Research & Development Foundation (ARDF), which had sued USDA.

Under the settlement, USDA agreed to reverse the agency's 30-year-old policy of exempting rodents and birds—which constitute 95% of research animals—from regulation under the Animal Welfare Act. The settlement was opposed by a coalition of research groups that included the National Association of Biomedical Research (NABR), the Association of American Medical Colleges, the Federation of American Societies for Experimental Biology, and the Association of American Universities.

To achieve its ends, the coalition enlisted Wallace Conerly, dean of the University of Mississippi Medical Center in Jackson. He telephoned Cochran, the third-ranking Republican on the Senate Agriculture Committee. Cochran responded by adding language to the agriculture appropriations bill that prevents USDA from drafting the new animal-care regulations during the 2001 fiscal year, which began on 1 October. The bill faces a threatened veto by President Bill Clinton on other issues, but Cochran's provision is expected to survive.

The ban "is great news," says Conerly, who worries that new rules would "cost [his university] millions of dollars." NABR's Barbara Rich says the delay will allow policy-makers to "take full consideration of the [settlement's] consequences for research." The issue, she predicts, "isn't going away."

–DAVID MALAKOFF

RESEARCH MISCONDUCT

Texas Scientist Admits Falsifying Results

A University of Texas (UT) immunologist has admitted to federal officials that he falsified research results over at least a 5-year period, leaving a trail of retracted papers and disgruntled collaborators. The scientist, who resigned and has been barred from receiving federal research grants, was found to have repeatedly duped colleagues by spiking test tubes with doses of a radioactive marker that produced positive results, according to detailed reports by UT and federal investigators.

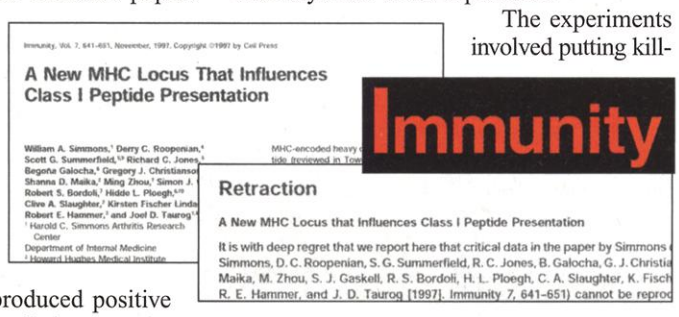
Last month, the federal Office of Research Integrity (ORI) announced that William A. Simmons of UT Southwestern Medical Center in Dallas had signed a statement admitting misconduct and accepted several penalties, including a 5-year ban on receiving federal research grants. ORI investigates misconduct allegations involving studies funded by the National Institutes of Health (NIH). Officials at the medical center, where Simmons worked under medical professor Joel Taurog, said in a statement that they are considering "further disciplinary action." This could include financial penalties and the revocation of his 1996 Ph.D.

Simmons could not be reached for comment, and Taurog declined to speak to *Science*. The following account is based on ORI and university investigation records obtained through the Freedom of Information Act.

Simmons enrolled as a graduate student at UT Southwestern in 1989. After receiving his degree in 1996, he won a postdoctoral position in Taurog's lab, which uses transgenic rats and mice to study the role of the gene *HLA-B27* in a group of autoimmune diseases, including a painful spinal arthritis known as ankylosing spondylitis. Over the next 2 years, Simmons published a series of papers, including a 1997 *Immunity* paper (see box) suggesting that an undiscovered gene—dubbed *Cim2*—influences *HLA-B27*'s behavior. Efforts to find *Cim2*, however, stalled after Simmons left Taurog's lab in 1998 for a corporate job. The postdoc who replaced Simmons "had almost no success in reproducing any of" Simmons's work, according to ORI records, and Simmons was rehired as an untenured faculty member in April 1999 "to help straighten out" the research.

Within days Simmons's work came under suspicion, however, when an unidentified coworker observed him pipetting fluid into vials used to test the activity of certain immune system cells. The procedure was not consistent with the experimental protocol. Returning later to investigate, the co-worker discovered a wash bottle and testing vials full of radioactive chromium 51—a substance that should not have been present in the vials until days later in the experiment.

