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R&D Budget Request for FY 2003: DOD and NIH Big Winners

On February 4, President Bush released a fiscal year (FY) 2003 budget request containing a record \$111.8 billion for research and development (R&D). But in a repeat of last year's request, nearly the entire increase would go just to the Department of Defense and the National Institutes of Health, leaving all other discretionary R&D with flat funding (see table on page 4).

There are no clear patterns in the mix of increases and decreases for the remaining R&D funding agencies. Unlike last year, FY 2003 would see increases and decreases scattered even within R&D portfolios as agencies try to prioritize in an environment of scarce resources. Some cuts are due to the Bush Administration's campaign to eliminate congressional R&D earmarks, which reached \$1.5 billion in FY 2002. Other cuts are due to efforts to return to normal funding levels from FY 2002 totals inflated by post-September 11 counterterrorism appropriations.

The **National Institutes of Health (NIH)** would receive \$27.3 billion for its total budget in FY 2003, an unprecedented increase of \$3.7 billion (15.7 percent) that would fulfill the commitment to double the NIH budget in five years. NIH R&D would rise 17.4 percent to \$26.5 billion. The big winner would be the National Institute of Allergy and Infectious Diseases (NIAID) which

would receive a boost of 57.3 percent to \$4.0 billion as NIH's lead institute for bioterrorism R&D. NIAID is also the lead NIH institute in AIDS research, which would increase 10 percent over FY 2002 to \$2.8 billion. Cancer research is another high priority with a request of \$5.5 billion, of which \$4.7 billion would go to the National Cancer Institute (up 12.2 percent). Buildings and Facilities would nearly double to \$633 million over an FY 2002 total already inflated by emergency counterterrorism funds, in or-

der to further improve laboratory security, build new bioterrorism research facilities, and finish construction of NIH's new Neuroscience Research Center. Most of the other institutes would receive increases between 8 and 9 percent.

The **Department of Defense (DOD)** would receive its second-largest dollar boost in history for R&D, rising to \$54.6 billion in FY 2003, an increase of \$5.4 billion or 10.9 percent. However, most of the in-

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Senate Braces for Cloning Debate

As the Senate prepares to take up a comprehensive ban on human cloning, groups on all sides of the issue are preparing for a bruising fight. Since Congress reconvened in January for its second session, two Senate committees have already held hearings on the issue, and outlines of the debate are beginning to take both a familiar and unique shape.

On one side are proponents of a bill (S. 1899) authored by Sens. Sam Brownback (R-KS) and Mary Landrieu (D-LA) which is identical to a bill approved by the House last summer (H.R. 2505). The Brownback-Landrieu bill would ban all forms of human cloning, whether for producing a human baby (reproductive cloning) or for scientific research (research cloning). On the other side are proponents of a narrower cloning ban that would prohibit reproductive cloning but permit research cloning. Two such narrow bans have been introduced, one by Sens. Tom Harkin (D-IA) and Arlen Specter (R-PA) and the other by Sens. Dianne Feinstein (D-CA) and Edward M. Kennedy (D-MA).

Senate Majority Leader Thomas A. Daschle (D-SD) promised Sen. Brownback last fall that he would bring S. 1899 to the floor in February or March and both camps are preparing for a vote before the Easter recess begins on March 25.

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"Our capacity to conduct research and to educate will have to be enhanced if we are to counter our foes over the long run."

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House Passes Cybersecurity Bill

On February 7, the House of Representatives passed the Cyber Security Research and Development Act (H.R. 3394), by an overwhelming vote of 400 to 12. The bill will authorize \$877 million in funds within the National Science Foundation (NSF) and the National Institutes of Standards and Technology (NIST). The funding will go towards an array of programs to improve basic research in computer security, encourage partnerships between industry and academia, as well as to generate a new cybersecurity workforce.

The Cyber Security Research and Development Act was introduced by House Science Committee Chairman Sherwood Boehlert (R-NY) in the aftermath of the terrorist attacks. "[T]he attacks of September 11th have turned our attention to the Nation's weaknesses, and again we find that our capacity to conduct research and to educate will have to be enhanced if we are to counter our foes over the long run," stated Boehlert on the House floor. The bill's cosponsor and the committee's ranking member Rep. Ralph Hall (D-TX) stated that "[t]he key to ensure information security for the long term is to establish a vigorous and creative basic research effort."

