tribute cells, while other countries may move faster (see next story). A year ago January, a lawyer for the Department of Health and Human Services ruled that stem cells derived from embryos were not themselves embryos; therefore, the National Institutes of Health (NIH) could fund research on the cell lines without contravening a ban Congress imposed on embryo research (*Science*, 22 January 1999, p. 465). Draft guidelines, now under review, would allow NIH-funded researchers to work on stem cell lines derived by private organizations, such as WiCell, as long as the derivation met certain ethical conditions.

On 31 January, NIH announced that it was extending the comment period on these guidelines for 3 weeks, until 22 February. NIH has already received thousands of letters, both pro and con, says Lana Skirboll, associate director for science policy. Although NIH has not tallied the responses, opposition has been significant. Skirboll says NIH now expects to issue the final guidelines no sooner than early summer.

Debate also continues on Capitol Hill. Senators Arlen Specter (R–PA) and Tom Harkin (D–IA) have introduced a bill that would allow NIH to fund both the derivation and use of stem cell lines. A Senate hearing on the bill is scheduled for 22 February, and House committees are planning hearings as well. All of this will likely keep federally funded U.S. researchers from placing orders with WiCell anytime soon.

–GRETCHEN VOGEL

STEM CELLS

Report Would Open Up Research in Japan

TOKYO—Japanese researchers are cheering last week's release of a report to the government that endorses the use of human stem cells in research—work that until now has been on hold. The draft report outlines a process for both publicly and privately funded scientists to follow in deriving and working with stem cells. "It's a very important step forward," says Shinichi Nishikawa, a professor of molecular genetics at Kyoto University's School of Medicine.

The report was drafted by a special subcommittee of the bioethics committee of the Council for Science and Technology, the nation's highest science policy body. In giving the green light for research using embryonic stem cells, the subcommittee cites the potential for "very important results for the advancement of medicine, science, and technology." Human stem cells, which theoretically can develop into any of the body's cells, may ultimately provide laboratory-grown replacement organs and treatments for diseases such as Parkinson's and Alzheimer's. Biologists are keen to use them as well to explore basic developmental processes. But the subcommittee said that research on human stem cells and related material must be strictly regulated.

Under the report's proposals, stem cells could be created only from embryos left over from fertility treatments and only after donors granted their informed consent. Donor privacy would be strictly protected, and the stem cells could not be used to clone humans or be combined with animal embryos. Each research center using or deriving stem cells would have to create an institutional review board, which would approve all work and maintain detailed records. The board, made up of lawyers, ethicists, and scientists, would in turn report to a higher government body.

These recommendations differ in two major ways from guidelines proposed in December by the U.S. National Institutes of Health (NIH) (see previous story). The Japanese rules allow government funding for both the derivation and use of stem cells. The NIH guidelines, in contrast, prohibit the use of public funds for the derivation of human embryonic stem cells. And whereas NIH's proposed rules apply only to NIH-funded work, the Japanese proposals address activity in the private sector as well, suggesting that the creation and distribution of embryonic stem cells be done on a not-for-profit basis. Payments to embryo donors would not be allowed, and fees for acquiring stem cells would cover only reasonable costs for their preparation and distribution. These differences would likely make academic labs the focus of stem cell creation in Japan, while for-profit companies take the lead in the United States.

One gray area involves the role of the institutional review committees. The report recommends that they have broad discretionary powers to decide whether a project is ethically appropriate and if the researcher has the necessary expertise. The report does not set standards for making these judgments, however, and Kyoto University's Nishikawa, a member of the subcommittee, says that the review boards' role is likely to remain cloudy until they are up and running. Nishikawa also believes that some aspects of the proposed procedures "may require some reconsideration." He notes that privacy rules might need to be revised, for example, if researchers and regulators require additional information on the donors before approving the use of stem cells for certain medical applications.

