# Hard Times at NIH

*Large increases in grant commitments in previous years have severely crimped NIH's ability to fund new projects now that tight fiscal times have arrived*

THIS HAS NOT BEEN A GOOD YEAR to apply for a grant from the National Institutes of Health for cancer-related research. In fact, it has been a very bad year. How bad? "The worst in the history of the National Cancer Institute," says Brian Kimes, associate director of NCI for cancer centers, training, and resources.

In the fiscal year that just ended, NIH funded only 29.3% of all approved projects competing for funds. That's an all-time low. The cancer institute, traditionally well funded, was among eight institutes that fell below that average.

And fiscal year 1990 will be worse. According to early estimates, less than 25% of approved grants will be funded this year. In real numbers, that means only about 4700 new grants will be given the go-ahead. Two years ago, that number was nearly 6500.

How can this be? Scientists nationwide have been asking each other this question with increasing anguish for months now. The topic has become a staple in the corridors and banquet rooms of scientific meetings. Everywhere you turn someone has a horror story about a senior scientist who has lost funding or a promising postdoc unable to get off the mark with NIH. And yet the NIH budget has been rising steadily, and it will go up again this year in spite of across-the-board cuts in federal spending to meet Gramm-Rudman deficit targets.

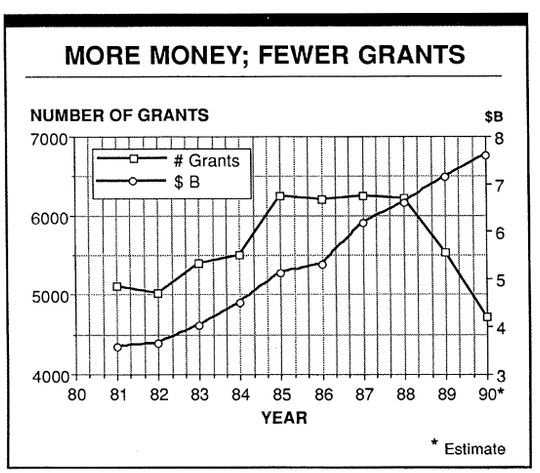
So what's going on here? The obvious answer is that the budget hasn't been going up fast enough to allow NIH to fund all the programs it would like, and national priorities such as AIDS and the human genome project have soaked up much of the new money. That has certainly been the case, but it is not the entire answer. Money for AIDS research projects has soared from $25 million in 1986 to an estimated $300 million in 1990, but that is still only 6.9% of the total NIH budget for research projects. And as for the genome project, it now has a budget of about $58.5 million for 1990, but officially that is all new money.

The seeds of today's discontent were sown 4 or 5 years ago. Between 1984 and 1987 the number of new and competing grants that received funding went from 5493 to 6447. At the same time, the average length of a research project was increasing. It went from 3.3 years in 1983 to 4.1 years in 1988. Add to that a steady rise in the dollar amount of individual grants—mostly due to an increase in indirect costs—and you have the formula for disaster

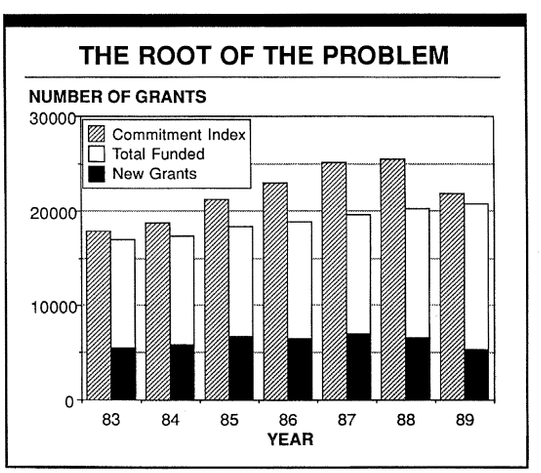
A simple computation gives the "grant commitment index," a measure of the funding obligation NIH takes on with each year's new awards. To calculate the index, multiply the number of new grants awarded in a year by the average grant length. In 1987, for example, NIH funded 6447 new grants lasting an average of 3.9 years, so the commitment index for 1987 was 25,143. In other words, if NIH simply continued to initiate new grants each year at that rate, it would be funding a total of just over 25,000 grants by 1990. But so far, NIH has never been been able to support as many as 21,000. The result: research projects approved in previous years are soaking up most of the available grant money, and there are scant resources left to launch new ones. What is occurring now is an attempt to bring the index back in line with reality, and it is a painful process (see graph).

