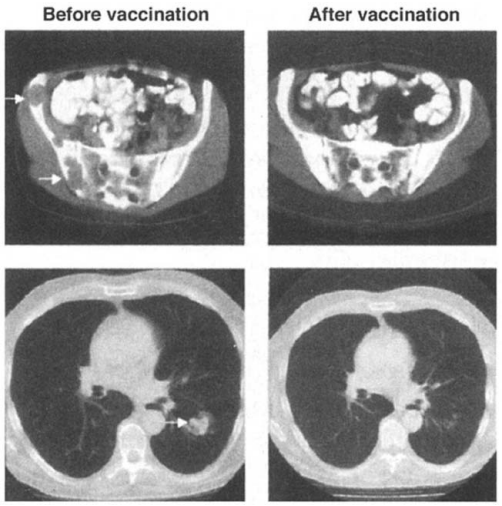
whether the data are valid.

The paper "was not prepared according to good scientific practice," according to the Göttingen panel. First author Alexander Kugler, a urologist who has since left Göttingen, drafted the manuscript so sloppily that inaccuracies made their way into the published paper, the committee said, faulting his selection of subjects and the documentation of illustrations and techniques. None of the other 14 authors, the committee found, was guilty of scientific misconduct. The university says it will release the full report when the authors have resolved the paper's fate with *Nature Medicine*, which published it in March 2000.

The paper made headlines around the world. It reported that patients suffering from advanced kidney cancer had been injected with cells formed by fusing their own tumor cells with dendritic cells, a type of immune cell that helps trigger the body's defenses. The idea—which has shown promise in many animal trials—was to prompt a tumor-specific attack by the patient's immune system. Of 17 patients, the paper reported, four enjoyed a complete remission, two more experienced partial remission, and one showed "mixed results." Kugler and Gernot Stuhler, a co-author from the University of Tübingen, won a $22,000 prize for their work from the German branch of Abbott Laboratories. (Stuhler says the money was never awarded.)



Before and after? Figure 3 from the disputed paper. An investigating committee found that the lower right CT scan is from a patient who was excluded from the study, and the origin of the scan at lower left is in dispute.

CREDIT: A. KUGLER *ET AL.*, *NATURE MEDICINE* 6, 335 (2000)

But doubts began to surface shortly after the paper was published. Biophysicist Ulrich Zimmermann of the University of Würzburg, an expert in cell fusion, criticized the methods the paper described for preparing the fused cells. He charged that the patients had been treated with an ill-defined "brew," which could have even been harmful due to impurities introduced during the electrical fusion treatment.

Peter Hans Hofschneider of the Max Planck Institute for Biochemistry in Martinsried and two colleagues were tipped off to other possible irregularities by an anonymous whistleblower. These concerns, widely reported in the German press, prompted formal inquiries at both Göttingen and Tübingen.

In July 2001, the University of Tübingen announced that it had found no evidence of misconduct by Stuhler. The Göttingen inquiry ended only this month, slowed by Germany's strict privacy laws that restrict access to patient data (*Science*, 7 June, p. 1778). In spite of its criticisms of the paper, the Göttingen committee concluded that no patients were harmed by the study. "Despite all the inaccuracies we found, some of the patients seem to have responded to the treatment," says Hans-Jürg Kuhn, the head of the investigation and a professor of anatomy.

Hofschneider is not satisfied with the conclusions of the investigation. He believes that the investigators should have examined more carefully what each author contributed to the paper and that it is too easy to blame only the first author, who is no longer in research. Kugler is now a senior physician at a hospital in southern Germany.

But Rolf-Hermann Ringert, the corresponding author on the study and Kugler's former supervisor, believes that the report is fair: "There is a high degree of sloppiness, but there has been no fraud and no recklessness." Ringert has offered to publish a clarification in *Nature Medicine*, but he says he sees no reason for a retraction.

Dolores Schendel of the National Research Center for Environment and Health in Munich, who works on vaccine therapies for renal cancer, is concerned that Göttingen's public statements aren't sufficient for those who need to know whether they can trust the findings. Since publication, the *Nature Medicine* paper has been cited more than 200 times, but there have been no published results using the same technique. However, several scientists told *Science* that as many as four papers on the technique are about to be submitted. Indeed, a trial almost identical in design to the one in Göttingen was launched 6 November by Genzyme Molecular Oncology.