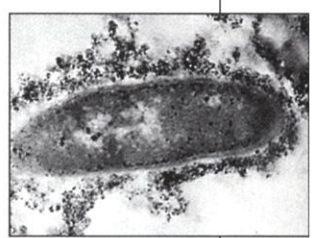
The experiments involved putting killer T cells and radioactive target cells together in the vials, then assessing the activity of the killer cells by measuring the radioactivity released by the target cells. By adding predetermined quantities of the radioactive chemical to the vials, investiga-



Taking it back. Misconduct case leads to retraction of 1997 paper in the journal *Immunology*.

ScienceScope

In the Zone Earth science chiefs at the National Science Foundation will need to think harder about how to take advantage of new technologies and findings. That's the conclusion of a National Research Council panel that is urging a two-thirds boost in the program's $100 million annual budget.



The committee's report (www.nap.edu/books/030907133X/html), released last week, points to research on the "Critical Zone"—where water, air, rock, soil, and life come together—and in the emerging field of geobiology, among others, as worthy of investment. The panel suggests cooperative planetary efforts with NASA and natural laboratories, such as turning deep-drilling sites into long-term observatories.

The committee, chaired by geophysicist Thomas Jordan of the University of California, Los Angeles, says that increased spending must not ignore "the single most important mechanism" for keeping earth science strong—research by individuals and small groups of investigators. It also "strongly endorses" the proposed EarthScope (*Science*, 26 November 1999, p. 1655).

A Thirst for Science An apocalyptic advertisement last week in Slovenia's largest daily newspaper warns of the dire effects of federal budget cuts to research and rallies support for a national walkout.

The ad, paid for with $5 contributions by hundreds of scientists, warns that research budgets are so thin that some institutes may be forced to close. Per capita spending has fallen to $60 per person, it declares—"enough for a dozen pizzas—without beer." The ad, which proclaims "the end of science," is part of a protest that was to culminate in a 2-hour walkout by researchers and professors on 13 October.

Slovenia, an ex–Yugoslav republic the size of New Jersey, is far from an economic basket case, and its science has been considered among the best funded in formerly communist European states. But the pedestal beneath Slovenian science is crumbling, say researchers. "The government has to act quickly, or this decline will be irreversible," complains Vito Turk, the biochemist who heads the country's biggest research center, the Jožef Stefan Institute. The ad and work stoppage are also aimed at candidates running for parliament on 15 October.

tors say, Simmons produced results that were in line with expectations.

After university officials were told of the co-worker's suspicions, they decided to investigate by laying an artfully designed trap. Simmons was asked to test cells that he was told should produce one type of result when, in fact, they should have produced the opposite. ORI documents explain that the test was designed to rule out the possibility that the whistle-blower was acting out of "possible frustration or anger at being unable to replicate Dr. Simmons['s] work [and] had himself spiked the vials." Simmons failed the test, and on 29 April 1999 university officials placed him on administrative leave. He resigned 2 months later following an investigation by three UT Southwestern academics—Frederick Bonte, head of the radiology department; Paul Bergstresser, head of the dermatology department; and James Forman, an immunology professor.

Simmons also falsified results on samples sent to him by collaborating researchers, concluded a subsequent investigation conducted by ORI. "A preponderance of the evidence" showed that Simmons had "systematically" falsified results "throughout his tenure as a graduate student and postdoctoral fellow," states the ORI report. Despite earlier denials of the allegations, Simmons signed an ORI settlement agreement on 10 August that called for the retraction of the 1997 *Immunity* paper and three others published since 1993 in the *Journal of Immunology and Immunogenetics*. A table in a 1998 *Journal of Experimental Medicine* paper was also withdrawn.

In the aftermath of the revelations, some of Simmons's former collaborators at The Jackson Laboratory in Bar Harbor, Maine, and the Wellcome Human Genetics Center in Oxford, U.K., are taking a tougher approach to cooperative research. "It's made me much more careful," says Derry Roopenian of the Jackson Lab, noting that he now deliberately hides the identity of reagents and other shared molecular tools from cooperating researchers in order to "blind" experiments. But most of all, Roopenian is upset that a number of young scientists—in his lab and elsewhere—"wasted a lot of time and money trying to reproduce results that weren't real to begin with."