The bill authorizes a total of \$568 million between fiscal years (FY) 2003-2007 to NSF, of which \$233 million would go to basic research grants; \$144 million to the establishment of multidisciplinary computer and network security research centers; \$95 million to "capacity building" grants to establish or improve undergraduate and graduate education programs; and \$90 million to doctoral programs.

NIST would receive almost \$310 million over the same five years of which \$275 million would go towards research programs that involve a partnership between industry, academia, and government laboratories. In addition, funding may go towards post-doctoral research fellowships. The bill provides \$32 million for intramural research conducted at NIST laboratories.

In addition to the \$310 million in research funds, H.R. 3394 provides \$2.15 million for NIST's Computer System Security and Privacy Advisory Board to conduct analyses of emerging security and research needs. Finally, the bill would provide an additional \$700,000 for the National Re-

search Council to conduct a two-year study of our nation's existing infrastructure vulnerabilities.

The Boehlert-Hall bill is not alone in congressional attempts to improve perceived threats in our nation's computer infrastructure. Rep. Lamar Smith (R-TX), also a member of the House Science Committee, introduced the Cyber Security Enhancement Act of 2001 (H.R. 3482) in December. His bill received some attention because it proposes to amend federal sentencing guidelines and include life imprisonment for some forms of hacking if it results in or attempts to cause death or serious injury.

Cybersecurity has become just one of the many science and technology solutions that

the government is focusing on as part of its overall strategy to improve homeland security. The president's budget request includes approximately \$4.2 billion for cyberterrorism-related programs. The administration also circulated a broad request for concepts to establish a government-only intranet that would connect federal agencies via a private network. The General Services Administration is analyzing over 150 responses to the administration's notice. ●●●

FOR MORE INFORMATION:

House Science Committee:
www.house.gov/science

Cloning *Continued from page 1*

Supporting the Brownback-Landrieu bill is an unusual coalition of religious conservatives and environmentalists. Religious conservatives argue primarily that human embryos should be afforded a moral status similar to human beings and should not be destroyed even in the course of scientific research. Environmentalists, meanwhile, argue mainly that permitting research cloning would also open the door to reproductive cloning, and that such research should not proceed until strict regulatory safeguards are implemented.

Opposing Brownback-Landrieu is a coalition of science organizations, patient groups, and the biotechnology industry, which argue that research cloning could potentially lead to cures for many diseases, that reproductive cloning can be stopped without banning research, and that criminalizing scientific research sets a bad precedent. (AAAS, publisher of *Science and Technology in Congress*, has issued a statement supporting the use of research cloning.)

At the first of the two Senate hearings, the Senate Appropriations Committee's Labor-HHS Subcommittee heard from Dr. Irving L. Weissman, who chaired a panel on reproductive cloning for the National Academy of Sciences. He cited a low success rate in animal cloning and abnormalities in cloned animals that survive as reasons for a ban on human reproductive cloning. However, he testified that there is evidence that stem cells derived from cloned embryos are functional.

"Scientists place high value on the freedom of inquiry—a freedom that underlies all forms of scientific and medical research," Dr. Weissman said. "Recommending restriction of research is a serious matter, and the reasons for such a restriction must be compelling. In the case of human reproductive cloning, we are convinced that the potential dangers to the implanted fetus, to the newborn, and to the woman carrying the fetus constitute just such compelling reasons. In contrast, there are no scientific or medical reasons to ban nuclear transplantation to produce stem cells [i.e., research cloning], and such a ban would certainly close avenues of promising scientific and medical research."

Another witness, Dr. Brent Blackwelder, president of Friends of the Earth, laid out the environmental community's case against human cloning. He argued that cloning and the possible advent of inheritable genetic modifications (changes to a person's genetic makeup that can be passed on to future generations) "violate two cornerstone principles of the modern conservation movement: 1) respect for nature and 2) the precautionary principle." He described these potential developments as "biological pollution," a new kind of pollution "more ominous possibly than chemical or nuclear pollution."

