

# Researchers Declare Crisis, Seek Funding Solutions

*Meeting in Washington last week, scientists grappled with a funding crunch that has left many scrambling for support*

THERE IS PAIN AND PARADOX in the biomedical research community. The pain is palpable. With many long-term commitments still to keep, the National Institutes of Health has had to cut way back on the number of new awards it can offer, and everyone, from the newest assistant professor to the most senior researcher, is worrying about making the grade.

The paradox is that NIH has more money, awards more grants, and supports more research than ever before. Speaking before a meeting of scientists and policy-makers last week\* in Washington, Senator Dale Bumpers (D-AR) said it best: "How can we look so rich, and feel so poor?"

There are many facets to the answer. More scientists are seeking funds; NIH overextended itself when it received a large funding increase in the late 1980s; and

\*Forum on Supporting Biomedical Research: Near-Term Problems and Option for Action, National Academy of Sciences, Washington, DC, 27 June 1990.

targeted programs for AIDS, diabetes, cancer, and the human genome project seem to have drawn some money from the pool available to individual investigators (*Science*, 24 November 1989, p. 988).

But these explanations are small solace to those affected. Bruce Alberts of the University of California at San Francisco, who chaired last week's forum, said that presently only one in nine new faculty are able to get NIH funding. Nobel laureate Harold Varmus said statistics like these were making graduate students and postdoctoral fellows wonder if they had chosen the wrong career. "If I had been rebuffed as many talented young faculty are today, I'd probably be practicing internal medicine," he said. "My mother might be happy, but I wouldn't be." Katherine Wilson, a cell biologist and new assistant professor at Johns Hopkins University, said that she had been scrounging funds for the past year because, despite a high rating from a study section, her first

grant application was not funded.

The National Institutes of Health has responded by proposing a budget for 1992 that starts a 5-year plan to double the number of research grants from the current figure of approximately 20,000 grants to 40,000 by 1997. And the Administration is listening, too. Presidential science adviser D. Allan Bromley said that he was fully aware of the pain that now exists in the research community, "and both I and the Bush Administration are committed to responding in positive and concrete fashion to it."

But scientists attending the meeting in Washington last week were having a hard time taking the long-range perspective. Even if the plan to double the number of research grants remains intact as it makes its way through the budget mill, they believe that there is an immediate crisis in biomedical funding that can't even wait for short-term, let alone long-range, solutions.

"From our point of view this is really an emergency situation," said Thomas Kelly, a virologist from Johns Hopkins University and chairman of the virology study section at NIH. "Our field and other fields really can't sustain continued advances at anywhere near the traditional level unless the situation is rectified."

But that won't happen overnight. Like a compulsive shopper with a new credit card, NIH responded to substantial budget increases in the late 1980s by committing to

## Planning a Budget: In God We Trust?

When discussing their budget, officials at the National Institutes of Health must talk out of both sides of their mouth. When they speak in public, they can only discuss their budget for the upcoming fiscal year, which begins on 1 October. But internally at NIH, their main focus is on the budget for 1992, which has been in the works for several months and has already passed one or two rungs on the approval ladder.

To understand how the budget process works, take the example of the NIH's AIDS budget for fiscal year 1991. At the start of last year, the NIH AIDS office asked each of the institutes to present a "scientifically justifiable" request for what they would need to work on AIDS. Their total request came back at \$1.379 billion.

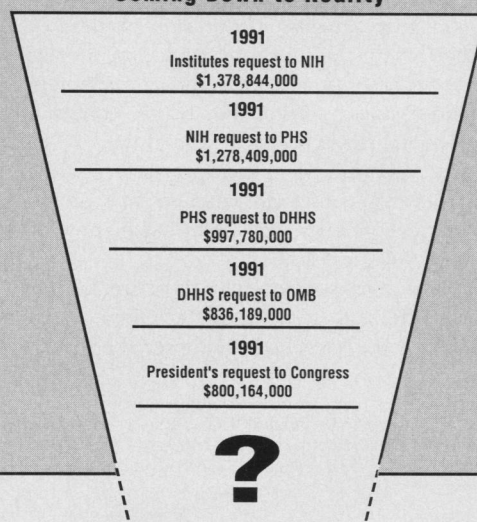
After looking over the budget for requests that were overlapping or redundant, NIH reduced that amount to \$1.278 billion, a request sent on to the office of James O. Mason, assistant secretary of health and head of the Public Health Service, around the start of last summer. Mason's office consid-

ered the request, along with requests from other parts of PHS including the Centers for Disease Control and the Alcohol, Drug Abuse and Mental Health Administration. Ultimately, Mason's office set the AIDS budget at \$998 million, the figure that was sent to Secretary of Health Louis W. Sullivan. There it competes with other Health and Human Services agencies, like the Health Care Financing Administration and the Family Support Admin-

istration. The secretary trimmed the budget still further and sent it on to the White House Office of Management and Budget, which made the ultimate cut to \$800 million, the figure the President sent to Congress at the start of the calendar year.

At each stage, there is a dialogue where agencies get to defend their requests. The process can continue right up until the time the budget goes to the printer. Then it's up to Congress. In the past, Congress has actually added money to the President's request for NIH, so even after nearly 9 months of internal haggling, the \$800-million figure is just a starting point. ■ J.P.

