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U.S. BUDGET

Biomedicine Gets Record Raise As Congress Sets 2002 Spending

All's well that ends well. This year's bumpy budget-making journey ended in a relatively smooth landing late last month with a record raise for U.S. biomedical science and increases for many other basic research budgets.

In April, President George W. Bush alarmed some science lobbyists with a spending plan for 2002 that called for trimming many nonbiomedical research budgets. But lawmakers rejected most of those cuts, instead increasing spending on everything from geological research to space science (see table). They added even more funds for military science and bioterrorism-related research in the wake of the 11 September terrorist assaults and subsequent anthrax attacks.

While the final numbers are still being tallied, analysts expect overall government R&D spending to rise by more than 6%, to some $100 billion, in the 2002 fiscal year that began 1 October. "It was like holiday shopping—they went on a late spending spree," says one congressional budget aide. Some of the money has strings attached, however, as lawmakers ordered up an unprecedented number of earmarks. The practice, in which Congress directs funds to a specific institution or research project, is opposed by many scientists and the Bush Administration.

Although Congress had already passed some spending bills affecting science agencies (*Science*, 16 November 2001, p. 1430), it wasn't until the week before Christmas that it approved budgets for the National Institutes of Health (NIH) and the Departments of Education and Defense. Here are highlights from those budgets and from other agencies that support research:

Biomedical science. For the fourth year in a row, NIH was the biggest winner. Its record $3 billion, 15% raise, to $23.2 billion, was contained in a $396 billion measure funding health, education, and welfare programs. The 2002 number is $200 million more than the White House requested and keeps the world's largest biomedical research funder on track for a budget doubling in 5 years, to $27 billion next year.

NIH's two dozen major institutes—including those focused on cancer, heart disease, and diabetes research—will each grow by 12% to 15%, producing nearly 900 new grants across the agency. A new, congressionally mandated institute for biomedical imaging will start life with a $112 million budget. Construction grants for extramural facilities will grow by 10%, to $110 million. But that's far shy of what some university administrators had sought.

In a significant victory for science society lobbyists, Congress rejected a Senate proposal forcing NIH to spend $143 million on Parkinson's disease research. The 60,000-member Federation of American Societies for Experimental Biology (FASEB) and other groups had opposed the directive, saying it would undermine NIH's history of giving funds to the best peer-reviewed science and not to specific diseases. The groups also feared that the earmark would trigger further directives in the NIH spending bill, which Congress has traditionally kept earmark-free. Lawmakers also turned aside a House move to reduce salaries for grantees, which FASEB and other groups said would doom efforts to recruit more physicians for high-priority clinical research studies.

Even so, some of NIH's increase won't remain fully in the agency's control. Budgeteers tagged nearly $300 million to be funneled to the Department of Health and Human Services, NIH's parent agency, for management oversight and other activities. Another $100 million is dedicated to a new Administration initiative to fight AIDS, malaria, and tuberculosis, part of which will involve NIH.

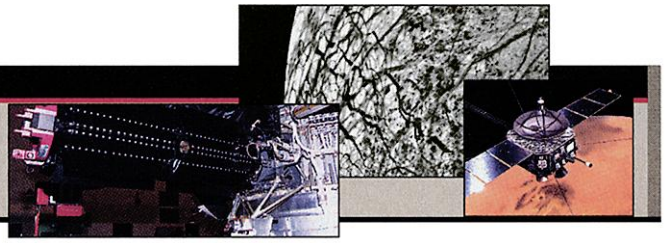
Military research. The $318 billion defense bill boosts the military's own basic research spending by 5%, to $1.4 billion—more than $100 million above the president's request. Basic science funded by the Defense Advanced Research Projects Agency will grow by nearly 4%, to $519 million. The raises are good news for universities, which depend on the Pentagon for up to half of their math, engineering, and computer science research funding.

The defense bill also

2002 RESEARCH BUDGET HIGHLIGHTS ($ MILLIONS)

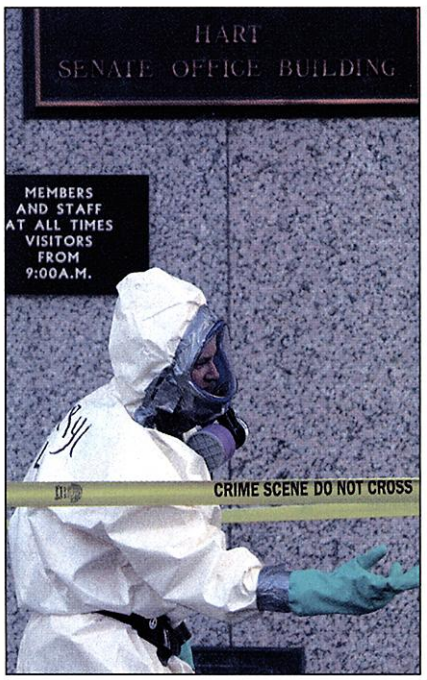
	2001	2002	% change
National Institutes of Health	20,358	23,355	14.7%
Biomedical Imaging*	2	112	5500.0%
National Science Foundation	4416	4789	8.4%
Research	3343	3598	7.6%
Education	786	875	11.3%
Defense Basic Research	1317	1389	5.5%
DARPA Basic Research	500	519	3.8%
Department of Energy			
Office of Science	3180	3233	1.7%
High Energy Physics	712	716	0.6%
Biological/Environmental	483	527	9.1%
Basic Science	992	1004	1.2%
NASA	14,253	14,800	3.8%
NASA Space Science	2625	2849	8.5%
NASA Earth Science	1716	1573	–8.3%
NASA Biological/Physical Science†	379	714	88.4%
NIST	597	629	5.4%
Advanced Technology Program	145	185	27.6%
Environmental Protection Agency S&T	695	698	0.4%
Department of Agriculture			
Research Service	967	1068	10.4%
U.S. Geological Survey	883	914	3.5%

