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Work on stem cells in Michigan raises many hopes, questions

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In a sprawling lab packed with beakers, test tubes, microscopes and constantly bustling doctors and lab technicians, tiny gray splotches may hold the secrets to saving lives -- and Michigan 's economy. They are clumps of human embryonic stem cells, and they carry the still-mysterious encryption codes to grow into nerves or muscles or even skin.

A lot is riding on their secrets -- scientists say an understanding of some deadly diseases and possibly cures.

"This is a transformative time for medicine. ... It's a new frontier," said Dr. Eva Feldman, who leads stem cell research efforts at the lab at the University of Michigan 's A. Alfred Taubman Medical Research Institute.

Just more than a year after voters relaxed state limits on embryonic stem cell research through Proposal 2 -- over opponents' protests that such research violates the sanctity of human life -- Feldman and others point to a series of events that they say confirm that Michigan is now poised to be a stem cell research powerhouse.

Meanwhile, lawmakers are pursuing legislation that they and some abortion opponents said will establish a legal framework governing the research and penalties for those who violate its boundaries. It's a new industry in a relatively new science, and -- despite the promise that human embryonic stem cell research might cure diseases eventually -- scientists, lawmakers, academics, patient advocates and even those who opposed the 2008 ballot proposal to relax restrictions for research want to sort through ethical questions and research protocols.

"We want to be very prudent moving forward," said Oakland University biological sciences professor Rasul Chaudhry, who has organized meetings to work out ethical and political issues associated with stem cell research. "We want to be beyond 100% right in everything we do."
Illustrative of some of those concerns: Proposed state legislation would add reporting requirements and make it a felony for anyone who violates the legal limits of human embryonic stem cell research.

These efforts and others are happening as the region prepares for the World Stem Cell Summit in Detroit in October:

· Beginning early next year, the University of Michigan plans to accept embryos from fertility clinics to begin its own stem cell lines -- a crucial step in embryonic stem cell research. Last week, researchers at Michigan State University and OU said they will do the same.

· In Detroit, Wayne State University hopes to begin construction on its Wayne County Stem Cell Commercialization Center , a series of labs and offices that would offer lab space and high-tech equipment to small start-up companies and researchers.

· In October, more than 1,000 scientists, policy makers, businesses, patient advocates and others are expected to gather in downtown Detroit for the Genetics Policy Institute's World Stem Cell Summit.

Those at the meeting will talk science, business and ethics. And the potential for multimillion-dollar collaborations is endless, said GPI Executive Director Bernard Siegel. Siegel said the state's research universities and the University of Michigan 's A. Alfred Taubman Medical Research Institute were among the reasons GPI members were drawn to Detroit .

It wasn't even a tough decision, Siegel said: "We could have taken this conference to anywhere in the world," he said, but "this is ... the right place -- no question about it."

What it will take for success

It has been more than a year since voters overturned a 1978 state law that limited the destruction of embryos. Creating new stem cell lines -- masses of constantly dividing cells to use in research -- means destroying the embryo, something Michigan hadn't been able to do because of that law.

A limited number of embryonic stem lines were available nationwide for years, but researchers worried they had been contaminated through years of use and that they lacked diversity -- a concern that U-M scientists said this month that they had confirmed through testing.

"The passage of Proposal 2 signaled that Michigan was open for business in stem cell research," said Jeff Mason, executive director of the University Research Corridor, an alliance of the state's three biggest universities..

In the lab, Dr. Eva Feldman, who leads stem cell research at the Taubman Medical Research Institute at U-M, sees both economic and human promise. A longtime physician, she said she has too often faced young moms and dads -- children at their side -- to deliver the news that they have ALS, a fatal neurodegenerative disease also known as Lou Gehrig's disease.

Feldman knows the odds: They have, maybe, 36 months to live, she said.

"Your heart just breaks," she said.

In September, Feldman learned that the U.S. Food and Drug Administration approved her request to conduct the first human clinical trial of a stem cell treatment for ALS. In a lab, stem cells placed near dying nerve cells afflicted with ALS nourish the withering cells. So doctors will inject neural stem cells along patients' spinal cords in trials that are to

begin in January at Emory University in Georgia , where a surgeon worked with Feldman to develop the procedure.
Eventually -- and it's a long process with layers of review, Feldman said -- she hopes to bring the procedure to Michigan 's operating rooms. Jim Eliason, the executive director of WSU's Stem Cell Commercialization Center hopes to hire a half-dozen people to support the lab as soon as it opens next year, and he'll hire more as businesses sign on to use the labs.

Michigan's slice of the regenerative-medicine economy is limitless, he said: "We have what it takes to make it succeed here. We have a lot of really smart people here." The past year has also been used to lay out protocols for stem cell research and work out moral and ethical dilemmas. Investigative review boards at universities -- those that review biomedical research to make sure it is safe and scientifically and morally sound -- wrestle with some of the thorniest issues, too: How much detail should donors have to reach the "informed consent" threshold required by law? And how will embryos be treated and stored?

Finding the right balance
One thing they want to ensure is that scientific and moral implications are not run over in the dash for new research. Opponents of Proposal 2 argued that embryonic stem cell research is unnecessary because alternative types of cells are available for research. Some argued that life begins at conception, so destroying embryos is wrong, even if they might be discarded.
Since the vote, opponents have been relatively quiet -- at least publicly, but that might change as events such as the stem cell summit in October unfold.

Especially with embryonic stem cells, "the political climate has changed ... but there's going to be a segment of the society that's always going to be opposed," said Siegel of the GPI.
And though voters made their decision, it's still up to Michigan 's lawmakers to work out the details, said Sen. Tom George, a Kalamazoo Republican.

A U-M alum, anesthesiologist and one of the opponents of the 2008 vote, he has sponsored legislation that would require extra reporting for researchers, better define constitutional language that he said leaves "gray areas" and would make it a felony -- punishable by up to 5 years -- for anyone who violates the law governing the new research. "Even the most ardent proponents of stem cells acknowledge that this brings up unique questions and ethical considerations," he said.
"If it's a gray area, if it's ambiguous, a judge will have to figure it out," he said. "Clarity is good for everyone."

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Advances in stem cell research during the last year

Since Michigan voters removed limits to embryonic stem cell research on Nov. 4, 2008, events on a local and federal level have advanced research.

February 2009: Wayne State University plans a 2,500-square-foot stem cell research facility that could be used by university researchers and for-profit biotech start-ups around the state. It is expected to open in 2010.

March 9: President Barack Obama lifts 2001 limits on federal funding for stem cell research.

July 7: The National Institutes of Health, or NIH, implements guidelines that expand federally funded embryonic stem cell research.

Sept. 17: The Food and Drug Administration approves a University of Michigan neurologist's request to conduct a clinical trial of stem cells for the treatment of Lou Gehrig's disease, also known as amyotrophic lateral sclerosis, or ALS.

Oct. 15: The California-based Genetics Policy Institute announces that it will hold its annual World Stem Cell Summit in Detroit in October 2010, bringing the world's top scientists and doctors together to discuss research and policy questions.

Dec. 2: The NIH approves the first stem cell lines under its new guidelines.

Dec. 8: U-M announces plans to accept embryos from fertility clinics to develop its own stem cell lines.

Dec. 16: U-M researchers release study results that they say confirms worries among researchers: The stem cell lines developed under the 2001 funding limits lack diversity. None of the lines, for example, were derived from individuals of recent African ancestry, raising concerns that swaths of the population are left out of critical stem cell research.