duced last week by the chair of the House Science Committee, Representative Sherwood Boehlert (R–NY). The National Mathematics and Science Partnerships Act (HR 1858) would authorize $267 million a year in programs to strengthen teacher training and professional development. The bill would establish a new NSF grants program that would link universities and nonprofit organizations with local schools and businesses to improve math and science instruction in elementary and secondary schools. It would also provide scholarships for science and math majors or scientists wishing to become teachers, give teachers grants to do university-level research, and create four NSF-funded centers to study how children learn.

"One of the failings of our current [public education] system is that we don't take advantage of all the expertise residing in our universities and businesses," said Boehlert in a prepared statement. "My bill is an effort to do just that."

Partners aplenty. Representative Sherwood Boehlert's science and math education bill is one of many that address a new NSF program.

Slightly different versions of the Bush plan are embodied in HR 1 and S 1, the main Republican vehicles for the president's overall effort to rework federal support for elementary and secondary schools. However, those bills would funnel most of the partnership money to local and state school districts through the Department of Education.

Boehlert's bill avoids a controversial provision in a related education bill sponsored by Representative Vernon Ehlers (R–MI) that would require NSF to fund the salaries of master teachers at private as well as public schools. Ehlers says he hopes to move ahead with his bill, HR 100, which suffered a surprise defeat last fall (*Science*, 10 November 2000, p. 1068). But other observers predict that some of Ehlers's provisions will be folded into the chair's bill. Boehlert also hopes to join forces with House Democrats, who earlier this month introduced a partnerships bill, HR 1693, that places a greater emphasis on increasing the participaton of underrepresented groups and boosting educational technologies.

Boehlert's plan appears to be closely aligned with NSF's thinking on Bush's partnership program, which officials first learned about in late January. Judith Sunley, head of NSF's education directorate, expects to issue an announcement this fall on how the program will be run. "We hope that our legislation will influence what [NSF] decides to do," says Boehlert aide David Goldston, who expects the bill to be marked up by the full committee next month.

Whatever their differences, these bills simply give NSF permission to carry out specific programs. The money to run them comes from appropriators, who will shortly start carving up some $661 billion in discretionary spending for the 2002 fiscal year, which begins in October.

Political trade-offs are likely to shape NSF's overall budget, currently $4.4 billion and scheduled for a 1.3% boost. Despite widespread support for improving precollege math and science education, for instance, the 11% increase Bush has proposed for NSF's education programs might be vulnerable. On 16 May a House spending panel discussed shifting some education money into the foundation's core research programs in order to offset cuts and putting a freeze on major research facilities, as called for by the president's April budget. Comparing those cuts to a requested 13.5% increase for the National Institutes of Health, appropriations subcommittee chair James Walsh (R–NY) said after the hearing that "we may need to put more money into the physical sciences" to improve the balance of federally funded research. **–JEFFREY MERVIS**

EUROPEAN HIGHER EDUCATION

Thirty Nations Pledge To Harmonize Degrees

PRAGUE—European universities pride themselves on their unique histories and independence. But that autonomy can be a disadvantage in a world where intellectual talent is increasingly free to ignore national boundaries. Last week, the education ministers of 30 European nations agreed to bolster efforts to bring their systems of higher education closer together. They endorsed reforms that should make it easier for students and researchers to move freely among Europe's sometimes disparate universities.

Meeting here on 18 to 19 May, officials from Germany to Malta agreed to establish by 2010 a "European Higher Education Area" that would include elements such as compara-

ScienceScope

War of Words Dueling press releases this week broke the bipartisan calm that has pervaded the House Science Committee since Sherwood Boehlert (R–NY) became chair earlier this year. In a 21 May statement, panel Democrat Joe Baca (CA) slammed President George W. Bush for failing to appoint a science adviser, noting that no previous president has ever waited so long (*Science*, 11 May, p. 1041). The release said that Ronald Reagan, the prior record foot-dragger, had appointed George Keyworth as his adviser on 19 May 1981.

The next day, however, Boehlert complained that the Democrats had their facts wrong: Reagan nominated Keyworth on 1 July—a point the Democrats concede. "We used the wrong word," says a Democratic staffer, explaining that Reagan "named" Keyworth as his pick in May but didn't file the official paperwork until later. Either way, says the staffer, the flap "only calls more attention to the fact that this White House isn't getting scientific advice on important issues."

As if to highlight the vacancy, a House appropriations committee this week cancelled a budget hearing on the White House's Office of Science and Technology Policy (OSTP), which the science adviser traditionally leads. According to a committee aide, OSTP said it was so short-staffed it didn't have anyone available to testify.

Debate Not Depleted A new report from the U.K.'s Royal Society isn't likely to end the debate over whether soldiers have been sickened by radiation from depleted uranium (DU) munitions.

Some U.S. and European soldiers say their cancers are a result of DU exposure during the 1991 Gulf War and the 1999 Kosovo conflicts. But a study released this week concludes that health risks from DU radiation are "for the most part low." There are possible exceptions, however, including a likely higher risk of lung cancer in tank crew members who inhale the "impact aerosol" created when a DU shell pierces their vehicle's armor. But panel chair Brian Spratt, a microbiologist at London's Imperial College, says that more study is needed to pinpoint the risks from such close encounters.

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informed consent should focus on the process and substance of informing volunteers rather than on obtaining a signed document, and it suggests that some procedures should be exempt from routine consent requirements if the risks are truly "minimal."

The new report also could be the panel's swan song. Meslin says the commission has received no word on whether its charter, which expires in October, will be extended. Even if the NBAC report is ignored, however, the idea of a new oversight body has been embraced by the biomedical community. On 23 May a consortium of six university and research groups—including FASEB—announced the formation of the Association for the Accreditation of Human Research Protection Programs. The association will operate a voluntary national accreditation program to monitor clinical research carried out with either public or private funding.