Oncologist David Avigan of Beth Israel Deaconess Medical Center in Boston, who is directing the trial, says the preclinical data are strong enough to justify additional work. He says the *Nature Medicine* paper "was a tantalizing result, but one is always skeptical of a small trial."

–ADAM BOSTANCI AND GRETCHEN VOGEL

Adam Bostanci is a science writer in Exeter, U.K.

ScienceScope

Cells on Ice French researchers will have to wait a little longer to get imported stem cells. France's Council of State last week suspended an earlier government directive allowing researchers to import human embryonic stem cells from other countries (*Science*, 5 April, p. 27). Former research minister Roger-Gérard Schwartzenberg had approved the imports pending the approval of a revised bioethics law that would allow French scientists to produce their own cell lines.

The decision follows the filing of a lawsuit against embryo imports by the Alliance for the Rights to Life, a group supported by France's Catholic Church. The courts are expected to decide the suit early next year, but the case will be moot if Parliament approves the new bioethics law. Although the bill was introduced under the previous Socialist government, it is reportedly supported by key members of the current conservative regime, including research minister Claudie Haigneré. Geneticist Axel Kahn, director of the Cochin Institute in Paris, says, "The prognosis is that the law will pass."

Rubinstein to Big Apple The beleaguered New York Academy of Sciences has a new boss. Former *Science* editor Ellis Rubinstein became president of the 185-year-old institution this week, ending a yearlong search. He replaces Rodney Nichols, who resigned last year amid disagreements over how to stem the academy's financial woes (*Science*, 8 March, p. 1824).

Rubinstein, 56, has worked as a journalist and administrator in a variety of settings, including at *Newsweek* and *IEEE Spectrum*. He became *Science*'s news editor in 1989 and is credited with helping bring the magazine into the Internet era. He gradually moved away from journalism, spearheading an array of ventures, including Web sites focused on young scientists (www.nextwave.org) and research on aging (www.sageke.org). He shed his title as *Science*'s editor earlier this year.

Rubinstein says he wasn't seeking a new job and that the academy "sought me out." He aims to reinvigorate the 22,000-member organization by making it a more active presence in New York City and catering more to the needs of younger scientists. Nobel laureate Torsten Wiesel, who chairs the academy's board, says Rubinstein's "experience in business development and scientific publishing will serve the academy's needs at this crucial time."

ESS backers are putting a brave face on the disappointing news. Peter Tindemans, chair of the ESS council, insists that the council's decision is actually a welcome sign. "There is broad support for neutrons, and I am certain the final assessment will be positive," he says. Others are less sanguine. ESS "is not dead in the water, but it certainly missed a major opportunity," says nuclear physicist Claus-Konrad Gelbke of Michigan State University in East Lansing.

The council's recommendations leave TESLA and other highly rated projects with one last hurdle: the German government's final decision on funding, which is expected in 2003. In contrast, Gelbke notes, ESS "is scrambling to get its feet on the ground."

–GRETCHEN VOGEL

BANGLADESH

Agricultural Pumping Linked to Arsenic

In Bangladesh, groundwater has been both a blessing and a curse. Irrigation wells have helped end deadly famines. Yet millions of other wells dug to provide safe drinking water are laced with arsenic from ancient sediments, endangering human health. Now one study suggests that pumping for irrigation might be at least partly to blame for the poisoned water, although the finding is controversial.

On page 1602, a team led by hydrologist Charles Harvey of the Massachusetts Institute of Technology concludes that agricultural pumping might influence the release of arsenic into drinking water. That could signal the need for deeper drinking-water wells. "This is really important" if true elsewhere in the country, says physical chemist Stephan Hug of the Swiss Federal Institute for Environmental Science and Technology (EAWAG) in Dübendorf. But Hug and other experts caution that the finding might not be broadly applicable.

