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Cell multiplication: Universities push stem cell research in state

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Michigan is putting together the building blocks needed to promote the state as a center for stem cell research.

In Detroit and elsewhere, there's a rapidly growing network of labs, startup companies and university-led innovation focused on the cells, known for their ability to be grown and transformed into specialized cells and tissue.

“Michigan is really well positioned in the stem cell market for a number of reasons,” said Charles Rothstein, senior managing director of Farmington Hills-based **Beringea L.L.C.**

Rothstein said analysts expect the U.S. stem cell market to grow from \$100 million this year to \$8 billion by the end of 2016 and that Michigan should be a major beneficiary, thanks in part to groundbreaking embryonic stem cell research at the **University of Michigan** and at **TechTown's** commercialization center in Detroit.

There are several new developments related to job creation, research grants and collaborative efforts to build upon the state's stem cell momentum since the passage of Proposal 2 — which legalized embryonic stem cell research in Michigan — in November 2008. Among them:

- TechTown is expected to announce this month that at least two more Israeli stem cell companies, **BioAesthetics Innovation Ltd.** and **Bonus Therapeutic Ltd.**, are setting up shop in the **Wayne State University**-affiliated incubator and technology park.

BioAesthetics uses a patient's stem cells to grow grafts for soft-tissue repair and to make implants for plastic surgery.

Bonus Therapeutic develops stem cell-based therapies for bone repair.

They are part of a deal for at least 10 Israeli companies to open U.S. operations in TechTown in the first quarter.

A memo of understanding is in place and approval is considered a formality, according to Randal Charlton, TechTown's executive director.

Growing field

Here are other stem cell developments around the state in the past year:

- In August, Detroit's **TechTown** was awarded a combination grant and loan of \$4.1 million from the **U.S. Department of Housing and Urban Development** to build out a 15,000-square-foot stem cell center, a collection of wet labs that will be available to university researchers and for-profit companies from around the state.

- In December, shareholders at Ann Arbor-based **Aastrom Biosciences Inc.** (Nasdaq: ASTM) approved a reverse stock split that boosted the stem cell company's share price above \$1, preventing its delisting. That in turn allows new CEO and President Tim Mayleben to raise the capital needed to complete human trials on a variety of its therapies.

- A group of about 15 researchers from **Oakland University, Beaumont Hospital** and **Providence Hospital** is pursuing a variety of stem cell therapies, with the lead project focusing on spinal disc degeneration and another on retinal degeneration. Oakland professor Rasul Chaudhry said the group filed five applications for federal stimulus funding in 2009, and that four of them showed enough promise that they were asked by officials at the **National Institutes of Health** to refine and resubmit them. Chaudhry said the group has several patents in the works, with the hope of spinning out at least one for-profit company. In 2007, he helped found OU's **Umbilical Cord Blood Bank**, which collects stem cells from umbilical cords shortly after birth, both for research and to store in case the donor needs them later in life.

The agreement is with **Thalia Bioventure**, an investor in biotech companies and an affiliate of **Haifa Life Sciences Park**, an Israeli tech incubator.

It follows the announcement in December that **Taburit**, an Israeli biobank that stores umbilical cord blood stem cells, had signed a lease in TechTown and plans to hire up to 50 people in the next 12-18 months.

- **Wayne County** economic development officials are in the final stages of negotiating a funding agreement that will result in an Ann Arbor-based stem cell company, **Innovative BioTherapies**

Inc., moving some of its operations to TechTown. Innovative was awarded a \$2 million grant by the **National Institutes of Health** in October, moving at least four or five of its 24 employees into TechTown's stem cell center late this year.

County officials and company founder Dr. David Humes hope that within a few years, pending successful FDA trials, a high-volume facility will be established in the county that employs thousands of skilled workers to produce stem cell-based products needed to treat diabetes, kidney failure and congestive heart disease. (*See story, above right.*)

- Stem cell researchers at **Michigan State University**, headed by Jose Cibelli, a professor of animal biotechnology, have formed a relationship with the Andalusia region of southern Spain to help fund their work, which takes skin cells, converts them to the equivalent of embryonic stem cells and then converts those to other cells.

Cibelli's group, which supplies stem cells to about 10 research groups in the U.S. and Europe, has received almost \$1 million in funding from Andalusia thus far, and Cibelli said a new agreement will be announced soon that will provide more funding and transfer intellectual property from Spain to MSU.