–DAVID MALAKOFF

BIOTERRORISM

Experts Call Fungus Threat Poppycock

CAMBRIDGE, U.K.—The script seems straight from a John LeCarré novel. A former bioweapons lab in Uzbekistan tinkers with a fungus that destroys opium poppies, which Western antinarcotic teams then unleash on poppy fields in Afghanistan. Furious, Afghan heroin cartels retaliate by modifying the fungus to kill food crops in Western countries.

Far afield. British documentary on how an opium fungus could become a bioweapon is greeted with skepticism.

True? A documentary that was aired last week by the BBC and created a stir here paints the scenario as plausible. But experts contacted by *Science* play down the threat.

The real-life story begins in December 1989. A Soviet deputy minister "raised the issue of biological control of illicit narcotic crops" with a U.S. assistant secretary of state, according to Eric Rosenquist, head of the narcotics research program at the U.S. Department of Agriculture's Agricultural Research Service (ARS). The Soviet Union then approached the United Nations Drug Control Program (UNDCP) with proposals to develop biocontrol agents against opium poppies and marijuana plants that may be more effective and environmentally benign than herbicides, including 2,4-D and glyphosate. After the Soviet Union unravelled, several institutes—including some former bioweapons labs—pursued these proposals with help from the UNDCP.

One such lab, the Institute of Genetics in Tashkent, Uzbekistan, approached the U.S. embassy in Tashkent in May 1996 with its research on a naturally occurring fungus, *Pleospora papaveracea*, that kills poppies by attacking their roots. The institute, which the Soviet military had backed to develop agents to destroy crops, subsequently received U.S. and British funding.

The institute is now testing a version of *P. papaveracea* that can be sprayed from a plane. Research shows that the fungus doesn't affect any of 130 closely related plant species. On a recent visit by *Science* to the lab, institute director Abdusattar Abdukarimov said that the treatment could be deployed in a few years and that the research site, near the Afghan border, is heavily guarded.

The BBC program, "Britain's Secret War on Drugs," recycles concerns raised 2 years ago in the media that the Uzbek institute's efforts "touch the edge of biological warfare." In the program, Paul Rogers, a plant pathologist at the University of Bradford in the U.K., says the work "is providing new evidence as to how biological warfare could be used against crops." He later told *The Guardian* that "drug cartels could themselves acquire the technology and in revenge attacks use a form of agricultural terrorism against Britain or the U.S."

Other experts, however, play down such fears. "If drug cartels did acquire the fungus, they would have to adapt it to become a pathogen of food crops, and this would not be a trivial project," says plant pathologist Jan Leach of Kansas State University in Manhattan. Rosenquist questions whether *P. papaveracea* will ever become the weapon of choice against opium poppies. So far, he says, from the ARS's perspective the field tests have fallen short of showing its effectiveness as a herbicide.

Ironically, learning how *P. papaveracea* behaves and how to target it to certain fields may someday protect legitimate opium poppy plantations. The Uzbek work, says Rosenquist, could help "safeguard world supplies of analgesics" such as morphine.

–RICHARD STONE

CHEMISTRY

New Reaction Promises Nanotubes by the Kilo

Nine years ago, the news roused the slow-but-steady world of organic chemistry like a double espresso: Japanese researchers had discovered that carbon atoms can assemble themselves into tiny tubes with amazing properties. One hundred times as strong as steel and able to conduct like either metals or semiconductors, carbon nanotubes were soon being touted for uses as down to earth as lightweight fuel tanks and car bumpers and as fanciful as cables for elevators into space. The hitch, so far, has been that the most promising tubes—single layers of carbon atoms arrayed like sheets of rolled-up chicken wire—can be made only by the thimbleful. As a result, they have cost up to $2000 a gram, enough to make a single nanotube-based fuel tank worth more than a fleet of Lamborghini automobiles. But perhaps no longer.

At a meeting in Boston* last week, researchers from Rice University in Houston,

* American Vacuum Society, 47th International Symposium, Boston, Massachusetts, 2–6 October.

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