Stars and Stripes: A Patriotic Grant Proposal

To the Editor:

Pick your favorite descriptor of the current status of NIH funding for kidney research:

- Low
- Poor
- Inadequate
- Discouraging
- Dismal
- Destructive
- Devastating
- Catastrophic
- All of the Above

I address two questions:

HOW BAD IS IT?
WHAT TO DO ABOUT IT?

How Bad is it?

Table 1 shows the number of total grants (i.e., new and continuing), the number of new grants, the “operational percentile” (i.e., the percentile ranking an individual, competitive RO-1 grant application had to achieve in order to receive funding), and the “award rate” over the past few years in the National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK). (About one fifth of all NIDDK grants are in the Kidney and Urology Program Areas.)

The relative constancy (3% difference between high and low years) of the total number of grants, when compared with the relatively large annual variation in number of new grants (32% less in a low year than in a high year), is one factor that led the last Congress, in its advice to NIH for “Financial Management and Long Range Planning,” to indicate that NIH should adjust its grant portfolio so that the mean duration of grants is about 4 yr. This would insure about the same number of new grants in each succeeding year.

But 2,100 total grants at 4 yr each will be only 525 new grants per year—virtually the same number of new grants that NIDDK estimates will fund to the 16th percentile in fiscal 1991.

Therefore, if the same number of grant applications is submitted each year for the next few years, we can expect no better than funding to the 16th percentile. Indeed, for the future to be even this "rosy," the annual NIDDK appropriation from Congress would have to increase at a rate equal to the rate at which we increase (and Study Sections alter) the budgets of submitted applications. Such harmony between Congressional increases in NIDDK funding and our perceived increases in the cost of scientific research has not occurred over the past decade, and it is unlikely to do so now. The devastating impact of a greater rate of increase in dollars per grant than in NIH-budgeted dollars is shown in Figure 1.

Thus, the most realistic conclusion is that the percentage of submitted grant applications that will be funded in future years will decrease even in the presence of a constant number of newly awarded grants per year and even in the presence of increases in NIDDK appropriations that equal the rate of inflation.

NOW pick a descriptor of your reaction to future NIH funding:

- Dismal
- Destructive
- Devastating
- Catastrophic
- Why bother?
- I quit.
- I’m going into industry.
- I’m going into practice.

Why not get Congress to increase the NIH appropriation? Yes. Of course, this would be nice. But how much more is needed? The following figure is constructed from a recent grant cycle (that is, from one of the three cycles of grant applications NIH processes each year). Figure 2 shows the percentile ranking (up to the 75th percentile) of applications in the Renal Physiology/Cell Biology Program Area in NIDDK plotted as a function of the cumulative dollars (excluding Indirect Costs) that are or would be needed to reach the respective percentile. Paying to the 16th percentile (13 grants) on this round will use about $2,000,000 (plus indirect costs, which average 45% or about $900,000). Paying to the percentile which was operative in 1987 (35th) would fund 30 grants and require about TWICE as much: ca. $6,300,000 (including indirect costs). Payment of half of the submitted applications, a condition described in “Financial Management and Long Range Planning” for NIH when Congress said “... half (of grants) are really
Percentile is the familiar ranking we receive from Study Sections. Award Rate is the number of applications funded divided by the number of approved applications. As one example, amended applications reviewed twice in the same fiscal year would enter twice into the "percentile rank" but only once into the "award rate."


<table>
<thead>
<tr>
<th>Year</th>
<th>Total Grants</th>
<th>New Grants</th>
<th>Percentile</th>
<th>Award Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>2,069</td>
<td>686</td>
<td>35th</td>
<td>40%</td>
</tr>
<tr>
<td>1988</td>
<td>2,083</td>
<td>579</td>
<td>31st</td>
<td>34%</td>
</tr>
<tr>
<td>1989</td>
<td>2,073</td>
<td>504</td>
<td>24th</td>
<td>29%</td>
</tr>
<tr>
<td>1990</td>
<td>2,018</td>
<td>425</td>
<td>17th</td>
<td>24%</td>
</tr>
<tr>
<td>1991</td>
<td>2,078</td>
<td>529</td>
<td>16th</td>
<td>21%</td>
</tr>
</tbody>
</table>

* Percentile is the familiar ranking we receive from Study Sections. Award Rate is the number of applications funded divided by the number of approved applications. As one example, amended applications reviewed twice in the same fiscal year would enter twice into the "percentile rank" but only once into the "award rate."

Figure 1. The influence of increasing grant size (Grant %) by 6, 8, 10, or 12% per year on the number of grants that can be funded if the budgeted dollars (Budget %) increase by 8% per year.

Figure 2. The percentile rank of competing grant applications in the Renal Physiology/Cell Biology Program Area at NIDDK is plotted against the cumulative direct costs approved by study sections, thereby indicating the amount of money that would be needed (plus about 45% for indirect costs) to fund to any specific percentile grant. The 1991 payline is an estimate.

considered as deserving of support," would require about $88,200,000 (including indirect costs).

Yes, it would be nice to increase Congressional support for NIH—and, indeed, we must work vigorously and with stamina toward this goal. But the most optimistic atom in me says that in the next 4 yr. Congress is not going to increase support for NIH the more than twofold needed to reach the 35th percentile, let alone the nearly threefold needed to reach the Congressionally described "deserving" level of 50%.

What to Do About It?

