

SCIENTIFIC COMMUNITY

Grim Day for Turkish Science as Six Academics Get Long Prison Terms

the muscle tissue; growing the meat in a sterile environment and replacing humans with robots could solve that problem, Post says.

Then there is the problem of exercise. Muscles get bulky when they are used, but shreds of muscle in a dish don't exercise. Initially, Post tried stimulating the tissue mechanically or with electric shocks. Later, he found that placing two Velcro anchor points in the petri dish did the trick: The muscle cells spontaneously formed small fibers that stretch between the two points. But sometimes they pulled away from the Velcro, and at the press event, Post said that he now places a column of agarose gel in the middle of the dish and pipettes the cells around it. The muscle cells attach to each other, forming a doughnut-shaped piece of beef that contracts and thickens in a kind of in vitro training regimen.

For the patty, tens of thousands of these beef circles were turned over to Peter Verstrate, a self-employed food technologist in the Netherlands, who cut the rings to produce shreds of meat about a centimeter long, which he ground up. He added breadcrumbs and some binder to improve the texture, but color was a problem: Because of a lack of myoglobin—the oxygen-carrying molecule that makes muscle tissue red—the meat looked white. A mix of beetroot juice, saffron, and a little bit of caramel made the raw burger look a pinkish red and helped it turn brown while cooking.

The end result won't win any gastronomy awards. "The surface was surprisingly crunchy," Rützler says, but the inside did not have the meaty taste she was expecting. The other taster, Chicago, Illinois-based journalist Josh Schonwald, noted that the meat had a "familiar mouthfeel," but said the taste wasn't quite like a real burger, in part because of the absence of fat. Post said that adding fat-producing cells is one of the many challenges that this field is still facing.

Supporters of "cultured meat"—as Post prefers to call his creation—say such issues can be solved later. "Post's demonstration is a proof of concept. The message is that it is doable," says Gabor Forgacs, who is trying to build bigger pieces of meat from muscle cells using 3D printing technology at the University of Missouri, Columbia. "This is no longer a strange idea," adds Cor van der Weele, a biophilosopher at Wageningen University in the Netherlands who studies public attitudes toward cultured meat. The lack of science at Monday's event did not bother her. "Mark Post is not making a secret of the fact that he is not doing science here," she says. "The science will come once the money comes in." —**KAI KUPFERSCHMIDT**

The rift between Turkey's government and many of its scientists became a chasm this week when half a dozen academics were among hundreds of defendants convicted of crimes ranging from terrorism and treason to "insulting Turkishness." The trial, which has dragged on for 5 years, ended on 5 August in a courtroom in Silivri, west of Istanbul, when all the accused academics were sentenced to between 10 and 23 years in prison.

Outside Silivri, riot police used tear gas to disperse thousands of protesters. The verdicts are also drawing condemnation from human rights organizations and academics elsewhere. "I am greatly disappointed," says Peter Diamond, an economist at the Massachusetts Institute of Technology in Cambridge who visited some of the accused in prison. "Their detention is a violation of human rights."

According to the Turkish government, the 275 people rounded up since 2008 are connected to an alleged secret organization of secular elites known as "Ergenekon" that have been plotting to overthrow Turkey's democratically elected government, controlled since 2002 by the religiously conservative Justice and Development (AK) Party. Critics contend that the AK government is using the trial to punish critics and political opponents, including secular, liberal academics.

One professor who has become a cause célèbre in the scientific community is Kemal Gürüz, a chemical engineer sentenced to 13 years and 11 months in prison. "No credible evidence [against him] was ever produced," says Carol Corillon, executive director of the International Human Rights Network of Academies and Scholarly Societies (IHRN) in Washington, D.C. Gürüz has spent the past year in jail during the court proceedings, during which time his health has deteriorated due to a blocked artery. According to family members, Gürüz has grown despondent and attempted suicide by cutting his wrists in his prison cell in June. He faces another trial, on similar charges, slated to start in September.

Some of Gürüz's colleagues insist that the true motivation behind his conviction is political revenge. Gürüz chaired Turkey's

Council of Higher Education during the previous administration. One of the most controversial policies during his tenure was a ban on female university students wearing headscarves, a Muslim practice. The ban had been passed by Turkey's parliament, but religious conservatives blame Gürüz for enforcing the ban on campuses, says Aslı Tolun, a molecular biologist at Boğaziçi University in Istanbul. Once it came to power, the AK Party



Hard time. Kemal Gürüz grew so despondent in prison that he attempted suicide in June. On 5 August he was sentenced to nearly 14 years in prison.

reversed that policy, as well as many others intended to counteract religion in Turkish higher education.

The other jailed academics, all accused of involvement in the conspiracy to overthrow the government, are medical professors and presidents of Turkish universities during the previous administration. They received lengthy terms. The sole glimmer of good news was that at least three of the academics, including Mehmet Haberal, will be released from prison for the time being. Haberal is one of Turkey's most accomplished doctors, a transplant surgeon with an active research laboratory. Although he was sentenced to 12 years and 6 months of prison time, he was freed pending an appeal. He is suffering from liver disease and was reportedly ill after receiving no medical treatment in prison.