* New institute. † Includes transfer of space station research.



restores a cut of nearly $150 million that the Administration had proposed for Department of Energy programs aimed at securing Russian nuclear materials and keeping ex-Soviet scientists from taking their talents to enemy nations. And it includes some goodies for NIH as well: The National Institute of Allergy and Infectious Diseases will get $85 million for bioterrorism-related research and $70 million to build an ultrasecure laboratory for working with dangerous pathogens.

Bioterrorism security. At the last minute, lawmakers removed language from the defense spending bill that would have tightened security requirements for researchers working with potential bioweapons. The American Society for Microbiology and other groups had scrambled to help Congress craft workable regulations on worker screening and registering of pathogens, and some of those measures were attached to the Senate's version of the spending bill. After House leaders objected to using an appropriations bill to pass the new rules, however, the two bodies agreed to finalize separate bioterrorism security legislation early next year.



Fighting terrorism. NIH gets a new lab to work with dangerous pathogens and the government beefs up security.

Science education. The science education community got its heart broken by congressional appropriators. On 18 December, science education lobbyists celebrated completion of a highly publicized reform of federal funding for elementary and secondary education. Among many other provisions, the new law authorizes the Department of Education to spend up to $450 million a year on partnerships between universities and local school districts to improve math and science. Later that day, however, the committee that actually hands out the money approved a paltry $12.5 million for the program. "We're still recovering from the shock," says a disheartened Jodi Peterson of the National Science Teachers Association.

"It's kind of interesting that in the midst of all this talk about improving education, math and science are left out of the picture," says Representative Vernon Ehlers (R–MI), a long-time advocate for better science education. He also scolded scientists for not getting more involved sooner. "It was a question of too little, too late," he said. But Congress did provide at least a little solace: Earlier this year it gave the National Science Foundation $160 million to start a similar partnerships program.

NIST earmarks. The construction budget of the National Institute for Standards and Technology (NIST), approved in November, is larded with an unprecedented level of earmarks. Senator Judd Gregg (R–NH), the top Republican on the committee that oversees NIST's budget, managed to steer a staggering $18 million to his home state of New Hampshire, part of $41 million in earmarks for a $62 million account. NIST's overall budget rose 13%, to $674 million, due to the earmarks and a 27% increase, to $185 million, for the Advanced Technology Program. But NIST's $321 million core research budget edged up by only 3%. "I am amazed to see that we are more concerned about 'pork' than supporting world-class research facilities," says Senator John McCain (R–AZ), who regularly rails against the practice.

Researchers are already wondering about the effects of earmarks on next year's budget. The Bush Administration, which will release its 2003 budget proposal on 4 February, has said that rising security needs and a declining economy will leave little room for new research initiatives. But, while Bush has threatened to veto any bill that smells too strongly of bacon, Congress often holds the upper hand in budget battles.

–DAVID MALAKOFF

With reporting by Jeffrey Mervis.

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XENOTRANSPLANTATION

Cloned Pigs May Help Overcome Rejection

The cloning of Dolly the sheep nearly 5 years ago raised the hopes of transplant scientists looking for an endless supply of life-saving organs. It was a key step toward creating a line of identical animals genetically engineered so their organs could be used in people. Now, a team led by researchers at the University of Missouri, Columbia, has made another major advance—the creation of four cloned piglets that lack one copy of a gene that causes pig organs to be rejected by the human immune system.

"This is something that's been eagerly awaited," says immunologist Jeffrey Platt of the Mayo Clinic in Rochester, Minnesota, an expert in xenotransplantation, or animal-to-human transplants. The work, published online this week by *Science* (www.sciencexpress.org), brings researchers halfway to their goal of producing live pigs lacking both copies of the gene. It puts the Missouri group ahead of a pack of companies, one of which has just welcomed the birth of knockout pigs, that are pursuing the same goal.

Pigs are the most promising species for organ transplants because they are physiologically similar to humans and, unlike nonhuman primates, are in plentiful supply. But progress in the field has been slow for two reasons—the fear of new viruses being transmitted from pigs to humans and the almost certain rejection of the transplanted organ.

Pigs produce a sugar, a link between two galactoses, on the surface of their endothe-

Handling rejection. This piglet lacks one copy of a sugar-producing gene that makes humans reject pig organs.