Dr. Blackwelder advocated a moratorium on research cloning in order to prevent repro-

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Spotlight on Bioterrorism

With the majority of new research and development (R&D) funding in the President's fiscal year (FY) 2003 budget going to the Department of Defense (DOD) and the National Institutes of Health (NIH), it is no surprise that a major focus of the budget lies at the intersection of the two. Bioterrorism preparedness, pushed to the foreground by last fall's terrorist attacks, promises to be a major focus of federal R&D expenditures for at least the next two years.

But whereas some antiterrorism measures, such as strengthening airline security, have been relatively straightforward,

Bioterrorism preparedness is complicated by its dependence on the biotechnology industry, public health infrastructure, emergency response networks and university-based research.

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The president's budget, released on February 4, focuses on the last three: improving public health access and emergency response, and increasing funding for basic health-related R&D. Congress, meanwhile, has been developing legislation that meets similar goals but also seeks to smooth anti-terrorism partnerships between government, universities and the private sector.

The President's Budget

The President's FY 2003 budget calls for discretionary spending to increase \$49 billion over FY 2002 levels. NIH, which is calling the war against terrorism its "number one program priority," is one of the main beneficiaries. Under the proposed budget, NIH would receive an increase of \$3.7 billion (15.7 percent), bringing the agency's funding to \$27.3 billion. Of that, approximately \$1.8 billion is meant for anti-bioterrorism efforts, including basic research, drug procurement (\$250 million for an anthrax vaccine stockpile) and im-

provements to physical security.

The National Institute of Allergy and Infectious Disease (NIAID) would receive the largest increase of NIH's 29 institutes. The proposed \$1.4 billion increase would result in a total budget of \$4 billion, second only to the National Cancer Institute. Much of the increase in NIAID's funding would go towards basic bioterrorism research.

The President's budget also focuses on improving the security of laboratories and buildings. NIH would spend \$521 million, or almost 30 percent, of its \$1.8 billion bioterrorism budget on improving physical security and facilities. At the Centers for Disease Control and Prevention (CDC), the overall budget would decrease by \$1 billion (15 percent) from FY 2002, mostly because last year's budget was inflated by a one-time purchase of vaccines and other pharmaceuticals. But the CDC's physical security and facilities budget would be \$120 million, almost three times last year's amount and 40 times larger than the amount spent in 2001.

The Department of Defense is the other main beneficiary of the president's budget. But even though \$9.4 billion of its proposed \$369 billion FY 2003 budget is meant for counterterrorism efforts, little of it is going directly towards bioterrorism preparedness. In fact, although the defense R&D budget is increasing 10.9 percent, most of the new money will go toward developing weapons systems, leaving basic and applied research programs with flat or declining funding. The result is a budget that leaves NIH with the primary responsibility for defending against bioterrorism.

Bioterrorism Legislation

Last December, the House and Senate both passed bioterrorism bills (the Tauzin-Dingell bill, H.R. 3448, in the House and the Kennedy-Frist bill, S. 1765, in the Senate) that would improve bioterrorism preparedness at state and federal levels, encourage development of new vaccines and other treatments, and tighten federal oversight of food production and use of dangerous biological agents. Because the two bills are broadly similar, resolution of their differences may be completed as early as March.

One of the few substantive differences between the bills concerns food and water safety. The Senate version provides more

than \$520 million to improve food safety and protect U.S. agriculture from bioterrorism. The House version, however, provides only \$100 million, focusing instead on funding for water safety (\$170 million).

There are also some discrepancies in the amount of money allocated to specific programs. At the CDC, for example, the Senate bill authorizes only \$120 million for laboratory security and emergency preparedness, while the House bill provides \$450 million, more than three times as much.

Most of the bills' other provisions, however, are quite similar. Both bills would grant the states approximately \$1 billion for bioterrorism preparedness; both would spend approximately \$1.2 billion on building up the nation's stockpile of vaccines (\$509 million for smallpox vaccine alone) and other emergency medical supplies; and both would increase the federal government's ability to monitor and control dangerous biological agents, and to mount a rapid, coordinated response to a bioterrorist attack.