All the academics found guilty this week plan to appeal their convictions. IHRN, which issued a report last week that found no convincing evidence that any of them committed a crime, is helping the families of the accused

academics contact other international rights organizations. “We will not give up until justice is done in these sad cases,” Corillon says.

The persecution of academics who don’t see eye to eye with the government is likely to continue. “Currently there are hundreds of academics in similar situations,” who may face reprisals for holding views at odds with the government, says Çiğdem Atakuman, an archaeologist at Middle East Technical University in Ankara. Turkish academics who study “dangerous topics” such as the Kurdish or Armenian minorities, evolution, or secular

democracy are at risk of being “excommunicated from academia,” she says. Atakuman says she is disappointed that “despite all the outcry of Turkish academics,” the European Union and United States haven’t brought any pressure to bear on the Turkish government.

Discouraged Turkish scientists may take heart from Atakuman’s own story. She was chief editor of a popular science journal published by the government until she ran an issue in 2009 celebrating Charles Darwin, whose theory of evolution does not sit well with many supporters of the AK-led govern-

ment. After losing her position over the publication, Atakuman sued the government for lost wages and damage to her reputation. Last week, she won the first of two cases.

Gürüz and his five colleagues facing more than a decade in prison can only hope for a similar vindication when their appeal is heard. “Throughout my life, I have pursued academic excellence and upheld human intellect above all,” Gürüz penned in an essay in prison last year. “Where I should get rewarded, I now get punished.”

—JOHN BOHANNON

ENVIRONMENTAL POLICY

House Subpoena Revives Battle Over Air Pollution Studies

Republicans in the U.S. House of Representatives have taken an old battle over the health data that underlie Clean Air Act regulations to a new level. For the first time in 21 years, the House science committee has issued a subpoena, demanding confidential data from the Environmental Protection Agency (EPA). Committee Chair Lamar Smith (R-TX) has said that if EPA does not oblige, he may go after the institutions that conducted the groundbreaking studies decades ago.

Since 2011, Smith has made repeated requests to EPA for what he calls the “secret science” used to justify regulations that the agency promulgates under the Clean Air Act. Smith argues that the public should have a chance to scrutinize the data from two federally funded studies: the so-called Harvard Six Cities Study and a body of related data gathered by the American Cancer Society (ACS). Yet critics say the move is designed to allow industry to attack what is widely considered to be seminal work on the health impacts of air pollution. The latest move is “déjà vu all over again,” says economist C. Arden Pope of Brigham Young University in Provo, Utah, an author of both studies.

In the 1993 Six Cities study, published in *The New England Journal of Medicine*, Harvard researchers followed more than 8000 participants for 14 to 16 years and found an association between the risk of death from lung cancer and cardiopulmonary disease and exposure to particulate matter, or soot, in the air. Two years later, some of those same researchers used ACS’s much larger patient database to support the

connection between air pollution and mortality in Cancer Prevention Study II. Both studies were cited in EPA’s tightening of soot standards last December.

The battle over Six Cities is almost as old as the study itself. In 1997, EPA issued new air quality standards based on the Six Cities findings, placing the first limits on fine parti-



Mounting evidence. Chair Lamar Smith is apparently unpersuaded by the stacks of research, handed to him by Democrats, in support of air pollution regulations.

cles (2.5 micrometers across or less), whose sources include vehicle exhaust and industrial smokestacks.

Industry representatives demanded that the raw data be made public so the findings could be checked for errors (*Science*, 25 July 1997, p. 467). Harvard refused, citing confidentiality agreements with the study participants. The researchers had collected birth and death dates, smoking habits, diet, and health information including the presence of cancer and lung disease. In a compromise, Harvard shared the data with the Health Effects Institute (HEI), a nonprofit research organization partially funded by the auto

industry. HEI convened a team of independent scientists, which confirmed the findings in a study published in 2000.

At a contentious committee meeting last week, ranking member Eddie Bernice Johnson (D-TX) placed that HEI study in front of Smith, along with thousands of pages of other peer-reviewed research supporting the studies. She asked that the stacks be inserted into the committee record “since the Majority has claimed they don’t have enough science to review.” House Democrats also argued that most of the information requested was already available to legitimate researchers. ACS has a procedure for sharing its data with other institutions.

“I have to assume you will be passing this data to—excuse my language—industry hacks,” Johnson said in her opening statement Thursday. Smith asserted the data would be shared with “various reputable entities and organizations” and would be “de-identified” so that no names would be made public. But because the six cities were small, it would be easy to quickly figure out who the participants were, according to Pope.

The resolution was passed on 1 August in a vote strictly along party lines. It authorizes subpoenas for EPA as well as “other custodians of research data,” which could include both Harvard University and ACS, Smith said. Only EPA has received a subpoena so far, directing EPA Administrator Gina McCarthy to produce the data by 19 August. The agency has not indicated what it intends to do.

—KELLY SERVICK