*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

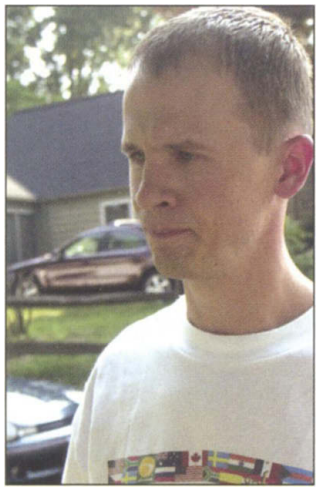
BIOTERRORISM

## 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

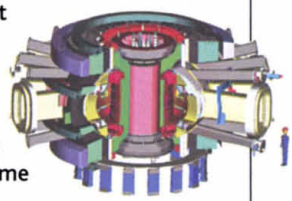
## ScienceScope

**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

serves in the National Guard, says the case has already caused his name to be added to an immigration watch list: When his military unit reentered the United States after training in the Caribbean, he notes, he was delayed for hours while FBI officials checked out his story. "It's gotten Kafkaesque," he says.

University officials, meanwhile, have watched with concern as Foral's case has unfolded. Some schools, such as the Massachusetts Institute of Technology in Cambridge, had already hinted that the criminal sanctions and security requirements imposed by the Patriot Act and the more recent bioterrorism law (*Science*, 31 May, p. 1585) might force them to end research on regulated agents such as anthrax. "Many researchers are still unaware of these laws," says Atlas. "Deans are terrified," he adds, that one of their students could be next.

–DAVID MALAKOFF

PSYCHOLOGY

## Violent Effects of Abuse Tied to Gene

Some children who suffer physical, sexual, or emotional abuse become violent adults. But many do not. Now a new study of both genetics and social surroundings points to the influence of a particular genotype on aggressive behavior in young adults from a troubled background.

On page 851, a team led by clinical psychologists Terrie Moffitt and Avshalom Caspi, both of King's College London and the University of Wisconsin, Madison, reports that a certain form of a gene that breaks down neurotransmitters makes men more likely to be violent, but only if they were maltreated as children. "This is a very important piece of work," says geneticist Greg Carey of the University of Colorado, Boulder. "It's pretty convincing for just a single study."

The gene codes for an enzyme called monoamine oxidase A (MAOA), which metabolizes several kinds of neurotransmitters in the brain. By getting rid of excess neurotransmitters, MAOA helps keep communication between neurons functioning smoothly. Studies of lab animals show that knocking out the *MAOA* gene makes adult mice more aggressive. The first suggested evidence in humans came from a 1993 report of a Dutch family (*Science*, 18 June 1993, p. 1722). Several men in this family had a defective *MAOA* gene—none of the enzyme was found in their cerebrospinal fluid—and were prone to impulsive bouts of aggression. But because the mutation is extremely rare, no one has replicated the finding in other families.

To see whether the *MAOA* gene influences aggressive behavior in the broader population, Moffitt and Caspi's team turned to New Zealand's Dunedin Multidisciplinary Health and Development Study. The study, begun in 1972, has followed 1037 children since birth. Hoping to get as homogeneous a genetic background as possible, Moffitt and Caspi selected 442 subjects with four white grandparents. "It's about as refined as it can be," Moffitt says.

As expected, the team discovered that severely maltreated boys were more likely to exhibit so-called antisocial behavior than boys who had suffered little or no abuse. But the researchers also found that antisocial behavior was more likely in males with the genotype for low *MAOA* activity who had been mistreated. The 55 boys in this group were about twice as likely to have been diagnosed with conduct disorder in adolescence as the 99 mistreated boys with the high-activity genotype. And they were three times more likely to be convicted of a violent crime by age 26. Although the 55 males who had experienced moderate or severe maltreatment and also had the low-activity genotype made up only 12% of the study group, they committed 44% of the crimes. "They're doing four times their share of rape, robbery, and assault," Moffitt says.

But environmental influences were critical, Moffitt found. In the absence of abuse, having the low-activity genotype didn't make boys any more likely to be antisocial. Jon Beckwith of Harvard Medical School in Boston agrees, although he'd like to see the finding replicated: "I would use this as a wonderful class example of how social factors can play an enormous role in expression of behavioral traits." Moffitt views the results as an example of how accounting for environmental factors can help reveal a gene: "Finding the stressor can be a magic key."

**Two strikes.** Men who have a certain genotype for a brain enzyme—and were abused—tend to be more prone to violence.

CREDIT: JAY DICKMAN/CORBIS

There are caveats. The link between the *MAOA* alleles and the activity of the enzyme in these males is only inferred, Beckwith points out. Also potentially confounding the study is that antisocial behaviors might depend on social situations, not just genes, adds sociologist Troy Duster of New York University.

Replicating the results will be important, researchers say, although this might be easier than in previous studies because the sample was drawn from the general population. Confirmation could also lead to better intervention strategies. Social workers and therapists would benefit from knowing which abused kids are most at risk, notes criminologist Alfred Blumstein of Carnegie Mellon University in Pittsburgh.

Legal implications are less clear. Although some attorneys might argue that the *MAOA* genetic defect results in diminished capacity, Hal Edgar of Columbia Law School in New York City doesn't think judges will buy it. "This particular study in and of itself is not going to shape the [legal] culture," he says. And experts warn that it's much too early to discuss whether drugs might counter the effects of low *MAOA* activity.

Experts also say that it's important to remember that many genes probably influence violence and other antisocial behaviors. Or as Carey says, the strongest genetic marker for violence is still the presence of a Y (male) chromosome. –ERIK STOKSTAD

NEUROSCIENCE

## Long-Awaited Technique Spots Alzheimer's Toxin

**STOCKHOLM**—Alzheimer's disease is notoriously difficult to diagnose, particularly as it begins to take hold. Researchers suspect that therapies, when they become available, will work best if given early, however, raising the need for a test that spots the first signs of this dementia-causing disease. On 24 July at the International Conference of Alzheimer's Disease and Related Disorders here, a team revealed the first images from a positron emission tomography (PET) technique that picks up one of the defining—and first—features of Alzheimer's disease.

"People are going to point to this particular presentation and say, 'This is when we started making progress' " on visualizing Alzheimer's disease, says Mark Mintun of Washington University Medical Center in St. Louis, Missouri. This putative marker, as well as others reported at the meeting, could be invaluable not only for diagnosis but also in clinical research, conference attendees say.

Clinicians settle on a diagnosis of