Meanwhile, Congress continues to de-

Last December, the House and Senate passed bills that would improve bioterrorism preparedness at state and federal levels.

bate other measures that could improve the nation's bioterrorism preparedness. On Feb. 5, at a hearing of the Senate Subcommittee on Science, Technology and Space, Chairman Ron Wyden (D-OR) discussed a bill that would create what he called a "National Emergency Technology Guard," a cadre of volunteers that could be called upon in case of a terrorist attack or other emergency. Sen. Wyden also advocated creating a central clearinghouse for information about government funding for bioterrorism R&D, as well as local registries of resources, such as hospital beds, medical supplies and anti-terrorism experts, that would speed response to a bioterror attack.

According to witnesses at the hearing, both private and academic sectors have had difficulty working with the federal govern-

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R&D in the FY 2003 Budget

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crease would go to the development of weapons systems rather than to research. The DOD S&T account, which includes basic and applied research plus generic technology development, would actually fall 2.0 percent down to \$9.7 billion. After nearly doubling its budget in FY 2002, the Ballistic Missile Defense Organization would see its R&D budget decline slightly to \$6.7 billion, which would still be more than 50 percent above the FY 2001 funding level. The Defense Advanced Research Projects Agency is a big winner in the FY 2003 budget with a proposed 19.2 percent increase to \$2.7 billion across its broad portfolio of research programs, including a 23 percent boost for its basic research portfolio.

The **National Science Foundation (NSF)** receives praise from the Bush Administration for its financial management, as well as increases for its R&D programs. The NSF budget would total \$5.0 billion in FY 2003, an increase of 5.0 percent. Excluding NSF's non-R&D education activities, NSF R&D would be \$3.7 billion, a boost of 3.6 percent or \$129 million. \$76 million of the increase, however, is due to the transfer of the National Sea Grant program from Commerce, hydrologic sciences from Interior, and environmental education from EPA to the NSF. While mathematical sciences would receive a substantial 20 percent increase to \$182 million, other programs in Mathematical and Physical Sciences (MPS) such as chemistry, physics, and astronomy would all decline. Another big winner would be Information Technology Research (up 9.9 percent), though at the expense of other research in computer sciences. Funding for the Major Research Equipment and Facility Construction account would decline \$13 million to \$126 million, with one new start (EarthScope) more than offset by proposals not to renew two FY 2002 congressionally earmarked projects. NSF would boost funding for the administration's high-priority Math and Science Partnerships from \$160 million to \$200 million, but would cut most other education and human resources programs.

The **National Aeronautics and Space Administration (NASA)** would see its total budget increase by 1.4 percent to \$15.1 billion in FY 2003, but NASA's R&D (two-thirds of the agency's budget) would climb

5.3 percent to \$10.1 billion. In an attempt to reign in the over-budget, and much-delayed International Space Station, NASA requests only \$1.5 billion for further construction, down from \$1.7 billion. The Science, Aeronautics and Technology (SAT) R&D accounts would climb 10.3 percent to \$8.9 billion. Space Science funding would increase 13 percent to \$3.4 billion, though it includes cancellation of outer planet missions to Pluto and Europa. The Biological and Physical Research program expanded greatly last year to take on all Space Station research; funding would rise 2.8 percent in FY 2003 to \$851 million. Aero-Space Technology would climb 11.7 percent to

\$2.9 billion, including \$759 million (up 63 percent) for the Space Launch Initiative to continue efforts to develop new technologies to replace the shuttle. The NASA request would eliminate most R&D earmarks added on to the budget in FY 2002, resulting in a nearly 50 percent cut to Academic Programs, a perennial home to congressional earmarks.

The **Department of Energy (DOE)** would see its R&D fall 8.0 percent to \$8.5 billion from an FY 2002 total inflated with one-time emergency counterterrorism R&D funds. Funding for the Office of Science would remain flat at \$3.3 billion, but most

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R&D in the FY 2003 Budget
(Budget authority in millions of dollars)