There is still a lot of money for research in the budget, it's just not there for new and competing grants. "It's not reasonable to say the sky is falling. The NIH budget is still very healthy," says Carol Scheman of the Association of American Universities. But Scheman says that any time you get a sudden bulge—either up or down—in the funding levels for multiyear projects, it causes problems in what are called the out-years. For NIH, big increases came in 1985 and 1987, resulting in a surge of new grants, each requiring an institutional commitment of anywhere from 3 to 7 years. "There's an elephant in the midst of this python," she says, "and it's going to kill us."

There's an ironic twist to the pain researchers are feeling: they helped bring it on themselves. For years, they have been urging longer durations for grants to help relieve the burden of constantly writing applications and to provide more financial stability for their labs. In former NIH director James B. Wyngaarden they had a sympathizer, and NIH began in the mid-1980s to move toward longer grant peri-




*NIH's total budget rose steadily during the 1980s, but the number of new and competing grants dropped sharply in 1989 and it will plunge again in 1990. The budget figures are in current dollars. In constant dollars, NIH's budget increased by 50% between 1981 and 1990.*




*As the number of new grants increased in the mid-1980s, NIH took on a commitment that it could not keep. Until 1988, the commitment index, calculated by multiplying the number of new grants by their average length, rose much faster than the total number of grants NIH could support.*

ods. Study sections were encouraged to increase traditional R01 awards—the fundamental investigator-initiated award—from the usual 3 years to 5 years, and several programs were started in the mid-1980s to give proven investigators longer periods of support. NCI began the outstanding investigator award with grants for up to 7 years; the National Institute of Neurology and Communicative Disorders and Stroke initiated the Javits Awards, also for 7 years; and throughout NIH MERIT (Method to Extend Research Time) Awards were established to provide up to 10 years of support for some top researchers. First-time applicants were also offered a shot at long-term funding through the FIRST (First Investigator Research Support and Transition) Award program, which gives out 5-year grants of up to $350,000 apiece.

"When they were initiated, all these long-term awards didn't take into consideration the fact that we have budget uncertainties every year and that we work under an annual budget from Congress," says Kimes of the cancer institute. "Those long-term awards are great if you have budget certainty, and you know you're getting an increase."

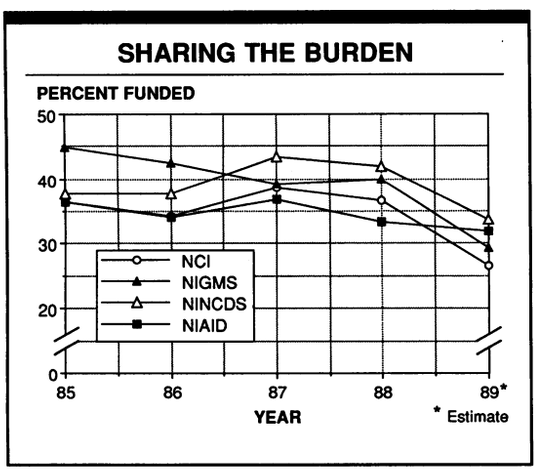
But didn't the budget officials at NIH know that increasing the duration of grants could put pressure on new awards in future years? They say they did but decided that the benefits were worth the cost. And yet, according to a staffer on the House appropriations subcommittee that oversees NIH's budget, this analysis was not shared with Congress.

Growth in the size of grants is also adding to the funding pressure. The dollar amount of grants has been rising steadily, in part because the cost of doing research has been going up faster than inflation. The biomedical research and development price index calculated by the Commerce Department routinely runs 2 or 3 percentage points ahead of inflation. Even using the biomedical inflation index, the average total cost of a grant rose nearly 10% in the last decade in real terms. Indirect costs, the portion of the grant paid to institutions for indirect support of the grant recipient, rose by nearly 25% in constant dollars over the same period. In addition, some of the cost of supporting research fellowships has been loaded into research grants. NIH directly financed something like 1000 fewer research trainees in 1989 compared with the previous year, forcing principal investigators to include pre- and postdoctoral salaries in their grant applications.