Arsenic levels in some drinking-water wells are high enough to thicken and discolor skin and raise the risk of various cancers. One explanation for the presence of dissolved arsenic, suggested in the late 1990s, was that irrigation pumping lowered the water table, leading to oxidization of the arsenic-bearing pyrite. Researchers at the British Geological Survey and University College London (UCL) later disproved this idea. UCL researchers favor another geochemical mechanism: Organic material from buried peat has been reducing iron oxides and releasing arsenic into the water ever since the last ice age.

But Harvey suspected that irrigation must play a role. During the dry season, a tremendous amount of water is pumped from the ground; this water is later replaced by monsoonal rains and local surface water. The heightened circulation "clearly brings in and transports chemicals through the aquifer," Harvey explains. These compounds—say, carbon from sewage—could change water chemistry in a way that might trigger the release of arsenic from the sediments. To test the idea, he and colleagues at the Bangladesh University of Engineering and Technology in Dhaka and other institutions studied the groundwater chemistry in the Munshiganj District, outside Dhaka in southern Bangladesh, where many drinking-water wells are seriously contaminated.

The researchers drilled 15 new wells and then set out to alter groundwater chemistry as they suspect pumping does. In one case they injected water containing molasses, which is rich in organic carbon; arsenic levels increased substantially within days. Harvey suspects that the increase occurred because the organic carbon reduced and then dissolved the iron oxides that bear arsenic. In another experiment, injections of nitrate caused arsenic levels in the aquifer to plummet 80%, also within days. Nitrate oxidizes dissolved iron, Harvey explains, which then precipitates along with arsenic. The team believes that irrigation pumping might lower or raise arsenic levels by either mechanism, for example, by pulling in oxygenated water from sandy sediments or by drawing down organic carbon-rich water from ponds and channels.

CREDIT: C. HARVEY

Trigger. Irrigation pumping in Bangladesh can release arsenic into groundwater.

At the study site, the researchers believe that this latter mechanism has spiked the drinking water with arsenic. In the upper part of the aquifer, inorganic carbon and methane—byproducts of carbon-based reactions that liberate arsenic—are roughly 40 years old, about the same age as irrigation pumping. "The message is clear," comments Michael Berg, an environmental chemist at EAWAG. "If you pump a lot of

ScienceScope

Moving On Up A new NASA budget plan is good news for space station science and bad news for a next-generation space shuttle. The preliminary 5-year plan, presented to Congress last week, sets aside more money for biological and physical research on the orbiting laboratory. But it would also curtail work on a reusable spacecraft to replace the aging shuttle in favor of a more conventional small winged vehicle.

In the new scenario, NASA would fly five rather than four shuttle missions a year starting in 2006, allowing more research aboard both the shuttle and the station, and pump an additional $75 million into science payloads through 2007. Meanwhile, NASA would start work on the orbital space plane, which would ride aloft on an expendable launcher. The vehicle, which could be ready by 2010, would allow the station crew to accommodate seven astronauts rather than the current three, allowing more science to be done.

The plan won't cost more than NASA's current budget request, an important selling point for Congress. But some lawmakers want more information on crew size, the cost of research facilities, and shuttle maintenance. The last-minute request takes advantage of congressional inaction on NASA's 2003 budget.

Updates: Sonar and Fisheries Environmental groups challenging the deployment of a new U.S. Navy sonar have agreed to let the government conduct restricted tests. Last month, a federal judge in California blocked the Navy from testing the submarine-detection system in a 36-million-km^2 swath of the Pacific Ocean west of Hawaii, ruling that environmental regulators hadn't fully considered its impact on whales and other marine mammals (*Science*, 8 November, p. 1155). Under the deal reached last week, the Navy can run trials in a 2.5-million-km^2 slice of the contested region until next summer, when the judge expects to hear the full case.

In New England, conservationists, government officials, and the fishing industry last week asked a federal judge to delay imposing strict new catch limits pending resolution of the impact on population estimates of a misrigged research trawler (*Science*, 18 October, p. 515). Fishing groups claim that mismarked cables invalidated the estimates used to set new quotas, which are due to take effect next August. Government researchers disagree. Now, both sides want up to a year's delay to allow an independent review of the data.

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