“Spain is very much interested in stem cell research and in forming alliances,” said Cibelli. He said other large grants have been approved for his group by the state of New York and by the **National Science Foundation** but have not yet been announced.

A for-profit spinoff from the group has been formed by the school's tech transfer office, **Gema Diagnostics Inc.**, which uses stem cell technology to improve in vitro fertilization techniques and has received funding from the state's **Michigan Economic Development Corp.** and a first round of venture capital led by Ann Arbor-based **North Coast Technology Investors**.

- TechTown and WSU have formed a new for-profit company called **MitoStem Inc.**, which will serve as an umbrella company to commercialize stem cell-related research, including neural regeneration, at the university.

Carol Brenner, an associate professor at WSU who heads up one of the school's two stem cell groups, is CEO, and the chief science officer is Jim Eliason, who is also director of the stem cell commercialization center.

- Over the next six months, UM will aggressively seek to expand its stem cell research by recruiting what Sean Morrison, director of the school's **Center**

for Stem Cell Biology, describes as world-class stem cell researchers.

“The school will invest \$1.5 million in each one. We could recruit one. We could get three. These are the best of the best, and we'll be competing against the Harvards and the Stanfords,” said Morrison. “We may not get everyone we want, but at least with the passage of Proposal 2, we can compete.”

He said each recruit would be expected to bring in his or her research team and in turn to bring in millions of research dollars. Over the next three or four years, those groups could add 50 jobs, he said.

While UM focuses on embryonic stem cell research, WSU, MSU and **Oakland University** focus on umbilical cord stem cells and what are called pluripotent stem cells, which are stem cells formed from a variety of adult cells. They were first formed in 2006 from mouse cells and in 2007 from human cells, and they bypass ethical or legal issues related to embryonic stem cells.

Gloria Heppner, associate vice president of research at WSU, said the biggest change she has seen since the passage of Proposal 2 is the sense of meaningful cooperation between the members of the **University Research**

Corridor — UM, MSU and WSU.

“Before, people were fragmented. People weren't working together in any meaningful way,” said Heppner. “It's really great to see the spirit of collaboration coming together between people at the three universities, teaching each other our tricks.”

As examples, Heppner cited Brenner's group at WSU being supplied with stem cells from a line produced by Cibelli's group at MSU; and a new group formed last year, **Stem Cell Michigan**, which includes the Michigan Economic Development Corp., WSU, UM, Oakland University and MSU. It was created to coordinate stem cell research and commercialization. Representatives met at UM in June, at MSU in October and will hold a third meeting in February at TechTown.

In 2009, UM received \$6.8 million in federal stimulus money to fund 13 stem cell research projects.

“The University of Michigan has received more stimulus-package money for medical research than any other university in the country, and this was in large part based on the fact that Michigan is now seen as a very favorable climate and state for stem cell work,” said Dr. Eva Feldman, co-director of the school's **A. Alfred Taubman Medical Research Institute**.

Feldman said her lab has, as a result, hired four new researchers, part of an estimated 35-50 new researchers hired universitywide for stem cell research. The researchers, generally post-doctorate fellows or research technicians, earn salaries of roughly \$40,000 to \$50,000.

In September, Feldman was told that the **U.S. Food and Drug Administration** had approved her application to conduct the first human clinical trials on a stem cell therapy for Lou Gehrig's disease. The trials begin this month at **Emory University** in Georgia.

Yet, Michael Kurek, a partner in Ann Arbor-based **Biotechnology Business Consultants L.L.C.**, a consulting firm that helps emerging tech companies find sources of federal funding, said local stem cell companies will need to survive on federal grants for the near term.

Venture capitalists, he said, will want to wait until therapies — many of which require a long FDA approval process — are closer to market.

“One thing that may be holding up investment is uncertainty about the way the FDA is looking at cell-based therapies right now,” he said.

Beringea is in the early stages of identifying stem cell companies in Europe and Israel for potential investments from the \$75 million of the \$150 million **Michigan Growth Capital Fund** that it invests on behalf of the state. It's likely to add

some as portfolio companies. Investments would be made in companies willing to open Michigan operations.

Rothstein said Beringea will be conservative in making any investments, preferring to see which of the many emerging stem cell companies survive early R&D.

“It will take years to fully develop this research into companies, but it's still very exciting,” said Ken Nisbet, executive director of UM's technology transfer office. “The initial research should lead to some incalculable contributions in the years ahead.”

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