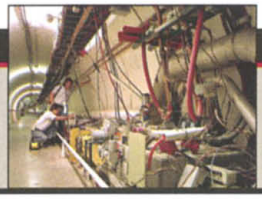
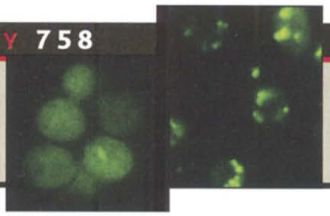


757 Prospects brighten for Tevatron

LEAD STORY 758 A more benign view of prions



764 Sedatives as chemical weapons?

"This could be a Framingham study on mental health," referring to a long-term examination of heart disease in that Massachusetts town. Others, however, are cautious about promising too much. "You may end up with data that is uninterpretable," warns Nora Volkow, a neuroscientist at Brookhaven National Laboratory in Upton, New York. "There's a consensus [that] we need to do our homework before embarking on such a program." She says that brain images from the same person can vary from day to day, and others note that drug users typically use several substances, complicating efforts to sort out variables.

The genetics portion will pose its own challenges, researchers say, particularly attempts to link specific genes with physiological changes. "Sure, we should try," says Harvard provost and neuroscientist Steven Hyman. "But we need to have the greatest humility as to where we are." Many agree, however, that neuroimaging and genetics demand collaboration. "There is no question about the importance of these two forces in understanding cognitive issues," says Phil Sharp, who heads MIT's McGovern Institute for Brain Research. The challenge, he adds, is to come up with studies that can pass muster in peer review, be replicated, and build up large databases for future researchers.

Breiter acknowledges that neuroimaging has had a reputation for producing "pretty pictures" but not replicable data. "It has been characterized as pseudocolor phrenology, but thanks to very rigorous animal neuroscience, we know how [neural] circuits work." Responding to colleagues, he revamped his proposal to include a slow scale-up. "The worst-case scenario," he says, is that it would end with the pilot studies, giving "a neural circuitry–based picture of nicotine and cocaine use and depression."

Such a picture would aid drug-abuse research, which Harvard University psychiatrist Perry Renshaw says has long suffered from a lack of good clinical studies using neuroimaging. Larger studies, he says, hold the key to making use of the technology's possibilities. They also require more money and are certain to raise controversial issues about confidentiality, gender, and ethnicity. "If this is not well thought out, it will hurt us," adds Volkow. But given new facilities, funding, and the strong support of the White House, drug-abuse researchers might have a good shot at riding to the forefront of neuroscience. **–ANDREW LAWLER**

CREDIT: DENNIS COOK/AP

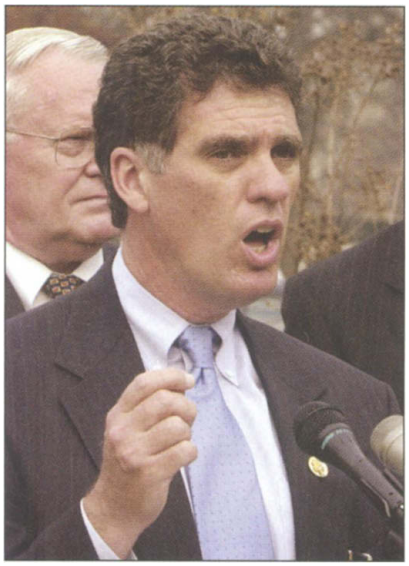
BIOTERRORISM

A Call for Restraint On Biological Data

Two events last week are prompting a public debate over a hot-button issue that has quietly been discussed in the scientific community since last fall's anthrax attacks: Should unclassified research that might conceivably help bioterrorists be openly published?

A handful of members of Congress filed a resolution criticizing the publication by *Science* of a paper on poliovirus and calling on journals, scientists, and funding agencies to take more care about releasing such information. Separately, the American Society for Microbiology (ASM), which represents 40,000 scientists, sent a letter to the National Academy of Sciences (NAS) 22 July requesting a meeting of biomedical publishers to discuss whether and how to publish research that might be co-opted by terrorists. NAS plans a meeting this fall.