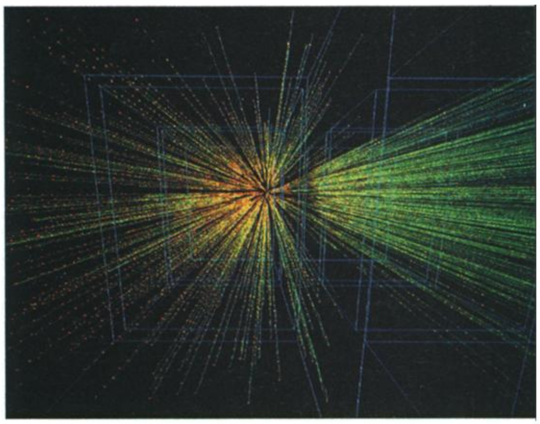
The draft is now open for a month of public comment before it goes to the Science and Technology Agency and the Ministry of Education (Monbusho), which are expected to draw up final guidelines by April. Meanwhile, some research centers have already set up review boards, and scientists are eager to take the next step. "This report means we will be able to extend this work to human stem cells," says Takashi Yokota, a professor at the University of Tokyo's Institute of Medical Science who has been using mouse cells to study basic stem cell mechanisms. He hopes for a chance to begin that work this spring.

–DENNIS NORMILE

HIGH-ENERGY PHYSICS

CERN Stakes Claim on New State of Matter

Not since the big bang has matter been in such a state. For a few microseconds after the birth of the universe, quarks and gluons roamed free in a blazing hot jumble of matter known as a quark-gluon plasma. As the plasma cooled, the quarks and gluons condensed into more familiar particles and disappeared. On Thursday, scientists at CERN, the particle physics laboratory near Geneva, were expected to announce—gingerly—"compelling evidence" of a new state of matter that might be quark-gluon plasma reborn—unless, that is, it's something else.



Hot lead. Colliding Pb nuclei disintegrate in a spray of high-energy particles.

CREDIT: CERN

The announcement marks the close of a 6-year chapter in high-energy physics. Since 1994, CERN physicists have been using the Super Proton Synchrotron (SPS), a 6-kilometer circle of magnets, to smash lead atoms together at enormous speeds and with energies as large as 3.5 TeV (trillion electron volts). The scientists hoped the colliding nuclei would become so hot and so dense that their protons and neutrons would reverse cosmic history, melting back into a soup of component quarks and gluons.

Now, however, CERN's instruments are about to lose their cutting-edge status. In May, a new accelerator known as the Relativistic Heavy Ion Collider (RHIC), up to five times as powerful as SPS, will come online at Brookhaven National Laboratory in Upton, New York. "The big thrust is going from CERN to Brookhaven," says

CERN physicist Maurice Jacob. So, Jacob says, it is an appropriate time to celebrate CERN's achievements.

The obvious question for the epilogue is, did CERN succeed? As *Science* went to press, CERN physicists were planning to present results from seven lead-beam experiments and cautiously lay claim to the creation of a quark-gluon plasma–like state of matter—if only for 10^{-23} seconds at a time. "A common assessment of the collected data leads us to conclude that we now have compelling evidence that a new state of matter has indeed been created … [that] features many of the characteristics of the theoretically predicted quark-gluon plasma," Jacob and his fellow physicist Ulrich Heinz write in a paper summarizing the results.

As early as 1996, CERN scientists saw evidence of a quark-gluon plasma in the unexpectedly low production of an elusive particle known as the J/ψ (*Science*, 13 September 1996, p. 1492). Since then, CERN experiments have shown other hints of a quark-gluon plasma, such as anomalies in the distribution of "vector mesons" (such as the ρ particle) and in the production of "strange hadrons" (such as the Ω particle). "The excess in strangeness is quite spectacular; for the Ω, the production is 15 times normal," says Jacob. "So something new is happening."

Yet none of the evidence has put the issue to rest. Columbia University's Bill Zajc, a spokesperson for a RHIC experiment, notes that other mechanisms might account for the destruction of J/ψ particles, such as collisions with less exotic particles hurtling away from the nuclear smashup. "It's like being caught in machine-gun fire," he says. RHIC scientist and Brookhaven physicist Sam Aronson agrees: "It's fair to say I don't find they've made a compelling argument for discovery at all."

