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BIOTECH: Stem cell experts meet amid rising expectations

By BRADLEY J. FIKES - Staff Writer

LA JOLLA ---- Stem cell researchers say they expect a surge of funding, an easing of restrictions and accelerating scientific progress in turning stem cells into disease treatments.

A cheery mood permeated Friday's annual stem cell conference at the Salk Institute, bringing experts in the field together from across the country. The approximately 400 attendees heard about progress in getting stem cell experiments out of the research stage and into treating human patients. The one worry appeared to be the sagging economy, which has made it more difficult to attract investment.

San Diego County is ranked among the top three biotech and life science clusters in the country, employing tens of thousands and attracting hundreds of millions in venture capital funding every year.

The "Stem Cell Meeting on the Mesa" was presented by the Sanford Consortium for Regenerative Medicine, an alliance of four San Diego research powerhouses: UC San Diego, The Burnham Institute, The Salk Institute and The Scripps Research Institute. It is the first major stem cell meeting in the country since the election of President Barack Obama, who has pledged support for stem cell research.

Philanthropist T. Denny Sanford, after whom the consortium is named, is attending the conference. In September, he gave the consortium \$30 million to advance stem cell research.

Sanford was optimistic about the prospects for stem cell research, which he called "the medicine of the future," and the incoming Obama administration's support of it. Stem cells are the undifferentiated "ancestral" cells that develop into the various types of cells in the body.

"Everything that I've heard thus far is that Obama certainly is behind stem cell research, he'll lift the restrictions currently in place (on federal funding of embryonic stem cell research), so it adds that much more excitement to the field," Sanford said in an interview before the conference began.

Embryonic stem cells, taken from days-old embryos, are believed to be more adaptable than "adult" stem cells. Scientists have recently turned skin cells into cells that act like embryonic stem cells. However, they say research will be needed with real embryonic stem cells for years to ensure the act-alike cells really are a good substitute.

In opening remarks at the conference, Sanford told the researchers he was counting on them. "I was promised, as part of the whole consideration when I made my pledge, that the institutions would get out of the way and let the scientists do their job, so please do," he said.

### **Out of animals, into humans**

After years of experimenting with animals, it's time to shift to experiments with human cells, researchers said during their presentations.

Alzheimer's disease, for example, doesn't have a good model in animals, said Larry Goldstein, director of UCSD's stem cell program. "Who can tell if a mouse is demented anyway? Or a fruit fly, for that matter," Goldstein said.

Speaker Kristin Baldwin, an associate professor in the department of cell biology at The Scripps Research Institute, said her team had found a way to duplicate the DNA of neurons so they can be studied more readily. Neurons can't be cultured easily, because they don't divide, like other cells that can be maintained in cell "lines" that reproduce endlessly.

"Now we've been able to copy that neuron's DNA and look at it," Baldwin said. Studying the DNA will help pinpoint the genetic changes in neurons associated with Alzheimer's, she said.

Novocell, a San Diego biotech company, is preparing to test its own human insulin-producing cells in patients. The cells are grown directly from human embryonic stem cells. They were first tested in mice and proved effective in restoring insulin production, said speaker Anne Bang, Novocell's associate director of stem cell technologies.

However, Bang said, there are safety concerns, because some of the cells produce tumors. Novocell has identified ways to purify cells to reduce this danger, she said.

### **Heart progress**

Harvard researcher Kenneth R. Chien discussed his work in developing human heart cells, with an eye to using them as replacement cells in damaged hearts. He framed the problem drawing on the somewhat similar challenge of heart transplants. He said the medical community succeeded by working across scientific and medical fields, and with cooperation between academic scientists and companies.

"It took 20 years, it took a team ---- working together, putting ego aside," Chien said. "It changed the world of cardiovascular medicine for people with end-stage heart disease."

Chien said his team has transformed stem cells into heart cells that show the characteristic beating pattern, and a tendency to organize. "We made cells. Our next step is to try to make (blood) vessels and then we're going to try to put them together," Chien said.

However, Chien said it was "highly unlikely" that a whole heart could be grown outside the body, or that replacement cells could help just by being inserted into the heart, which has a complex structure.

"Everyone who has cut into a flank steak knows there's a grain to every muscle, and the heart has a grain," Chien said. "The difficulty is not only to make the muscle cells, but have them aligned at the proper angle."

Chien, a former UCSD researcher, said a better strategy would be to grow the heart cells outside the body in the proper pattern, and then transplant that patch into the damaged heart.

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