	FY 2001 Actual	FY 2002 Estimate	FY 2003 Budget	Change FY 02-03 Amount	Percent
Defense (military)	42,235	49,171	54,544	5,373	10.9%
<i>S&T (6.1-6.3 + medical)</i>	8,933	9,877	9,677	-200	-2.0%
<i>All Other DOD R&D</i>	33,302	39,294	44,867	5,573	14.2%
Health and Human Services	21,037	23,938	27,683	3,745	15.6%
<i>Nat'l Institutes of Health</i>	19,737	22,539	26,472	3,933	17.4%
NASA	9,675	9,560	10,069	509	5.3%
Energy	7,772	9,253	8,510	-743	-8.0%
<i>NNSA and other defense</i>	3,414	4,638	4,010	-628	-13.5%
<i>Energy and Science programs</i>	4,358	4,615	4,500	-115	-2.5%
Nat'l Science Foundation	3,363	3,571	3,700	129	3.6%
Agriculture	2,182	2,336	2,118	-218	-9.3%
Commerce	1,054	1,129	1,114	-15	-1.3%
<i>NOAA</i>	586	644	630	-14	-2.2%
<i>NIST</i>	412	460	472	12	2.6%
Interior	622	660	628	-32	-4.8%
Transportation	792	867	725	-142	-16.4%
Environ. Protection Agency	598	612	650	38	6.2%
Veterans Affairs	748	796	846	50	6.3%
Education	264	268	311	43	16.0%
All Other	922	1,021	858	-163	-16.0%
Total R&D	91,264	103,182	111,756	8,574	8.3%
Defense R&D	45,649	53,809	58,554	4,745	8.8%
Nondefense R&D	45,615	49,373	53,202	3,829	7.8%
<i>Nondefense R&D excluding NIH</i>	25,878	26,834	26,730	-104	-0.4%
Basic Research	21,330	23,542	25,545	2,003	8.5%
Applied Research	21,960	24,082	26,290	2,208	9.2%
Development	43,230	50,960	55,520	4,560	8.9%
R&D Facilities and Equipment	4,744	4,598	4,401	-197	-4.3%

Source: AAAS, based on OMB data for R&D for FY 2003, agency budget justifications, and information from agency budget offices. February 7, 2002 - PRELIMINARY - will be revised.

CONGRESSIONAL RESEARCH SERVICE

Copies of CRS reports for congressional use are available by calling 202/707-7132.

- **Environmental Exposure to Endocrine Disruptors: What are the Human Health Risks? (RL31267)**
Endocrine disruptors are chemical compounds in drugs, food, consumer products, or the ambient environment that can interfere with internal biological processes that are normally regulated by their hormones. This report provides an overview of the potential sources of endocrine disruptors and the potential risks to human health. It discusses the scientific evidence, policy implications of screening programs, and existing legislation before Congress.
- **Military Space Programs: Issues Concerning DOD's Space-Based InfraRed (SBIRS) (RS21148)**
The DOD is developing SBIRS to replace existing early warning satellites that alert the U.S. military to foreign missile launches. This report provides an overview of the existing technical challenges facing the program, cost and schedule implications affected by the technical challenges, and policy issues facing Congress.
- **The Internet and the USA PATRIOT Act: Potential Implications for Electronic Privacy, Security, Commerce, and Government (RL31289)**
The USA PATRIOT Act, which was prompted by the September 11 terrorist attacks, is broadly scoped, and some of its provisions may affect Internet usage, computer security, and critical infrastructure protection. The Act was heralded by law enforcement officials as necessary for counteracting terrorists, but civil liberties groups urged caution in passing a new law in an emotionally charged environment. In light of this history, it appears that oversight of the Act's implementation will be of considerable interest to Congress and a broad range of interest groups.

GENERAL ACCOUNTING OFFICE

Copies of GAO Publications are available online at www.gao.gov or by calling 202/512-6000.

- **Science and Technology: Air Force's Planning Process Meets Statutory Requirement (GAO-02-273)**
This report addresses concerns within Congress regarding the Air Force's declining investment in science and technology. The National Defense Authorization Act for Fiscal Year 2001 requires that the secretary of the Air Force review the long-term challenges and short-term objectives of the Air Force's science and technology programs. This report reviews whether the Air Force complied with the criteria specified in the act. It addresses three primary areas: (1) long-term challenge identification and planning, (2) short-term objective identification and planning, and (3) program and budgetary resource assessment.

- **NASA: Better Mechanisms Needed for Sharing Lessons Learned (GAO-02-195)**

This report discusses the mechanisms that National Aeronautics and Space Administration (NASA) has in place to capture, disseminate, and apply past lessons learned towards mission success. It found that NASA's processes, procedures, and systems do not effectively capture and share lessons learned. Therefore, NASA has no assurance that lessons are being applied to future missions. The report includes recommendations to NASA on ways to strengthen the agency's lessons learning systems.