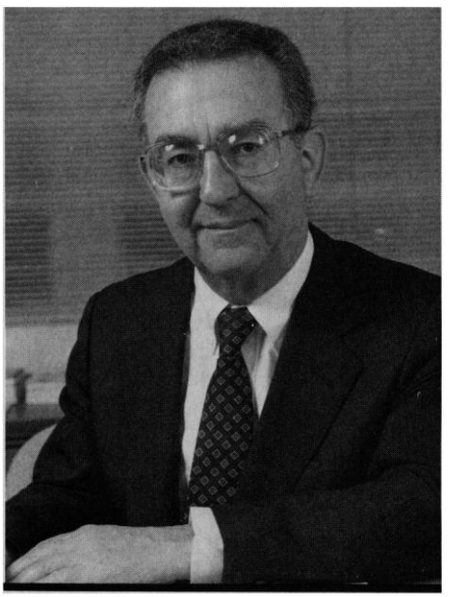
As the funding squeeze tightens, it is not surprising that many researchers are casting envious glances at the ballooning budget for AIDS research and are wondering whether it is responsible for their own difficulties in getting their projects funded. The issue is not just whether AIDS is diverting money away from other areas, but how NIH determines which areas of research to support.

Most of the new AIDS money has gone for programs such as AIDS research centers and clinical drug trials. But money has also been added to fund research grants. When an agency feels it is getting an insufficient number of AIDS grant proposals, it puts out a request for applications or a program announcement. Applications that come in response to these requests are still considered competing, but they compete against a limited number of grants for a defined pool of money. Many researchers complain that this directed, centrally managed research is siphoning funds away from traditional investigator-initiated competitive grants, and they contend that the projects that get funded are often of lower scientific quality.

The response of NIH officials to this charge is that NIH institutes have always kept aside some money to fund certain research projects. At the neurology institute, for example, approximately 20% of the total amount available for research grants is held back to fund key projects that score below the cutoff for competing grants. "There are certain congressional directives that we simply must pay attention to," says a senior official at the institute. "For example, if we didn't hold back some money and apply it to our clinical research, which tends to get poorer priority scores, pretty soon that type of research would disappear from our portfolio in times of tight funding."




*Although all institutes are under severe pressure, some are faring worse than others, as indicated by the percentages of approved grants that actually received funds. New money for AIDS has helped NIAID fund a larger percentage of approved grants than other institutes.*



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—David Korn

But the decision to target funds for AIDS has drawn special criticism. "I think that's bad science policy," says David Korn, dean of Stanford University School of Medicine and chairman of the National Cancer Advisory Board. "I think it's very understandable that there had to be a strong and forceful national response to the AIDS epidemic, but the question of where to put your money for the best breakthrough . . . is extremely hard to predict. It's not clear that you're buying the best benefit for AIDS by pouring more and more earmarked money into things that fit [the definition of] AIDS research."

But former NIH director Donald Fredrickson says directed programs are inevitable. "It's probably a sign of the maturation of the art. Programs will be created to attack large objectives," he says. While he is a strong believer in the need for basic research—after all, it was Fredrickson who began the push for setting a minimum number of new grants that had to be funded each year—he says there needs to be a balance between directed and investigator-initiated projects. Working out the priorities between these approaches will be a key problem for the coming decade, Fredrickson says.

There's no question that right now things

are extremely bad for those seeking new research funding. At the neurology institute, there is a temporary hold on funding any new grants at all until the 1990 fiscal year funding becomes clearer. Grants are being renewed on a competitive basis, but only those that fall in the top 12% in ratings by the study sections are likely to be funded. At NCI, that cutoff is 15% and at the National Institute of General Medical Sciences it's somewhere between 10 and 15%. It's hard to compare these numbers with traditional cutoffs because of a change in NIH accounting procedures, but they are clearly the worst ever for the institutes. It is also hard to compare these numbers with year-end totals, since the overall percentage funded will include many grants that will receive poorer scores than the nominal cutoff. But that's little solace to the neuroscientist who has to wait for news about whether a grant application that gets a 13.5 percentile score from the neurology institute will be funded.

While those paylines are likely to improve somewhat if the across-the-board cuts imposed under the Gramm-Rudman formula are ended, they won't improve by more than a few percentage points.

"I think it is sickening to have talented investigators looking at 11% or 9% or 13% award rates," says Korn. "Grant proposals that by any criterion are absolutely first class aren't going to get funded because there isn't enough money. I think that's terrible."

"It is going to affect in a drastic way the way science is going to be done," says Vincent Pirotta, a geneticist at Baylor College of Medicine and a member of the genetics study section. "It will affect the way that junior people are going to shape their careers, the way graduate students are going to be drawn into research labs."