### Coming Down to Reality



more new grants than subsequent budgets have allowed the agency to sustain. At the same time, in response to pleas from the scientific community for more stable funding, the average length of grants was growing from 3.4 years to the current 4.3 years. This means less money has been available for new grants and those up for competitive renewal. To suddenly award thousands of new grants would solve the short-term problem but set the stage for the same kind of crisis a few years down the road.

So what can be done? NIH has already begun to shift available money around. Ruth Kirschstein, head of the National Institute of General Medical Science, said that her institute will sometimes go out of its way to help the desperate—denying extra funds to a scientist with more than one grant to fund someone who has no other support, even if that person received a lower ranking from a study section. NIH has also used “downward negotiations,” a euphemism for cuts, to take money from continuing grants to free money for new grants.

But researchers feel available money just won't do the trick. Some say it is time to mount a massive, grass-roots lobby campaign to convince Congress that more money should be put into biomedical research. William Brinkley of the University of Alabama described efforts by the Biophysical Society and the American Society for Biochemistry and Molecular Biology and the American Society for Cell Biology to educate Congress on the importance of biomedical research. Such efforts, he maintained, had already helped create a more favorable budget climate.

But John Holmfeld, science consultant to the House Committee on Science, Space, and Technology, warned that scientists could lose their credibility on Capitol Hill if they run to Congress every time they faced what he described as a “mini-crisis.” “Rather than start a lobbying campaign to solve this immediate problem,” which he estimated would have less than a 50–50 chance of success, he said, “you ought to think, as others have suggested, in strategic terms,” such as establishing goals and priorities for spending. “Not only do we need a better idea of what's happening,” said David Baltimore, the new president of Rockefeller University, “but we need a model of what ought to happen.”

Some strategies have already been developed. Floyd Bloom said an upcoming report from the Institute of Medicine that he helped write will recommend testing a sliding scale for funding. Instead of funding some grant seekers fully and giving nothing to others, Bloom said the report will recommend providing graduated amounts of

money depending on study section rankings. “In our calculations for the current year this might permit an additional 350 grants to be supported,” he said. Other recommendations will be to give early, informal reviews for young scientists so that they will have a better chance of winning renewal, and creating a mechanism to support research teams during transitional periods as they finish one project and want to head in a new direction.

Whatever long-term solutions the Bush Administration and the NIH devise, they

are not likely to bring short-term relief, and times will continue to be tough. Acting NIH director William Raub asked last week's forum audience to look for the silver lining: “Some of the strongest advocates of biomedical research . . . in private go so far as to say a bad year now and then reinvigorates our advocacy and helps in the long run.” And some, he added, would say that “we should look to the fruits of this anguish rather than simply bemoan it.” But a moan went up from the audience even as he spoke.

■ JOSEPH PALCA

## Multidisciplinary Look at a Finite World

*Fledgling field of ecological economics seeks to imbue ecology with more theoretical rigor and bring economics down to earth*

HOW DO YOU ASSESS THE FUTURE VALUE of the spotted owl? Quantify the “gross national waste product”? Model the intergenerational impacts of the greenhouse effect? Determine the earth's human carrying capacity?

These are questions of almost unimaginable complexity, and they are usually ignored within conventional economics and ecology. But they are the kinds of things experts puzzled over at the first meeting of the International Society for Ecological Economics, held in May at the World Bank in Washington, D.C.

The meeting marked the debut\* of a “trans-discipline”—ecological economics—designed to supply a bridge between the natural sciences and economics. And it seemed to have tapped a need—about 150 participants were expected; 372 showed up. The attendees came to see if it made sense to bring under one umbrella work that has been conducted in recent years in resource and environmental economics, systems ecology, energy, applied physics and mathematics, operations research, and anthropology and sociology. What they had in common, says economist Ralph d'Arge of the University of Wyoming, is that they are “a whole group of people with interests in a revised macroeconomics consistent with physical and biological laws.”

That means they believe there are limits to growth, and some think the limits have already been reached. Many see the time as

ripe for an economics based not on growth, but on “sustainability.” According to World Bank economist Herman Daly, one of the organizers of the conference and a maverick in his trade, this calls for replacing the old paradigm of the economy as a self-contained system with one that treats it as a subset of the biophysical system.

At present, said Daly, “There is no point of contact between the macroeconomics and the environment.” He said leading economics textbooks do not even contain entries on such topics as natural resources, pollution, and depletion. That's because most economists treat environmental functions as “externalities.” Ecologists, for their part, have little understanding of economic constraints, said conference co-organizer Robert Costanza, an economist at the University of Maryland's Chesapeake Biological Laboratory. They tend to stick to natural systems and leave out the human angle.

People working in ecological economics are inclined to be technological pessimists. They start with the premise that there is no getting around the First and Second Laws of Thermodynamics: since energy/matter can't be created or destroyed, resources are finite; and that once dissipated they can't be reused (entropy law). Most do not believe new technologies will be sufficient to avert major human and ecological disasters if current trends continue. They see no alternative to slowing population growth and the “throughput” of environmental goods and services.

Sustainability has become the rallying cry for development experts in recent years, but the term is nonspecific. What level of eco-

\* The Society for Ecological Economics was formed at a meeting in Barcelona in 1988. It has its own journal, *Ecological Economics*, edited by Robert Costanza.