THE NATIONAL ACADEMIES

Government offices may obtain single complimentary copies by calling the Office of Congressional and Government Affairs at 202/334-1513. Others may order copies from the National Academy Press (800/624-6242, www.nap.edu).

- **At What Price?: Conceptualizing and Measuring Cost-of-Living and Price Indexes (ISBN: 0-309-07442-8)**
This report examines the foundations for consumer price indexes, comparing the conceptual and practical strengths, weaknesses, and limitations of traditional "fixed basket" and COLI approaches. It analyzes a range of complex issues, from how to deal with the changing quality of goods and services, including difficult-to-define medical services, to how to weight the expenditure patterns of different consumers. The book makes recommendations as to how the Bureau of Labor Statistics can continue to improve the accuracy and relevance of the CPI.
- **Evaluating, Rewarding, and Improving Effective Teaching in Undergraduate Science, Mathematics, Engineering, and Technology (ISBN: 0-309-07277-8)**
This report offers concepts for systematic evaluation of teaching practices and academic programs, with recommendations to the various stakeholders in higher education about how to achieve change. It discusses how to evaluate undergraduate teaching of science, mathematics, engineering and technology and what characterizes effective teaching in these fields. The report explores the implications of differences between the research and teaching cultures, and how practices in rewarding researchers could be transferred to the teaching enterprise.
- **The Age of Expert Testimony: Science in the Courtroom, Report of a Workshop (ISBN 0-309-08310-9)**
This report provides a summary of discussions held at a workshop to address the challenges of identifying objective and unbiased scientific experts for court-appointed roles. Topics discussed at the workshop included the nature of expert evidence, the rules of evidence as they apply to science, the scientific method and its application in law, and the many difficulties in reaching conclusions regarding causation when experts disagree.

scientific definitions

1. The act of making clear and distinct.
2. the act of stating a precise meaning or significance.

CYBERSECURITY TERMS

AUTHENTICATION The process of identifying an individual, usually based on a username and password.

AUTHORIZATION The process of granting or denying access to a network resource. Most computer security systems are based on a two-step process. The first stage is authentication (see above), and the second stage is authorization, which allows the user access to various resources based on the user's identity.

DoS ATTACK Short for denial-of-service attack, a type of attack on a network that renders it inaccessible by flooding it with useless traffic. Many DoS attacks exploit limitations in basic Internet protocols. For all known DoS attacks, there are software fixes that system administrators can install to limit the damage.

DIGITAL SIGNATURE A digital code attached to an electronically transmitted message that uniquely identifies the sender. Like a written signature, the digital signature guarantees that the individual sending the message is who he or she claims to be. Digital signatures are especially important for electronic commerce and are a key component of most authentication schemes.

FIREWALL A system designed to prevent unauthorized access to or from a private network. Firewalls, which can be implemented in hardware, software, or a combination of both, are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet.

HACKER A slang term for a computer enthusiast. Among professional programmers, the term can be either complimentary or derogatory, but the popular press uses the term to refer to individuals who gain unauthorized access to computer systems for the purpose of stealing and corrupting data.

PORT SCANNING The act of systematically scanning a computer's ports. Since a port is a place where information goes into and out of a computer, port scanning identifies open doors to a computer. It has legitimate uses in managing networks, but also can be done maliciously by someone looking for a weakened access point to break into a computer.

PRETTY GOOD PRIVACY (PGP) PGP is a free and widely available encryption technique used to protect electronic messages. PGP is based on the public-key method, which uses two keys: a public key that is used by the sender to encrypt a message and a private key used by the recipient to decrypt the message.

SSL Short for Secure Sockets Layer, a protocol developed for transmitting private documents via the Internet using public-key encryption. Many Web sites use the protocol to obtain confidential user information, such as credit card numbers.

SOURCE: www.webopedia.com/Networks/Security/

Cloning

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ductive cloning from taking place. "Even though many in the biotechnology business assert that their goal is only curing disease and saving lives," he testified, "the fact remains that once these cloning and germline technologies are perfected, there are plenty who have publicly avowed to utilize them."