–ELIOT MARSHALL

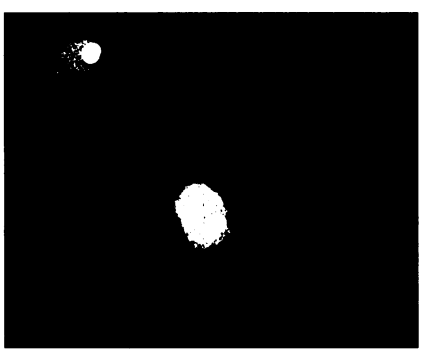
With reporting by Gretchen Vogel.

CELL BIOLOGY

Protein Clumps Hijack Cell's Clearance System

Although Parkinson's, Huntington's, amyotrophic lateral sclerosis, and other neurodegenerative diseases cause very different behavioral symptoms, inside the neuron they look a lot alike. All are marked by big intracellular clumps of protein that scar neurons targeted by the disease. But researchers haven't known whether these protein clumps cause neurological damage themselves or are mere byproducts of some other system gone awry.

Now a study on page 1552 suggests that protein aggregates can directly damage cells by hijacking a cellular quality control mechanism, the ubiquitin-proteasome system (UPS). Normally, the UPS seeks out and destroys misshapen proteins inside the cell—including those that tangle up into clumps in neurodegenerative disease. But in cells artificially induced to churn out clump-prone proteins, the system stalls. Protein tangles thus apparently "initiate a vicious cycle," says Susan Lindquist of the University of Chicago. "The study suggests very nicely that there is an interplay between the two: As proteins start to accumulate, they put stress on the UPS. This in turn causes more proteins to accumulate, which in turn puts more stress on the UPS."



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Overwhelmed. Cells with clumps of proteins (yellow) can't clear an aberrant protein marker (green).

A stressed-out UPS spells trouble for the cell. As many as 80% of the proteins a cell produces don't fold correctly, points out Alfred Goldberg of Harvard Medical School in Boston; the UPS destroys them before they cause damage. Ubiquitin tags abnormal proteins for destruction, and the proteasomes chew up those ubiquitinated proteins. If proteasomes are stifled by inhibitors, even healthy cells accumulate abnormal proteins in thickets similar to those seen in neurodegenerative diseases. These cells can't reproduce, and they're likely to die.

Earlier research uncovered suggestive links between the UPS and neurodegenerative diseases. Mutations in UPS-related genes can cause early-onset forms of Parkinson's disease, for instance. And protein clumps inside diseased neurons are studded with both ubiquitin and proteasomes.

To test directly whether protein clumps can hobble the UPS, Ron Kopito and colleagues at Stanford University developed an easy-to-read tracer, composed of a fluorescent protein attached to a protein fragment that sends an "eat me" signal to the UPS. If the clearance system is working efficiently, it destroys the tracer and the cell's fluorescence quickly dims.

The researchers engineered cells to produce one of two proteins—one involved in cystic fibrosis and the other in Huntington's disease—both of which tend to aggregate. In cells with clumps of these proteins, the researchers found, the fluorescent tracer glowed robustly, indicating that the UPS was powerless to break it down.

Although they're not sure how tangled proteins shut down the UPS, one possibility is that "the proteasome is, as we put it, frustrated," says Kopito. Abnormal proteins are sucked into the proteasome through a small opening, like someone slurping a strand of spaghetti. If the protein is tangled into a clump, the proteasome can't pull it in. But, because the proteasome is a "possessive enzyme" that holds onto its prey, it also can't let go. "The proteasome is basically out of commission," says Kopito, which prevents it from chasing down new, badly built proteins, and the problem escalates. Either player in the drama—an excess of misfolded proteins or a glitch in the UPS—could trigger the cycle, Kopito says.

A malfunctioning UPS could be partly at

ScienceScope

Germany's Space Future For the first time in nearly 2 decades, Germany has an official space policy. The plan, approved by the cabinet last week, commits $3.8 billion to space R&D over the next 4 years. But some researchers worry that homegrown science will be squeezed to accommodate international projects.

The new policy will give Germany "the necessary planning security" to fund both national projects and long-term partnerships with the European Space Agency (ESA) and other nations, says Walter Kröll, chair of Germany's aerospace research center in Cologne. But critics note that the lion's share of the funds will go to ESA projects and the international space station, leaving just $150 million a year for domestic programs.

Astrophysicist Wolfgang Hillebrandt, a director of the Max Planck Institute for Astrophysics in Garching, says that greater levels of support are needed so that German researchers "can participate in the science that is part of the ESA missions."

Reducing the Mortgage The National Cancer Institute (NCI) is moving to rein in the explosive recent growth of its $1.7 billion grants portfolio. NCI chief Richard Klausner told an advisory board this week that the number and size of NCI's extramural grants has been growing faster than the agency's budget, prompting at least two new rules. One limits researchers applying for renewals of 3- or 4-year grants to no more than a 20% increase (and he predicts most will get substantially less). The other will require the growing number of scientists seeking especially large grants—$500,000 or more—to enter a separate competition for a specified pool of funds.

Klausner says the changes will help NCI, the largest member of the National Institutes of Health (NIH), make a smooth transition to the slower budget growth expected when Congress completes an NIH budget-doubling push in 2004. He noted that NCI's spending on grants grew 17% last year, compared to a 13.5% overall budget increase—growth that "cannot be sustained with anticipated funding," he says. "Eventually, the numbers come back to bite you."

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