NIH Funding Mechanisms Need Little Defense

Lawrence M. Lichtenstein

The current level of funding by the National Institutes of Health (NIH) constitutes a tragedy for U.S. biomedical research and, if continued for even a few years, will lead to the loss of U.S. world leadership in medicine and biotechnology. In times like these, many, in their frustration, will attack the funding mechanisms themselves, rather than the level of funding. In this context, I was asked to write a piece emphasizing what is "right" about the way in which NIH funds biomedical research. I would like to take the position that the funding mechanisms of NIH need little defense—that they have, in fact, led to the strongest and most successful biomedical research effort that has ever been mounted. I will do this from a perspective of one who has received NIH funding and has served in consultation to that institution: In the 1970s, I spent 4 years on immunological study sections within the Division of Research Grants (DRG) and in the early 1980s I spent another 4 years serving on the study section of the National Institute of Allergy and Infectious Diseases (NIAID). Currently, I am in my fourth year as a member of the council of the same institute. It is also relevant that I am the recipient of a MERIT Award from NIAID.

Before its funding mechanisms are addressed, the mission of NIH must be clearly in mind. Throughout its history, NIH has funded a very broad class of scientists, from those doing fundamental bench research at small institutes that fully support faculty salaries to clinical investigation carried out in medical schools that support essentially none of the investigator's costs or salaries. This whole spectrum of research is, in my opinion, of equal importance in meeting the health research needs of the country, but the funding requirements are quite different.

The argument about the relative merits of individual (RO1) grants versus program project grants (PO1) has gone on for at least the 30 years that I have been associated with NIH. I believe that investigator-initiated research grants (RO1) are the most critical element of NIH-funded research and are responsible for its remarkable success. Virtually all bench and clinical investigators share the belief that RO1 grants should receive by far the most funding. They do now, and this has always been true: Approximately four times as many dollars are being spent at NIH for RO1 than for PO1 grants. It seems unrewarding to argue whether this ratio should be 4 to 1 or 4.3 to 1. The mission of NIH virtually demands program project grants in certain areas. These are often the more clinical areas; in my years of peer reviewing, I have seen many of these vehicles as they relate to immunological diseases. Almost invariably, such program project grants are given to highly meritorious groups and generate first-rate science. Moreover, I believe NIH is fairly flexible in changing the areas funded by PO1s as needs change. NIAID, for example, has recently almost completely rearranged the subject areas of their PO1 awards. Critics often attack the small amount of a PO1 grant that goes for administrative costs. Those complaining are usually in situations where their administrative indirect costs are used to administer their grants. However, in many university settings the central administration takes virtually all of the indirect costs, leaving no funding for the administration of even substantial units in medical school departments. Thus, these costs are necessary for the execution of the research.

Most investigators believe that the funding of young individuals through the mechanism of First Independent Research Support and Transition Awards (FIRST Awards) has been extremely successful. At NIAID, FIRST Awards are in fact funded with a higher success rate than are RO1s. Thought may be given to increasing the level of this funding to $90,000 or $100,000 per year because, particularly in the medical schools, $75,000 barely covers salary and fringe benefits, leaving no funds to do the research. At the other end of the spectrum are the Method to Extend Research in Time Awards (MERIT Awards), which fund established (not necessarily old) investigators for periods of up to 10 years. As a council member, I have spent the last 4 years reviewing the results of the research by recipients of MERIT Awards. The great majority of individuals who receive such awards continue to do the cutting-edge research that led to the MERIT Award in the first place. The council can, in fact, make a judgment regarding the excellence of this work after 4 years of a MERIT Award and, if an extremely high level of science is not being produced, the council can end the award. The council has acted in this fashion on several occasions. Thus, I believe that MERIT awards are useful and that they relieve stress on both the system and the investigator. I find it unfortunate that the criticism of these awards has markedly reduced the number that are being funded.

The National Institute of General Medical Sciences (NIGMS) recently decided to take an extra look at the individual principal investigators (PIs) who receive more than $500,000 in direct costs in any given year. They reached the conclusion that this needed to be taken into account when an additional grant for such an investigator is judged. On the basis of the experience of NIGMS, our institute, which is considerably larger, carried out a similar study in 1990, although for reasons I will state in a moment we set the sum to be investigated at $1 million per PI per year. We found that there were very few investigators, and certainly no bench investigators, who had grants totaling that sum of money. The only recipients of more than $1 million in research funds were PIs who lead large, basic or clinical vaccine or treatment research programs—grants that, by their very nature, are expensive. Thus, in the opinion of the council, the conclusions reached by NIGMS did not hold at NIAID. Parenthetically, the reason that we set the annual sum higher than the sum of $500,000 per year used by NIGMS is that many, or even most, investigators funded by NIAID must obtain all faculty and staff salaries from their RO1 grants. These salaries increase the size of RO1 grants more for individuals funded by NIAID, whose portfolio includes many more faculty at medical schools than those funded by NIGMS, which funds more grants at state universities and small institutes, institutions that generally provide salary support for their faculty.

