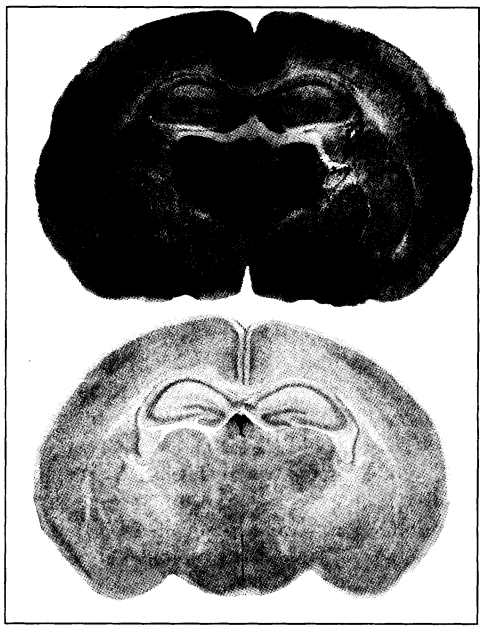
neurons from rat cerebellum maintained in lab cultures. The new work confirms that the same happens in whole animals, and in more areas than just the cerebellum, says Hoffman. What's more, she adds, the suggestion of a role for GABA receptors in the killing effects of alcohol "is quite novel."



Deadly consequences. The black staining shows massive cell death in a brain section from an 8-day-old alcohol-exposed mouse (top). The bottom section is from an untreated mouse.

Indeed, those results raise the possibility that benzodiazepines (Valium and its relatives)—which are sometimes given to newborns as anticonvulsants—may also kill neurons in the developing brains of human infants. "The benzodiazepines are considered extremely safe drugs," says Tabakoff. "If this study is correct, one might need to reassess their safety in [infants] while the brain is still developing."

Ikonomidou points out, however, that the rats were given higher doses of benzodiazepines than those usually given to infants, and it will require more studies to say whether the drugs as they are typically used present a danger to infants. "Prolonged seizures themselves ... can lead to irreversible brain damage, and it is imperative to try and stop them," she notes, adding, "we do not have good alternative drugs to use."

Some alcohol researchers point out that understanding how alcohol kills neurons could spur the development of antidotes that would block its effects in pregnant women. But others see that as a long shot. The Olney group observed the dying neurons 24 hours after alcohol exposure, and the time window for preventing that damage may be too narrow for a "morning after" pill to work. And fetal alcohol researcher James R. West of Texas A&M University's Health Science Center in College Station points out that alcohol doesn't just kill neurons; it has other negative effects, such as causing neurons to grow incorrectly. Because of these multiple effects, there will be "no one silver bullet," West says. "The key thing," he adds, "is to find some way to keep mothers from drinking when they are pregnant." But Tabakoff notes that some alcohol-addicted pregnant women may find it virtually impossible to quit, making progress toward developing a drug that could block even some of alcohol's damaging effects "very, very important."

–MARCIA BARINAGA

STEM CELLS

Wisconsin to Distribute Embryonic Cell Lines

Since the 1998 announcement that scientists had managed to grow human embryonic stem cells in lab culture, researchers have been clamoring for access to them. But they have been blocked on two fronts. One is proprietary—the biotechnology company Geron, which funded much of the work to derive the cells, has kept a tight rein on them. The other is regulatory. In the United States and many other countries, research is restricted because these cells are derived from early embryos or aborted fetuses.

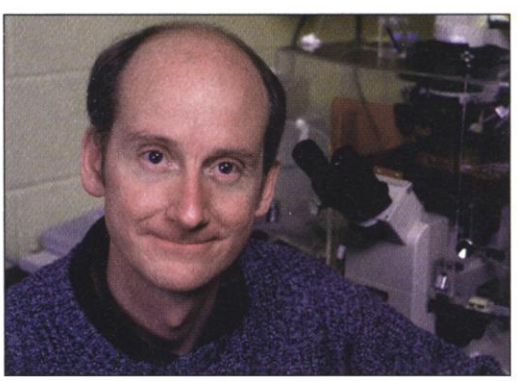
On 1 February, the University of Wisconsin (UW), Madison, took a major step toward lowering the first hurdle. In a move welcomed by many biologists, the university announced the creation of a nonprofit research institute to distribute the embryonic stem cell line derived by UW researcher James Thomson. But the legislative and regulatory limbo persists and may not be resolved before this summer.

