itself was soon circulating in e-mails, and when outsiders learned about it last week, NIEHS apparently withdrew the order.

Huff, 64, is no stranger to controversy. Beginning in 1979, he helped develop a high-profile program at NIEHS that tests suspected carcinogens on mice and rats by feeding them chemicals over an entire lifetime. Regulators have used such long-term assays to decide which chemicals might cause human cancer—and have come under intense fire for using methods that industry believes exaggerate risk. Huff, the author of more than 300 published scientific papers, has defended the validity of these methods and publicly criticized attempts by NIEHS and industry officials to revise them. Last year Huff publicly blasted a $4 million NIEHS-industry research collaboration on the effects of chemicals on human reproduction and early development.

The draft agreement, which Huff says he received 23 July, came after NIEHS scientific director Lutz Birnbaumer asked Huff to stop other research and prepare a report on a topic Huff isn't interested in. In an e-mail, Birnbaumer said that the disagreement arose because Huff "has refused to review and summarize" an area of cell biology "in a timely manner."

The NIEHS agreement would have required Huff "not to send any letters, emails or other communications that are critical of NIEHS as an Institute or its scientific work to the media, scientific organizations, scientists, administrative organizations, or other groups or individuals outside NIEHS." It also states that if Huff violates the agreement and can't provide a satisfactory explanation to the NIEHS director, he must retire or resign "voluntarily" within a week, and that he must retire by December 2003 in any case. Francine Little, an NIEHS administrator whose name appears on the memo, declined to comment on it, describing it as a "confidential personnel matter." But she noted that it was part of a negotiation and not "a done deal."

News of the threatened action spread rapidly among toxicologists and public health advocates. Some said they were upset by what they saw as an attempt to silence internal dissent. Lorenzo Tomatis, former director of the respected International Agency for Research on Cancer in Lyon, France, who collaborates with Huff each summer at NIEHS, said the draft agreement "had the tone you would expect to find under a dictatorship." And Christopher Portier, director of NIEHS's environmental toxicology program, said he had not seen the memo firsthand, but "it sounds somewhat extreme."

Congress is getting into the fray as well. Representative Dennis Kucinich (D–OH), in a letter he sent last week to NIEHS director Kenneth Olden and Little, demanded information on Huff's case and NIEHS policies on gag orders. "NIEHS should be determining the incidence of human illness caused by chemical, pollutant, and other environmental causes, not putting a gag order on one [of] its best scientists," Kucinich wrote in an e-mailed statement to *Science*.

Olden, who was away on vacation, could not be reached for comment. But David Brown, an assistant to Olden, said Olden telephoned Huff on 2 August and offered him a new job in the director's office. Brown concludes, "There's no story now." Huff says he's encouraged by the offer but adds: "No commitments have been made. ... I want to see what they put in writing." –DAN FERBER

HIGH-ENERGY PHYSICS

Muon Measurements Muddle a Model

Scientists at Brookhaven National Laboratory in Upton, New York, hope they've made a momentous discovery: They have confirmed a nagging discrepancy between the Standard Model of particle physics and the "magnetic moment" of the muon. Physicists are still debating just how significant the mismatch is, however.

"That's what we're all asking ourselves," says Frank Wilczek, a physicist at the Massachusetts Institute of Technology. It's possible that the discrepancy is a statistical glitch or a problem with the theoretical calculations, or it might be a sign of physics beyond the Standard Model.

The new result, presented last week at a seminar at Brookhaven, is twice as precise as earlier results of the experiment, presented last year (*Science*, 9 February 2001, p. 958; 21 December 2001, p. 2449). In the experiment, known as muon g–2 (pronounced "g minus two"), scientists used a 14-meter-wide superconducting magnet in Brookhaven's Alternating Gradient Synchrotron to induce muons—heavier siblings of the electron—to curve around in a circle. In the process, they measured the muon's propensity to twist in a magnetic field, known as its magnetic moment. They have now measured the value to an uncertainty of 0.7 parts per million. "It's just an awesome experiment," says Wilczek.