Dr. Blackwelder went on to describe the Feinstein-Kennedy bill as "Swiss cheese." Sen. Specter, however, the ranking member of the Labor-HHS subcommittee, vowed to erect a strong barrier between research and reproductive cloning. "We're going to put up a wall like Jefferson's wall between church and state," he said.

The second hearing, held by the Senate Judiciary Committee, featured testimony from Rep. Dave Weldon (R-FL), who shepherded a cloning ban through the House. Rep. Weldon addressed the moral status of a human embryo, describing the "great peril of allowing the creation of human embryos, cloned or not, specifically for research purposes."

"Regardless of the issue of personhood," he said, "nascent human life has some value."

Among those testifying in favor of the Feinstein-Kennedy bill was Henry T. Greely, a Stanford law professor representing the California Advisory Committee on Human Cloning, which released a report in January entitled "Cloning Californians?" The report, which was mandated by a 1997 state law imposing a temporary ban on reproductive cloning, unanimously recommended a continued ban on reproductive cloning, but not on research cloning.

"The twelve members of this Committee started with very different positions," Mr. Greely testified. "As we heard more testimony and public comment, read more deeply in the literature, and began writing (and arguing about) our report, our views began to converge. ... Government should not allow human cloning to be used to make people; it should allow—with due care—human cloning research to proceed to find ways to relieve diseases and conditions that cause suffering to existing people." ●●●

FOR MORE INFORMATION:

Human Cloning Resources:

www.aaas.org/spp/cstc/issues/cloning.htm

R&D in the FY 2003 Budget

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programs would receive increases, offset by cuts in R&D earmarks and a planned reduction in Spallation Neutron Source construction. While overall funding for Solar and Renewables R&D would remain level, program emphasis shifts toward hydrogen, hydropower, and wind research. Fossil Energy R&D would receive steep cuts of up to 50 percent on natural gas and petroleum technologies. In Energy Conservation, DOE would abandon the Partnership for a New Generation of Vehicles to develop high-mileage gas-powered vehicles and would replace it with the FreedomCAR, a collaborative effort with industry to develop hydrogen-powered fuel cell vehicles. DOE's defense R&D programs would fall 13.5 percent to \$4.0 billion because the FY 2002 total is inflated with one-time counterterrorism emergency funds. However, defense programs in advanced scientific computing R&D and stockpile stewardship R&D would receive increases.

R&D in the **U.S. Department of Agriculture (USDA)** would decline \$218 million or 9.3 percent to \$2.1 billion, mostly because of steep cuts to R&D earmarks and the loss of one-time FY 2002 emergency antiterrorism funds. Funding for competitive research grants in the National Research Initiative (NRI) would double from \$120 million to \$240 million, offsetting steep cuts in earmarked Special Research Grants from \$103 million down to \$7 million. The large NRI increase would partially make up for the administration's decision to block a \$120 million mandatory competitive research grants program from spending any money in FY 2003. In the intramural Agricultural Research Service (ARS) programs, Buildings and Facilities funding would fall from \$119 million down to \$17 million because FY 2002 emergency antiterrorism security upgrades and congressionally earmarked construction

projects would not be renewed. ARS research would decrease \$30 million to \$1.0 billion, but selected priority research programs would receive increases, offset by the cancellation of R&D earmarks.

Department of Commerce R&D programs would decline 1.3 percent in FY 2003 to \$1.1 billion. Once again the administration requests steep reductions to the Advanced Technology Program (ATP) at the **National Institute of Standards and Technology**. **National Oceanic and Atmospheric Administration (NOAA)** R&D would decline by 2.2 percent or \$14 million due to the transfer of the \$62 million National Sea Grant program to NSF in FY 2003. Overall, NOAA R&D programs would see increases.

R&D in the **Department of the Interior** would decline 4.8 percent to \$628 million, but steeper cuts would fall on Interior's lead science agency, the **U.S. Geological Survey (USGS)**. USGS R&D would decrease 7.0 percent or \$41 million to \$542 million. Hardest hit would be reductions in the National Water Quality Assessment Program and the Toxic Substances Hydrology Program, including a \$10 million transfer to NSF to initiate a competitive grants program to address water quality issues.

