

Clinic in US isolates 50 lines of stem cells

By Gareth Cook, Globe Staff | June 9, 2004

A private Chicago fertility clinic is set to announce this week that its scientists have isolated 50 new lines of human embryonic stem cells, part of an ambitious effort to create specialized colonies of cells that could help uncover cures for muscular dystrophy and other genetic diseases.

A team at the Reproductive Genetics Institute grew the cells from frozen embryos donated by patients after fertility treatments, according to the institute's director, Yury Verlinsky. He plans to announce the project at an international stem-cell conference in Boston and then submit the work to a scientific journal.

If the cell lines prove to be healthy and scientifically useful, they would represent a dramatic increase in the number of embryonic cell lines in existence around the world.

Even more significant, said other scientists, the team has created lines that carry the mutated gene for muscular dystrophy and six other debilitating genetic diseases. Scientists see such specialized lines of stem cells as powerful new tools to explore what goes wrong in the body when disease takes hold.

The Chicago effort comes about as the president's ban on funding of research using new embryonic stem-cell lines is being subjected to increasing criticism, even from conservative politicians. On Friday, 14 Republicans were among 58 senators who sent a letter to the White House asking the president to relax the restrictions. And several weeks ago, Nancy Reagan pleaded with President Bush to stop preventing embryonic stem-cell research, because it might help cure diseases like Alzheimer's, a speech that has gained added poignancy with the recent death of President Reagan.

Under the Bush policy, designed to prevent the destruction of more embryos, the new lines are off-limits to scientists using government funding.

"The cell lines that represent disease models are the best argument for why the Bush policy should be reevaluated," said Dr. George Q. Daley, a stem-cell researcher at Children's Hospital who has been an outspoken critic of the restrictions.

Scientists cautioned yesterday that until the Reproductive Genetics Institute describes its work in a scientific journal, it will be difficult to assess the quality of the work and to determine whether the new lines would be useful to researchers.

The institute, founded in 1986, and its director are internationally known for their pioneering work in a field, called preimplantation genetic diagnosis (PGD), that led directly to the new cell lines. With PGD, scientists begin as they would with any in-vitro fertilization procedure, by fertilizing eggs with sperm in a laboratory dish. About five days after conception, when the embryos are microscopic balls of cells, the scientists can check them for genetic abnormalities. Embryos free of disease are implanted into a woman.

For the new work, the team took leftover embryos, including several that carried genetic diseases, and extracted their stem cells. The cells were grown in a dish with special nutrients and then frozen for future use.

Critics have said that the destruction of embryos to create stem cells amounts to the taking of human lives, and on Aug. 9, 2001, Bush said the government would fund research only on human embryonic stem-cell lines that had already been created.

The work is expensive and time-consuming, but Verlinsky said he was motivated to do the research by a feeling that it would be a waste to discard the leftover embryos when they could be used to help medical research.

Stem cells with a genetic defect could help researchers in many ways. Because embryonic stem cells have the ability to create any tissue in the body, watching disease lines develop into particular kinds of tissue, such as muscle or brain cells, could shed light on the origin of the disease symptoms. They could be used to test possible treatments.

Verlinsky said he intends to make all the cell lines created at the institute available to other researchers.

The Chicago team's work adds to the increasing number of human embryonic stem cells that are effectively off-limits to most US scientists. Last month, a Globe survey found that 128 cell lines had been created since the Bush ban on working with new cell lines. A team from Russia at the Boston conference plans to announce it has created three new lines of human embryonic stem cells, according to a summary submitted to the conference, which is sponsored by the International Society for Stem Cell Research.

In addition to Duchenne muscular dystrophy, Verlinsky said his team has created disease lines for beta thalassemia, neurofibromatosis type 1, Marfan syndrome, myotonic dystrophy, Fragile X syndrome, and Fanconi anemia. More than 100 diseases can be screened for using PGD, and the team plans to make many more disease lines, Verlinsky said.

Specialists in several of the individual diseases contacted by the Globe said that having disease lines would be a boon for research, but did not constitute a revolutionary step forward. In Marfan syndrome, for example, scientists have already created a mouse that is a good model for the disease, said Bjorn Olsen, a professor of cell biology at Harvard Medical School and Harvard School of Dental Medicine. Eventually, he said, it will be "absolutely essential" to compare the results of research in mice with human cells like the ones derived by the Chicago team. "There might also be some benefit that's very unpredictable," he said. "So it's unfortunate that a lot of scientists will not be able to work with these."