In NCI administrator Kimes's opinion, matters have already reached a crisis point: "I don't think we can expect the biological research establishment to stay strong for very long under these conditions."

Although study sections are not supposed to take funding questions into account when they judge applications on their scientific merits, molecular biologist Elizabeth H. Blackburn of the University of California at Berkeley says the dismal funding picture inevitably influences the way the panels view projects. Reviewers become more conservative in their decisions, leaning toward projects that appear to have a greater chance of success, she says. Blackburn worries that Nobel Prize– quality work, like that done by Thomas Cech who used *Tetrahymena* to discover that RNA could act as a catalyst, might well be passed over. "If his grant had gone into a study section in the current funding situation, a study section would say: 'Look, there's a strong chancy element in this; he's using an obscure system to study something; why bother studying something in this system?' Then you would never have happened upon what he happened upon, which is basically a revolution in biology."

Study sections are also put in the impossible position of having to make absurdly fine distinctions between competing applications. "We've reached a point where we are substantially beyond the sensitivity of the peer-review system to be able to really discriminate high-quality science," says Keith K. Yamamoto of the University of California at San Francisco and chairman of the molecular biology study section. Choosing which grants fall in the top third of those approved is not that difficult, he points out, but determining which fall in the 15th percentile and which in the 20th is virtually impossible. Says Yamamoto: "It becomes a quite subjective decision, and I think for investigators that are stuck on the wrong side of that subjective decision the message is one that is extremely frustrating."

The funding situation for new applications will improve once the bulge of grants made a few years ago passes through the system—once the elephant passes through the python—but some believe there remains a problem of chronic underfunding of biomedical research in the United States.

"To me it comes down to a lack of adequate dollars," says Lowell Weicker, former senator from Connecticut and now president of Research! America, an organization attempting to encourage grass-roots support for medical research. "If the Congress did anything to Social Security or cost-of-living adjustments, the whole damn country would be in an uproar," he says. "That same Congress doesn't have to care one iota about the National Institute on Aging, which is responsible for all the research on diseases of the aging. That gives an idea of what has and hasn't been sold to the American people. What the hell good does it do to have a Social Security check if you're either dead or not in a condition to spend it." ■ JOSEPH PALCA

# House Trims off Academic Pork

As Thanksgiving approached, it became harder for members of Congress to slice a little ham for the universities back home. Following what is by now a common formula, members of the House and Senate appropriations committees slipped $62 million into the mammoth defense appropriations bill for science facilities at seven specific universities. This year, the move immediately drew the wrath of two powerful senators, Sam Nunn (D–GA) and Jack Danforth (R–MO), and the funding was quietly excised when the bill reached the House floor.

But the fact that the funds got into the bill at all is testimony to the political appeal of pork barrel science. Last year, in an effort to prevent their colleagues from stuffing university projects into the defense budget, the same senators sponsored legislation requiring that the contracts for such projects be awarded on a competitive basis. No more sweetheart deals for specific institutions.

The restrictions seemed to be working. Neither the House nor the Senate versions of the defense appropriations bill contained any funds for individual university facilities. But when the conference committee, which is supposed merely to iron out differences in the bills passed by the House and Senate, produced a final version of the legislation, the following items were included:

- $15 million for the National Center for Industrial Innovation at Lehigh University;
- $6 million for the Center for Technology Management at Auburn University;
- $12 million for a supercomputer system at the Minnesota Supercomputer Center;
- $13 million for the University of Scranton Technology Center;
- $5.2 million for the proposed Center for Environmental Medicine at the Medical College of Ohio;
- $8 million for the proposed Center for Commerce and Industrial Expansion at Loyola University of Chicago; and
- $2 million for the Pilot Program for Combat Casualty Care Management and Research at the Martin Luther King, Jr., General Hospital/Charles R. Drew University of Medicine and Science in Los Angeles.

To make certain the bill would bring home the bacon to their favorite "charities," the sponsors actually wrote in a provision specifically exempting the projects from the competition requirement and directing the Pentagon to come up with the cash within 60 days.

Nunn and Danforth promptly served notice that they would seek to knock the projects out of the bill when it reached the Senate floor. But in the event, they didn't have to. The bill went first to the House, where Representative Steve Bartlett (R–TX) raised a point of order on the grounds that the items were not germane to the defense budget. The bill's sponsors quietly conceded, and the funds were excised—for this year, at least. ■ COLIN NORMAN