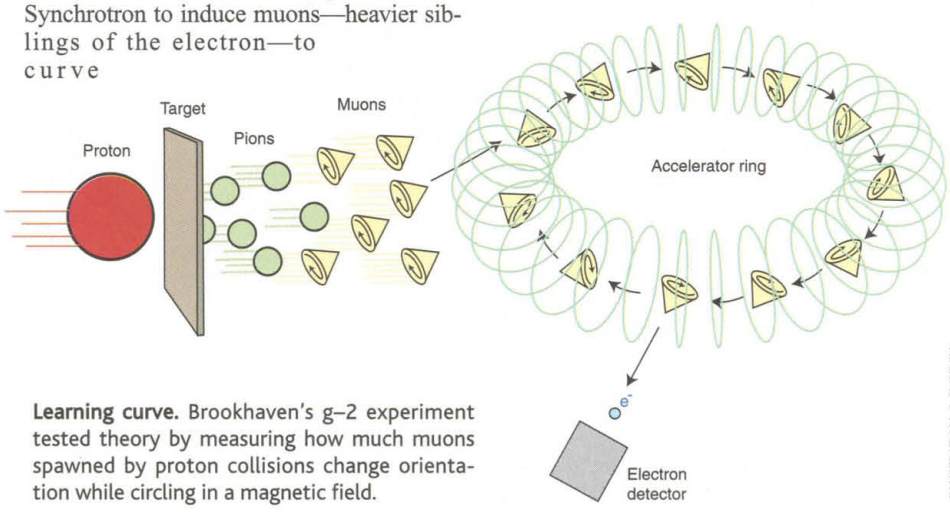
The results give "a very nice, consistent picture" of the magnetic moment, says Boston University's Lee Roberts, a member of the muon collaboration. "But the question for the theoretical community is ... what we should really be comparing it with."

Physicists would like to test the value against the Standard Model, the theoretical framework that explains how particles interact. The model predicts what the muon's magnetic moment should be. Unfortunately, at present it gives two different numbers.

That's because the theory relies on other experiments to fill in data that aren't easily calculated from first principles. Physicists can get the missing information either by studying electron-positron collisions or by watching the decay of tau leptons, other heavy siblings of the electron. The two methods should agree, but they don't.

According to team member James Miller of Boston University, this makes it hard to evaluate just how significant the disagreement between experiment and the Standard Model is. "We're not sure which number to take," he says. Using tau-decay data, the difference is a mere 1.6 standard deviations, which is not considered significant. Using published electron-positron data, the number jumps to 2.6 standard deviations, which is considered interesting but far from conclusive. However, using new, unpublished electron-positron data from the Budker Institute of Nuclear Physics in Novosibirsk, Russia, the significance jumps to 3.7 standard deviations—which, if true, would be a significant result.

"My first statement would be not to be in a hurry" to jump to a conclusion about the mismatch between theory and experi-



Learning curve. Brookhaven's g–2 experiment tested theory by measuring how much muons spawned by proton collisions change orientation while circling in a magnetic field.

ILLUSTRATION: C. SLAYDEN

ment, says Simon Eidelman, a physicist at the Budker Institute. Although Eidelman thinks that the Brookhaven experiment is "extremely beautiful from the physics point of view," he says it's too early to tell whether there's a problem with the calculations, with experiments that feed into them, or with the Standard Model itself. "When and where all this will converge, I can't tell," he adds.

Eidelman might have to wait a while to find out: The muon collaboration has some more data yet to be processed that should bring the error bars down a bit, but the White House budget contains no funding to continue the Brookhaven experiments. Experiments that study the B meson, such as BaBar at the Stanford Linear Accelerator Center in California and Belle at KEK in Tsukuba, Japan, might help narrow down uncertainties in the theory. However, it will be at least half a decade before the Large Hadron Collider at CERN, the European particle physics laboratory near Geneva, shows for sure whether the Brookhaven result is the sign of new physics or just an interesting twist in the same old story.

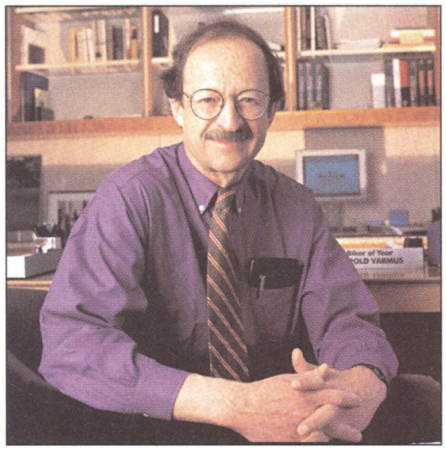
–CHARLES SEIFE

BIOMEDICAL RESEARCH

Panel Hears Ideas for Overhaul of NIH

Does the $23.5 billion U.S. National Institutes of Health need a major overhaul to trim its ever-growing fleet of 27 centers and institutes? Last week, an Institute of Medicine (IOM) panel that's begun investigating this question heard comments from current and former NIH directors. Two out of three said NIH would be better off if it were more centralized. But a former member of Congress who guided NIH funding injected a dose of reality, saying that "it is going to be a very daunting task" to overcome political pressures to maintain the status quo.