CERN physicists are careful not to overstate their case. "While all the pieces of the puzzle seem to fit, it needs definite confirmation," says CERN spokesperson and physicist Neil Calder. Achim Franz, a physicist who worked on two of the seven CERN experiments, agrees. "There's nothing there with a big red flag saying 'I'm a quark-gluon plasma,' " he admits. "I don't think you'll see an event and say, 'That's it!' "

Such decisive evidence is exactly what some researchers hope RHIC will provide. "The hope is that when you go to RHIC, which has two to five times as much energy, the particles created will have crossed the threshold, and it will be easier to interpret the results," says Wit Busza, a RHIC experimenter and physicist at the Massachusetts Institute of Technology. But Franz cautions against too much optimism. "I started as a postdoc in '86, and people said that SPS would find the quark-gluon plasma right away. It wasn't there," he says. "I don't think there will be a threshold suddenly."

For now, the CERN experiments will continue, colliding atomic nuclei at lower energies to fill in gaps in the data. Most of the community's anticipation, however, is focused on CERN's next big step: an accelerator called the Large Hadron Collider, which will eclipse RHIC in 2005. Until then, CERN scientists must be content to celebrate a set of experiments that gave them a glimpse of something bizarre. "I don't know whether it's a quark-gluon plasma or not," says Franz. "But if you take all the experiments together, it's something new and exciting."

–CHARLES SEIFE

HUMAN GENETICS

Start-Up Claims Piece of Iceland's Gene Pie

For almost 2 years, Iceland's small scientific and medical community has been torn apart by a bold plan to pool the entire country's medical records in a database that would aid the search for disease-causing genes. In December 1998, parliament approved the creation of the database (*Science*, 1 January 1999, p. 13). And just a month ago, the health ministry gave one company, deCODE, exclusive rights to run it—a move that engendered heated opposition.

Now, a small biotech start-up is providing an alternative for those critics who want to mine Iceland's genetic riches but dislike the arrangement with deCODE. The company, called UVS—after Urdur, Verdandi, and Skuld, three witches who according to old Icelandic sagas determine the fate of man—was established as an alternative to deCODE, concedes Snorri Thorgeirsson of the U.S. National Cancer Institute in Bethesda, Maryland. Thorgeirsson started the company along with Bernhard Palsson, a researcher at the University of California, San Diego, and Icelandic businessman Tryggvi Petursson.

> **"For me, it's a relief to have another company, so I'm not accused of monopolizing" Iceland's gene pool.**
>
> —Kari Stefansson

Founded 2 years ago, UVS went public last week and promptly announced three major research agreements—with the Icelandic Cancer Society, the National University Hospital, and the Reykjavik City Hospital. Within 6 to 8 weeks, UVS plans to open a lab outside Reykjavik, says Thorgeirsson.

Scientists at UVS, like those at deCODE, believe that disease-causing mutations are easier to find in genetically homogenous populations, such as Iceland's, whose genomes have less "noise" than those of more diverse societies. Both companies hope to profit by selling that knowledge to pharmaceutical companies, which can use it to develop diagnostic tests and drugs. But whereas deCODE's search will be helped by having medical records on almost everyone in Iceland, UVS says it can turn up valuable data by working with smaller groups of patients, who have volunteered to participate.

UVS is teaming up with several scientists who fiercely oppose the national database. Critics have argued that procedures for obtaining patients' informed consent and safeguarding their privacy are inadequate. One of those is Jorunn Eyfjord, a geneticist at the Icelandic Cancer Society's lab, who will cooperate with UVS on three cancer projects. Another is Jon Johannes Jonsson, head of the department of biochemistry and molecular biology at the University of Iceland. Formerly a member of deCODE's scientific board, Jonsson broke with the company because he opposed the health database. Now, one of his faculty members, Reynir Arngrimsson, is scientific director of UVS, and the company will share laboratory equipment with his department. "I don't like to see a monopoly in Iceland," says Jonsson, "and I don't like to see human genetics done in the way deCODE proposes to do it."

Kari Stefansson, founder and CEO of deCODE, is unfazed by the competition. The Icelandic government, keen to stimulate its budding biotech industry, has embraced deCODE's plan. And so far, only about 5% of Icelanders have asked that their medical data be excluded from the database—which shows that the general public has more confidence in deCODE than some scientists do, says Stefansson. Nor, he adds, does deCODE have a shortage of collaborators. The company, which employs almost 300 people, is working with many physicians on projects to identify genes involved in lung, prostate, colon, and skin cancer. Says Stefansson: "For me, it's a relief to have another company, so I'm not accused of monopolizing" Iceland's gene pool.

–MARTIN ENSERINK