The *Science* paper, published online 11 July (www.sciencemag.org/cgi/content/abstract/1072266), describes the assembly of poliovirus from stretches of DNA obtained by mail from specialty reagent suppliers. The publication troubled Representative Dave Weldon (R–FL). Along with seven other Republicans, Weldon introduced a resolution 26 July criticizing *Science*'s publisher, the American Association for the Advancement of Science (AAAS), for publishing "a blueprint that could conceivably enable terrorists to inexpensively create human pathogens." The resolution, which has been referred to three congressional committees, also calls on government funding agencies to reconsider how they classify research. The polio study, funded by the Department of Defense and led by Eckard Wimmer at the State University of New York, Stony Brook, was unclassified.



Critic. Rep. Dave Weldon took AAAS to task for publishing a paper on poliovirus.

Many microbiologists say that they see no threat to national security in the polio paper, because the virus's DNA sequence is available over the Internet and techniques for building it have long been known. "The colleagues that I have spoken with … do not feel there was any information presented in the publication that was national security information," says Andrew Onderdonk, a microbiologist at Harvard and editor-in-chief of the *Journal of Clinical Microbiology*, one of 11 journals published by ASM. At the same time, some biologists have condemned the publication for needlessly raising public fears (see Letters, p. 769).

Alan Leshner, AAAS's chief executive, defended the decision to publish: "The technique reported in *Science* is neither a practical nor efficient method for making more complex, lethal viruses," he said, noting that methods used in this research had been previously published and that the virus Wimmer's group produced is less virulent than natural poliovirus.

Weldon's call for rethinking open publication of potentially sensitive microbial work, however, echoes months of conversation among biologists. "Everyone is walking on eggs," says Sam Kaplan, chair of the ASM publications board. Editors of the ASM journals, which frequently publish research on dangerous pathogens, have been mulling over policies since last December. The Department of Defense, meanwhile, is funding a workshop of journal editors and national security experts on 12 August in Washington, D.C., on the publication of research it funds that is potentially related to biological warfare.

Absent clear guidance, some scientists are taking matters into their own hands. Ronald Atlas, president of ASM, says that the group's journals have received "a dozen or two dozen inquiries" from scientists afraid to publish their work in full. ASM's answer: Incomplete papers are not eligible for publication. In at least one case, though, a gutted paper did slip through: a report on smallpox sent to the

Journal of Clinical Microbiology by Thomas Smith, director of the Virology Laboratory at the Mayo Clinic in Rochester, Minnesota, and colleagues at the Centers for Disease Control and Prevention in Atlanta, Georgia.

The Mayo-funded report described a way to rapidly identify smallpox by a small segment of its genetic sequence. After the paper was accepted, Smith says, federal employees he declines to identify raised concerns. They worried that a terrorist could alter this bit of sequence to slow identification of the virus during an attack. Smith's group agreed to remove critical details, and the journal published the shorter version in June. Experiences like this, according to Atlas, drove the society to call for the NAS publishers' meeting.

Even though scientists agree that some research results might be risky to release—and that they might not know what constitutes a security threat—they are wary of suppressing data. Furthermore, some say, biodefense research is needed now more than ever, and keeping it secret will only make fighting terrorism tougher. "You can dream up all sorts of extreme scenarios on how bioterrorists can benefit from information," says Paul Keim, an anthrax researcher at Northern Arizona University in Flagstaff. But suppressing information "will hurt our effort to combat bioterrorism."

Scientists might have to live with some censorship, however, says Claire Fraser, director of The Institute for Genomic Research in Rockville, Maryland: "There could be more harm than good done by publishing a paper," she thinks. "That's going to be very hard for scientists to deal with."

–JENNIFER COUZIN

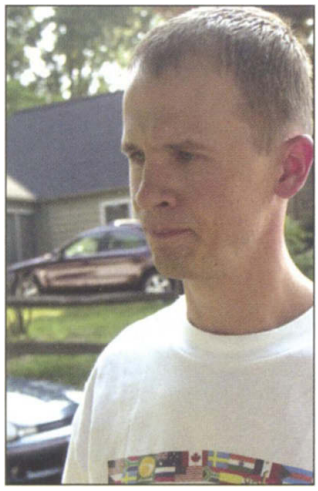
BIOTERRORISM

Student Charged With Possessing Anthrax

A University of Connecticut graduate student has become the first researcher charged under new antiterrorism laws with mishandling a potential bioterror agent. Federal prosecutors last week charged Tomas Foral, 26, with unlawfully possessing anthrax-tainted cow tissue.

