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U-M takes small step to broaden stem cell research

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University of Michigan scientists want to be competitive with scientists at other research centers in embryonic stem cell research. Concerned about falling behind in this emerging field, the U-M Life Sciences Institute has readied a small lab where scientists can use private funds to work with newer embryonic stem cell lines not approved for federally funded research.

This move, funded with \$300,000 in private dollars, will let researchers move forward, says Sean Morrison, director of the U-M Center for Stem Cell Biology. But Michigan laws limiting embryonic stem cell research will still keep scientists from developing new stem cell lines. That's a key advantage scientists in California, Wisconsin, Massachusetts and many other states have as they push ahead in privately funded efforts to explore the cells' disease-fighting potential, Morrison says.

"The federal restrictions slow us down a little bit, the state (laws) slow us down a lot," he says.

Cells a divisive issue

Human embryonic stem cells are the undifferentiated cells of early-stage embryos, first isolated in 1998, that many scientists believe may hold immense promise in understanding and treating diseases and conditions like Parkinson's, Alzheimer's, diabetes and spinal cord injuries. U.S. presidents, federal and state legislators and voters have weighed in on this controversy-ridden, much-hyped field.

Opponents of the research find the destruction of human embryos that the work currently requires morally unacceptable. They also voice fears about unregulated human cloning and say adult stem cell research provides adequate alternatives in fighting disease.

Proponents counter by pointing to a recent national poll by the Coalition for the Advancement of Medical Research that shows embryonic stem cell research has the support of 72 percent of the public.

Rules issued by the Bush administration in 2001 set limits on researchers. Researchers may use federal research dollars for embryonic stem cell work only if they use certain approved stem cell lines created before 2001 from embryos discarded by fertility clinics.

These lines, thought in 2001 to number around 60, have turned out to have limitations: Only about one-third remain viable, and all were grown on a layer of mouse cells, which research suggests could be contaminated by mouse proteins and viruses and would not be suitable to use in people, Science News reported last year.

U-M lab awaits cell lines

The new lab at the Life Sciences Institute, which researchers call "the non-presidential room," is the size of a large walk-in closet. The lab is available to any U-M researcher who wants to use existing non-approved lines in privately funded work.

"Its only purpose is to segregate the culture of non-presidential (embryonic) stem cell lines," says Morrison. To comply with federal funding rules, scientists need to use the lab for the parts of the research that involve working with the actual cells, Morrison says. "Their desks don't have to be in there."

The institute will keep separate accounts for the expenses involved in using the lab, says Robin Stephenson, Life Sciences Institute communications director. Some U-M scientists do embryonic stem cell research using approved lines, most notably Sue O'Shea, who directs the Michigan Center for Human Embryonic Stem Cell Research and uses the cells to study nerve cell development.

In the new lab, U-M scientists will comply with state law and federal rules as they culture and grow embryonic stem cells for their research, Morrison says.

State law limits research

The new lab does nothing to address the roadblock Morrison sees in state law. A 1978 law forbids using a human embryo for nontherapeutic research if the life or health of the embryo is jeopardized; a 1999 law, passed after the cloning of Dolly the sheep sparked fears of unregulated cloning, makes it a crime, punishable with a fine of up to \$10 million, to "use somatic cell nuclear transfer to produce a human embryo." Somatic cell nuclear transfer is a method used for two different ends: to make an embryo that is allowed to develop into a full-fledged live being, or to make an embryo from which embryonic stem cells can be harvested to use in treating a patient.

The laws in effect keep Michigan scientists from creating new embryonic stem cell lines using unwanted extra embryos that would otherwise be discarded by fertility clinics. The current method requires destroying a human embryo, though the future may hold alternative methods, Morrison says.

U-M researchers want to expand their proven record in adult stem cell research to include advances in embryonic stem cell work, which holds promise for insights and treatments not possible with adult stem cells, says Morrison. But to do that, they need to be able to develop their own new embryonic stem cell lines.

"We just want to have an even playing field," he says. "In adult stem cell research, we play on that playing field and we win."

Morrison has won awards and praise as one of the nation's most promising scientists in stem cell biology. He has made important discoveries about adult stem cells that produce cells in the blood, immune system and peripheral nervous system, as well adult stem cells involved in cancer, work that points the way to more effective future drugs. Adult stem cell research will and should continue, he says, but the untried promise of embryonic cells needs to be explored, too.

State law limits what can be done in the new lab, where no privately funded studies have begun yet. Morrison wants to launch studies to understand the origin of inherited neurodegenerative diseases such as Huntington's disease and neurofibromatosis. First, though, he needs to find and obtain lines suited to the projects. He is looking into obtaining existing embryonic stem cell lines from other states and abroad.

"One of the limiting factors is, who's going to be willing to share cells with us?" Getting legal arrangements that allow U-M to use the lines and benefit from its discoveries is likely to take time, he says. "There are a lot of negotiations and intellectual property issues to work through when you can't make your own cells."

Five-year plan

Life Sciences Institute officials see the new lab as an interim measure: They are seeking \$1 million in private funds to support it for five years. "People do expect this will not last forever," says Stephenson.

Those who want to see loosening of federal funding restrictions and a change in Michigan law regarding embryonic stem cell research saw November's election results as good news for their cause. They hope for changes in Washington that will free up the use of federal funds for work with more stem cell lines. They also hope bills introduced in the Michigan House in 2005 and the Michigan Senate this year will gain traction and remove the limits that state law currently poses for creating new embryonic stem cell lines.

But that's not likely, says Matt Resch, spokesman for outgoing Michigan House Speaker Craig DeRoche (R-Novi). He says the election may not have reduced the substantial number of state legislators, Republican and Democrat, who oppose loosening restrictions on embryonic stem cell research.

"There are a large number of people in the legislature who do not support the idea of creating a life and then destroying a life," he says. "Those are the fundamental issues that have kept that bill in committee (in the House)."

For his part, Morrison says staying in the running with other leading research centers will be hard unless new legislation alters state law. "It's a significant disadvantage," he says. "Right now there are not that many (existing embryonic stem cell) lines out there." His lab would like to understand the origins of genetically influenced neurodegenerative diseases. To do that, they need stem cells that carry the genetic defects. None of the presidential lines do, Morrison says. "For us to study the diseases that affect the people of Michigan, we have to wait till somebody in another state decides to develop a line."

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