Congress asked for the study in a report accompanying a 2001 spending bill. Lawmakers wanted to find out "whether the current NIH structure and organization are optimally configured." The most prominent advocate of restructuring at that time was Harold Varmus, NIH director from 1993 through 1999. He spelled out his ideas in an article last year arguing that constantly adding new institutes, each with its own budget allocation, was becoming too cumbersome (*Science*, 9 March 2001, p. 1903). He called for reforming NIH into five institutes organized by disease group. In his plan, a sixth institute, "NIH Central," would house the NIH director and have much more power to shift funds among institutes than the director has now.



Nonproliferator. Harold Varmus thinks NIH needs fewer, not more, institutes.

Varmus explored his ideas with the IOM panel, which is chaired by former Princeton president Harold Shapiro and includes James Wyngaarden, another former NIH director (1982 to 1989). Varmus explained that, with 27 institute chiefs squeezed into a room, "it's very difficult to feel you're actually molding things." Administrators "got tired" of being pushed to do joint projects on zebrafish, mouse, and bioinformatics. "There is a serious misconnect between this checkerboard of institutes and how science is being done," Varmus said.

A leaner structure also received the support of Bernadine Healy, NIH director from 1991 to 1993, who suggested grouping NIH in four slightly different "clusters." Healy, however, thinks more institutes are fine; she even suggested two new ones for nutrition and rehabilitation. Current NIH director Elias Zerhouni didn't take a stand on restructuring. He asked the panel to think not only about "organizational change" but also "better management tools" to "optimize performance." He and others also suggested other questions, such as whether institute directors should have term limits.

Abolishing institutes is easier said than done. The same disease advocacy groups that have pushed to double NIH's budget over 5 years to $27.3 billion in 2003 also support their favorite institutes, and most institutes have congressional champions as well. Debra Lappin of the Arthritis Foundation reminded the group that "the American public owns the NIH." Redundancy, she suggested, could be a good thing, because consolidating could lead to "great orthodoxy" and "less competitiveness."

"Any attempt to eliminate individual institutes will meet probably very strong political resistance," former Illinois Representative John Porter told the group. However, he thought giving budget authority to a cluster director to move money around institutes within that cluster "is possible." This wasn't

ScienceScope

Science Cuts Coming? French Prime Minister Jean-Pierre Raffarin is considering major cuts to France's R&D budget, according to press reports last week. Finance ministry officials are thinking about cutting the $9 billion research account by 7.6% in 2003 to help the government make up for a slowing economy and deliver a promised tax cut, according to the daily *Libération*. But science minister Claudie Haigneré was reportedly campaigning against the idea, noting that the ruling party has also pledged to boost overall science spending to 3% of GDP by 2005. R&D spending currently accounts for 2.17% of GDP.

Anxious French researchers will know soon whether Haigneré's arguments fell on sympathetic ears: The budget proposal is due to be considered by the council of ministers on 18 September and then sent to Parliament for final approval.

Technically Sound Test Ban There are no major technical hurdles to verifying a global nuclear test ban treaty, a National Academy of Sciences panel concluded last week. The 11-member panel, led by Harvard University security expert John Holdren, concluded that monitoring technologies make it nearly impossible for cheaters to hide tests of even the smallest weapons, down to 1 kiloton. The findings undermine claims made by opponents of the 1996 Comprehensive Test Ban Treaty (CTBT), signed but never ratified by the United States.

Crater from 1962 blast.

The report, requested 2 years ago by Clinton Administration officials, arrives as nations prepare to gather in New York City next month to discuss ways to move ahead with the stalled CTBT, which can't take effect until it is ratified by the 44 states judged capable of building nuclear weapons. So far, 13 of those nations have refused. The Senate tabled the treaty in 1999 after a bitter debate, and the Bush Administration has no plans to revive the issue.

The report isn't likely to break the stalemate, observers say. But panelist Paul Richards, a seismology expert at Columbia University's Lamont-Doherty Earth Observatory in Palisades, New York, predicts that the treaty "will become politically salient again. And when it does, this report will be out there, ready to inform policy-makers."

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CREDITS: (TOP TO BOTTOM) NIH; U.S. DEPARTMENT OF ENERGY