What makes these cells so desirable is their potential to develop into any tissue in the body, such as insulin-secreting pancreas cells or dopamine-producing neurons. Researchers envision using these cells to treat a variety of ailments, from diabetes to Parkinson's disease. Not surprisingly, private sector interest in stem cell research is high.

Thomson's work at Wisconsin was supported by Geron Corp. of Menlo Park, California, and by the Wisconsin Alumni Research Foundation (WARF). Although Geron retains rights to certain commercial and therapeutic uses of the cells, WARF retained the right to distribute them to other researchers. WARF has now created the WiCell Research Institute, which will begin distributing stem cells to academic and industrial scientists late this spring. Thomson will serve as WiCell's scientific director but will also continue his research.

Scientists will be asked to submit a confidential summary of their research plans to WiCell, which will review it "to make sure the cells are used appropriately and with adequate respect," says WARF director Carl Gulbrandsen. For example, researchers will not be allowed to use the cells for reproductive cloning experiments or to mix the cells with intact embryos. Academic researchers will pay a one-time fee of $5000 for two vials of the cells, which should provide a virtually unlimited supply of cells in culture. The fee will cover quality control and technical support for the care of the fickle cells. Gulbrandsen says WARF's goal is to create a "not-for-profit subsidiary. We're not intending to make a profit off [academic] researchers, but we're also not intending to lose money."

WiCell will require researchers to certify each year that they are complying with the original agreement. In addition, the license for academics will apply only to research uses. If academics want to use the cells for profit, they will have to renegotiate with WiCell. Geron has commercial rights to "therapeutics and diagnostics with certain cell lines," Gulbrandsen says, but is keeping the details of its license agreement under wraps. WARF has a preliminary agreement with Geron to notify WiCell's stem cell recipients of the areas in which the company has exclusive rights.



Cell promoter. James Thomson's cell lines will be available to researchers.

Industrial researchers, on the other hand, will pay "a significant up-front fee" and a yearly maintenance fee, Gulbrandsen says. WARF will also collect a "flow-through royalty," a percentage of any revenue that results from the use of the cells. Those revenues will have to come from cell uses not already licensed to Geron.

Stem cell researchers welcome the new initiative. "It's an excellent idea to share these cells," says Oliver Brüstle of the University of Bonn Medical Center in Germany.

WiCell's first customers may come from overseas, because U.S. policy is unlikely to be settled by the time WiCell is ready to dis-

CREDITS: (LEFT TO RIGHT) OLNEY *ET AL., SOC. NEUROSCI. ABSTR.* **25**, 550 (1999); J. MILLER/UW MADISON NEWS & PUBLIC AFFAIRS

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.

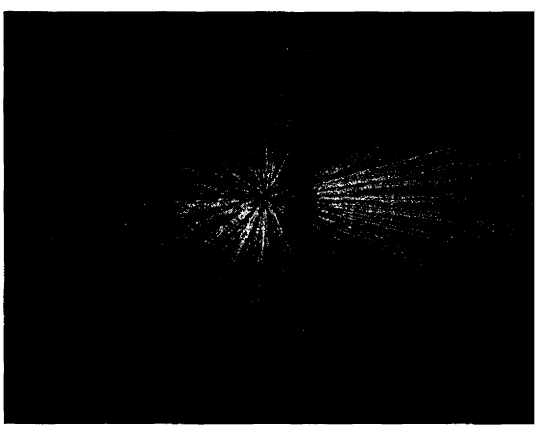
The draft is now open for a month of public comment before it goes to the Science and Technology Agency and the Ministry of Education (Monbusho), which are expected to draw up final guidelines by April. Meanwhile, some research centers have already set up review boards, and scientists are eager to take 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.



CREDIT: CERN

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

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