline. I have another suggestion. Why not fund the same percentage of clinical studies and nonclinical studies that are submitted to each study section? For example, if 35% clinical studies and 65% nonclinical studies are submitted in a session, then 35% clinical applications and 65% nonclinical applications should be funded. This funding method would eliminate much of the bias and dissatisfaction that now prevails.

Steven Lehrer
30 West 60 Street,
New York, NY 10023, USA

■

Peer-Review Study

Eliot Marshall's 12 August News article "Congress finds little bias in system" (p. 863) describes a General Accounting Office (GAO) report that complacently concludes, "peer-review processes appear to be working reasonably well." The GAO found no regional or institutional bias, but noted that assistant professors or other junior faculty were underrepresented on review panels. Should grants be spread like oil on water? Are junior faculty members experienced and unbiased enough to allocate grants? Would anyone run a business, select a professional sports team or symphony orchestra, or stock an art museum in this way?

Kenneth S. Warren
Picower Institute for Medical Research,
Manhasset, NY 11030, USA