Realistically, in the absence of extensive change, it is not going to be possible in the next half-decade to fund new grant applications to the 1987 level of 35%, let alone the "desirable" level of 50%. Because this is the case, is it time to reassess the way grants are awarded so that more investigators are funded? I believe that the answer is YES.

Indeed, I believe that it is absolutely necessary that more investigators be supported. The incentives in place at this time are keeping talented young people from entering scientific fields (witness the ad campaign launched by the Pharmaceutical Manufacturers Association drawing attention to the "manpower problem that permeates the ranks of the entire scientific enterprise"). The current disincentives in nephrological research are both stripping the future of academic nephrologists (witness the paucity of young physicians in our academic career training programs and the few young nephrology faculty obtaining grants from NIH) and depriving future victims of renal disease the new cures and treatments that further research will bring.

Please note that by suggesting that more investigators must be supported I am NOT challenging the peer review system. I have participated in peer review at NIH (off and on) since 1969. I am fully aware of the strengths of peer review, and there are many. I am aware of weaknesses in peer review, and there are many when it is used to differentiate the "top 15%" from the "next 15%." Peer review was not developed to make such fine differentiations. There is too much noise in the system. Peer review, in my opinion, cannot determine reliably that a grant at the 15th percentile is better than another grant at the 25th percentile. If you agree with this assertion, then you must also agree that, currently, the landing of a "fundable priority" includes a large element of luck.

Well, then, you should reasonably ask, if I want both more grants in the absence of substantially more money and more funded investigators, how can there still be a peer review system?

Allow me to advance a proposal for discussion and revision:

NIH should split the current RO-1 application into TWO types of applications for established researchers: STARS grants and STRIPES grants.

** STARS (Scientifically Top Award of Research
Support) grants would be reviewed and funded under exactly the same rules and procedures as are current RO-1 applications. The only change would be that HALF of the funds available for individual research would be awarded by this mechanism. Yes, this would mean that there would be about half the number of STARS grants as there are current RO-1 grants.

**STRIPES** (Support of Talented Research In Promoting Excellent Science) grants would use the remaining HALF of individual research funds and would differ from STARS by having certain restrictions. I propose the following as a basis for further discussion:

- Total (direct and indirect) award of $125,000/year (adjusted in future years for biomedical inflation) for up to 4 yr, with indirect costs to be one half that allowed to the institution on STARS grants up to a maximum of $25,000/yr, thereby insuring a minimum of $100,000/yr for the use of each STRIPES investigator. (If an institution doesn’t want a 25% indirect cost cap, it doesn’t have to approve submission of STRIPES applications by its faculty. Such an institution’s faculty can apply for as many STARS as they want.)
- Will be reviewed by the same Study Sections, using the same criteria for and in competition with STARS awards.
- Must not be awarded to applications that have a percentile ranking greater than 50%. If such a harmonious condition were to occur, the additional funds would revert to STARS awards.
- The above two conditions mean that applicants for STRIPES will have to write more focused (as well as meritorious) research proposals in order for the proposed work to be conducted within the available budget. Otherwise, only STARS grants will be in the top 50% of applications.
- Can be applied for only if no STARS or other STRIPES grant is submitted simultaneously.
- Only one STRIPES award may be held at a time by each investigator.
- STRIPES may not be held concurrently with any other NIH research grant award (PPG, Center, RO-1, FIRST, STARS, etc.)

Advantages of STARS and STRIPES Grants:

- Peer-reviewed quality would be maintained.
- Only proposals containing science “deserving” of support would be funded.
- Those with the most outstanding ideas would not be caught in a funding cap.
- There would be no decrease in total funding for science. (Details would have to be worked out between NIDDK, NIH, The Department of Health & Human Services, The Office of Management and Budget, and Congress in order to anticipate “out year” or future changes in number of grants, priority scores, interbureau and intrabureau comparisons, etc.)
- Individual investigators could obtain grants that enabled them to spend time working in the lab instead of writing more and more ever bigger and unfunded grants. (Could this be the stimulus to return us to our labs, where many say their happiest days were spent?)
- More investigators would be funded, thereby broadening the base of scientific investigation and widening the net for capture of future “stars.”
- Investigators trying to change directions in their research would not be forced to compete directly with STARS, thereby encouraging and facilitating scientific renewal by experienced investigators.
- Entry-level investigators would not be in direct competition with STARS, thereby encouraging replenishment of the pool of scientific talent—this is essential if we are to convince the young physicians and scientists of today that there is a future for them in American Academic Medicine and Science.

The omnipotent might argue that the current method, wherein research grants go only to the most highly ranked grants, should not be changed, that it provides the highest quality research. However, this argument ignores the inability of the peer review system to make such fine differentiations AND, more importantly, it ignores the need to provide to young physicians and scientists the vision of a viable future in which there is sustained support of those who conduct “deserving” research. The latter is essential in order to assure that this country’s future kidney research will continue to be of the highest quality.

This immodest proposal is advanced with the hope that it will stimulate discussion that will, in turn, result in the first step toward changing NIH funding of kidney research to the happy state wherein, in part because of STARS and STRIPES, we would be forced to select from a new list of patriotic descriptors of the status of NIH funding of Kidney Research:

- Competitive
- Rewards productive investigators with larger grants
- Encourages new areas of investigation
- Provides for renewal of existing and future scientific talent
- There is a future in academic medicine and science
- All of the above

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