Foral can avoid a trial—and up to 10 years in prison if convicted—by completing a community service program. But the young scientist is upset by the charge, which he says he can't afford to fight and believes is the result of "a misunderstanding" with a laboratory superior.

The case highlights the increasingly treacherous legal landscape surrounding pathogen research, some researchers say. "I fear this young man has gotten caught up in an overreaction to [last year's] anthrax attacks," says Ronald Atlas, a bioterrorism expert at the University of Louisville, Kentucky, and president of the American Society for Microbiology.



Charged. Tomas Foral says the case resulted from a misunderstanding.

Foral's troubles began late last October at the university's pathobiology laboratory in Storrs, Connecticut, where he is a master's degree student working to develop a detection test for West Nile virus. After a professor asked him to help clean out a malfunctioning basement freezer, Foral found a rusty container labeled "anthrax" holding about a half-dozen vials of cow tissue collected in the 1960s. Foral says that after a brief conversation with the instructor, he saved two of the vials in another locked laboratory freezer for future research. According to Foral, the instructor was unclear about what to do with the vials, so Foral froze them. (*Science* could not reach the instructor for comment.)

One month later, following an anonymous tip, police investigating an anthrax death in a town about 100 kilometers away came searching for the vials. After Foral turned them over on 27 November, the lab building was closed for more than a week. FBI agents began an investigation, including searches of Foral's home and university room, where they photographed textbooks and journal reprints, he says.

On 22 July, U.S. Attorney John Danaher announced that the government was charging Foral with possessing a controlled biological agent in violation of the USA Patriot Act, an antiterrorism law rushed through Congress last October (*Science*, 2 November 2001, p. 971). Foral was not covered by any of the law's exemptions, such as possessing anthrax for "bona fide research" purposes, prosecutors said in a statement.

Foral can avoid prosecution by doing community service, continuing to cooperate with investigators, and staying on the right side of the law. Prosecutors emphasize that his participation would not be "evidence of guilt." But Foral says he is deeply disheartened by the ordeal and worried that it might harm his efforts to get into medical school. The Czech-born American citizen, who

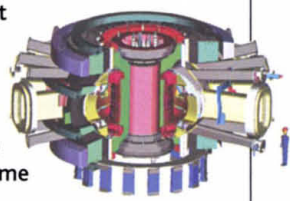
ScienceScope

Good Reviews U.K. learned societies breathed easier this week after a House of Commons select committee gave them mostly positive reviews. The report, requested earlier this year (*Science*, 15 February, p. 1212), was sparked by concerns about how the prominent Royal Society spent its government grant, which provides about 70% of its $56 million annual budget. The society gets most of the public funds given to U.K. science groups.

In its report, the 11-member panel led by Ian Gibson, a former biology dean at the University of East Anglia in Norwich, concluded that two-thirds of the $41 million grant goes to "very valuable" research, with the rest spent on other activities. The panel rejected concerns that the male-dominated society—fewer than 4% of its 1248 members are women—discriminates. Instead, it worried that the body might be biased against relatively new disciplines, such as computing. It also urged the government to consult the nation's learned bodies more often and do more to compensate them for advice. But it concluded that the Royal Society has too much sway over public education efforts and suggested that the government create a new independent body.

The societies were studying the report as *Science* went to press. The government is expected to respond later this year.

Hot Decision Fusion scientists are heating up their case for a major new experiment. At a summit last month in Snowmass, Colorado, fusion experts from around the world concluded that they could use a new facility for studying burning plasma, a state of matter that gets most of its heat from fusing hydrogen. Now they have to decide which of several designs is best—and persuade policy-makers to come up with the money.



The summiteers didn't make recommendations, but many predicted that two proposals will dominate discussions within the Department of Energy's (DOE's) Fusion Energy Sciences Advisory Committee (FESAC), a U.S. advisory body: ITER, a multibillion-dollar magnetic-fusion facility planned by an international consortium; and FIRE, a less ambitious version proposed by U.S. scientists. Summit organizer and FESAC member Gerald Navratil of Columbia University expects the panel to come up with a recommendation to DOE after it meets next month in Washington, D.C.

CREDITS: (TOP TO BOTTOM) BOB CHILD/AP; PPPL