The **Environmental Protection Agency (EPA)** R&D budget would rise 6.2 percent

to \$650 million in FY 2003. Much of this increase may be attributed to the \$77.5 million set aside for research in dealing with biological and chemical incidents.

In sharp contrast to the financial optimism of last year's budget when economists forecasted endless surpluses, the FY 2003 budget proposes deficit spending. With President Bush having taken the lead to prepare the public for budget deficits for the next few years, the most likely outcome is that Congress will spend whatever it feels it needs in order to adequately fund defense, domestic programs, homeland security, and other priorities.

For federal R&D programs, the only thing certain is that NIH will eventually receive its requested \$27.3 billion, and perhaps even more. In an election year, the pressures for Congress to add on more money will be even greater than last year. Combined with the continuing crisis atmosphere on matters related to war and security and the near-disappearance of balancing the budget as a constraint, the president's budget will almost certainly be a floor rather than a ceiling for R&D appropriations action to come. ●●●

—Kei Koizumi and Paul Turner
AAAS R&D Budget and Policy Program
www.aaas.org/spp/R&D

Bioterrorism *Continued from page 3*

ment to protect the U.S. from bioterrorism. The main challenge faced by small companies trying to develop antiterrorism technologies is the lack of funding for products that may not have immediate market value, said John Edwards, CEO of Photonic Sensor, and Una Ryan, CEO of AVANT Immunotherapeutics and a representative of the Biotechnology Industry Organization. They testified in favor of the kind of central clearinghouse recommended by Wyden, which they argued would speed the development of anti-bioterrorism technologies. Along similar lines, Bruno Sobral, director of the Virginia Bioinformatics Institute, suggested that a government-sponsored central database of bioterrorism-related information would facilitate coordination among academic researchers, who otherwise might fail to identify crucial gaps in knowledge about dangerous pathogens. ●●●

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Heard off the Hill

Shocking Map • With the help of two low-flying satellites, NASA scientists have produced a map of the world's lightning hot spots.

The map was produced using satellite-mounted sensors that monitored the tops of clouds for signs of electrical activity. It gives scientists their first view of lightning over the oceans, the Poles and sparsely inhabited land areas where weather observation is rare. According to the map, the best place to play Ben Franklin in the U.S. is Florida, where colliding eastern and western winds cause frequent storms. Worldwide, Central Africa wins the prize for most thunderstruck. The map can be found at www.msfc.nasa.gov/news.

---> *National Space Science and Technology Center, Jan. 28, 2002*

Gene Goggles • A recent study by Harvard biologists has shown that a tiny genetic manipulation may be all it takes to change male mice into lovers, not fighters. The mice were genetically engineered to lack a protein that allows them to detect air-borne hormones, or pheromones, released by other mice. Unable to distinguish between males and females, the mice tried to initiate sexual contact with both. The gene the researchers removed normally produces a receptor in the mouse's vomeronasal organ, where pheromones are detected. Humans also have a vomeronasal organ, but there is no evidence that it has the same effects on humans as it has on mice.

---> *Science, January 31, 2002*

Not by Genes Alone • If two plants with identical genes are raised in identical environments, they should look identical, give or take a few random differences. At least that's what traditional genetics dictates. But what if one of the "identical" plants is small and shriveled, and if all of its offspring are too? According to researchers at Washington University in St. Louis, the difference between the plants may lie in how genes are translated into proteins, not in the genes themselves. A genetic "switch" in a parent plant—perhaps a mutant protein that influences gene transcription—could be passed on to its offspring, stunting the plant's growth without altering its DNA.

---> *Genes and Development, January 15, 2002*

Cold War Fallout • A study from the University of Leicester has shown that nuclear weapons testing by the Soviet Union in the 1940s and '50s may have led to elevated rates of genetic mutation in communities downwind from a nuclear facility in Kazakhstan. Researchers found that mutations in "mini-satellites" (repeating sequences of DNA that are sprinkled throughout the genome) were 80 percent higher in people who had been exposed to the fallout than in people who had not. Even the children of those exposed had mutation levels that were, on average, 50 percent greater than normal. It is unclear what health effects, if any, the mutations may have had; the mini-satellites, which were the only kind of DNA examined by the study, have long been thought of as a kind of "junk DNA."

---> *Science Express, February 7, 2002*