There is an increasing use of request for application (RFA) mechanisms to solicit grant awards. In our institute, 80% of the RFAs are in response to the increasing level of congressional mandates for funds to be spent studying specific diseases. There is no question that this puts major constraints on NIH resources. It is apparent to most scientists that when activists for a particular disease convince Congress to set aside monies for research on that disease, they are doing the involved patients a disservice: Therapeutic advances are far more likely to come from basic than from directed research. However that may be, it should be noted that grant applications in response to RFAs are judged in various ways: Many

(*Continued on page 113*)

The author is director of the Johns Hopkins Asthma and Allergy Center at the Francis Scott Key Medical Center, Baltimore, MD 21224.

(*Continued from page 17*)

such grants are assigned to regular DRG study sections; others are judged by ad hoc committees or by the internal study section of the institute. The institutes, of course, must follow congressional mandates. In addition, the institutes themselves clearly have a right to solicit grants in areas that are related to their mission, as they see it. Sometimes they set aside funds for these grants; on other occasions, they do not but simply solicit in the area and let normal funding mechanisms decide priorities. Although I think that this mechanism is somewhat overused, it is definitely a necessary part of the whole.

A criticism that often emanates from investigators in nonmedical school environments is that training grants should be used primarily for graduate students rather than for postdoctoral fellows. Most members of the faculty of medical schools were attracted to research only after they had completed their M.D. training and were introduced to science by means of training grant support. These individuals, who start research after medical school, obviously cannot compete for their own training instrument, and very few investigators have an additional $30,000 or $35,000 on their RO1s to support such beginning scientists. To deny funding to such individuals would be to deplete the university medical schools of their research faculty at a time when fewer and fewer U.S. physicians are entering academic medicine. Training grants have, in the past, been abused. I believe that the fat is now out of the system and that training grants are being awarded for what they were intended to do—that is, to train scientists, whether Ph.D.'s or M.D.'s, to continue to advance knowledge at academic centers.

I perceive some problems with the NIH DRG, which is responsible for the study sections. When I first served, the Nixon Administration had introduced a recision that led, for the only time in the history of NIH until the present, to the funding of only 10 to 15% of approved grants in any one cycle of review. Study sections cannot function properly at this level of funding, and we are now being told that the non–acquired immunodeficiency syndrome (AIDS) research of NIAID will be funded to the 10th percentile in fiscal 1994. About a third of grants received by a study section are very highly meritorious, and scientists cannot, with any degree of precision, pick the one in seven or one in ten grants that are better than the others. The fact that disparate members of the study section each casts his or her own vote makes accurate judgment impossible. Although I am a firm believer in the peer-review system, the inaccuracies generated by very low levels of funding make it more, rather than less, necessary to have oversight at the council level. These problems are clearly not the fault of the DRG, but I do believe that the DRG errs in changing the nature of study sections too slowly and that it is too resistant to oversight from outside scientists. Although I know that there are arguments on the other side, I still believe that the individual submitting the grant knows best which study section is most suited to review his or her grant, and I believe that the DRG should be more flexible in allowing this to occur. If that leads to too many grants in the area of one study section, it means that another study section in that discipline is needed. This need for investigator choice is particularly relevant when a study section has acted such that the scientist believes that he or she has been denied a fair review. The ability for an investigator-initiated change in study sections then becomes critical. I know of an investigator who received a 50th percentile rating from a study section and felt that he had been misreviewed. The DRG would not let the study section be changed, and the grant was reviewed again, with a similar low level of enthusiasm. When, on the third try, the DRG allowed the grant to be reviewed by the appropriate study section, designated by the investigator, it was found to be at the 5th percentile. This is far more error than the system should allow. I should add that while the DRG as a whole is rather ponderous, the executive secretaries who run the individual study sections have been, in my experience, scientists sincerely dedicated to helping the investigators.

As I said above, I believe that in these very difficult times the scientists and lay people who serve on institute councils play an increasingly important role. In some institutes they may not exercise appropriate authority. If so, that is unfortunate. I believe that NIAID has a council that fully exercises its review function; its power to make decisions is increasing, and I believe it plays a necessary and at times a critical role. In times of stress, these councils need to be strengthened.

In sum, NIH must fund individuals in a variety of settings. There are many ways research can be organized, and each of us tends to think that the way we do it is the most correct. This is not the case. Highly meritorious research can, in fact, be carried out at institutions with very different kinds of structural organization, and I believe that the mission of NIH demands that these be funded with equality. We must not lose sight of the very great success that has resulted from the funding mechanisms used by NIH, and there seems to be little need to make more than minor adjustments. The job of the biomedical researchers at this time is to reach out to the public and to convince Congress of the absolute necessity for an increase in funding to NIH.