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Australia Gearing Up For Votes To Allow Therapeutic Cloning

By Nuala Moran

BioWorld International Correspondent

MELBOURNE, AUSTRALIA - Australia is set to join countries that allow therapeutic cloning, with a vote on the issue due later this week in the Victoria State Parliament.

Victoria, home of the Australian Stem Cell Center (ASCC), has pushed hard to legalize cloning. The state was influential in shifting the federal government from its stance in June 2006 that the law should not change, to allowing a vote in December 2006 in which the House of Representatives voted in favor of liberalization.

For the law to be implemented it also must be passed by individual states. Victoria is first to vote on the issue, with Queensland and New South Wales expected to follow suit soon after.

Assuming a positive vote, the ASCC will not apply for a license immediately, but plans to set up a workshop of scientists from around Australia.

"This will be a forum that will develop a national initiative on therapeutic cloning," Stephen Livesey, CEO of the ASCC, told *BioWorld International*.

Since 2002 when scientists in Australia were first allowed to use embryos left over from in vitro fertilization treatment for deriving human embryonic stem cells, the country's efforts have been fragmented.

"I think a coordinated effort [on therapeutic cloning] would be better," Livesey said. "We will also bring in the licensing body, to have it involved from the start."

Under the Australian rules, an application for a therapeutic cloning license will have to specify a particular application, and show that the research would add to the body of science. Livesey said that as yet no particular disease areas or applications have been singled out as the topic of the first application for a license.

While the political wheels have been turning, the ASCC has been making headway with its lead research program, which has the ultimate aim of making transfusable blood products from stem cells.

As staging posts, the center is working on white blood cells generated from cord blood stem cells for use in patients receiving cancer chemotherapy, and on expanding cord blood stem cells to generate sufficient cells for use in adult bone marrow transplants.

The vision in the transfusable blood program is to mimic the natural process of continuous production of blood cells in bone marrow, in a nanoscale bioreactor.

"In other words, we want to develop a flow-through system, not one that uses huge vats," said Livesey. "We will do this at a nanoscale and then add lots more [units] to scale up."

There has been progress in achieving one of the major scientific challenges of the program, with one group demonstrating that a two-step serum-free culturing system can be used to direct the differentiation of embryonic stem cells to blood cells, with an 80 percent plus conversion rate.

"There is no longer a conceptual barrier, but only small amounts [have been produced] in the lab," Livesey said. "The question is how to increase the volume and make it safe."

Progress also has been made on understanding the environmental factors underlying stem cell production and differentiation in situ.

Biological understanding of the components of that niche is feeding into the development of smart polymer surfaces that can direct the growth of stem cells, to form the basis of the bioreactor.

Another group associated with the ASCC has succeeded in directing cord blood into white blood cells. Livesey said he is talking to a U.S. company about a partnership to commercialize that and expects the first Australian clinical trials in patients receiving chemotherapy to start in two years. It will be between seven and 10 years before any transfusable blood products are ready for clinical trials.

Livesey said the major hurdle in developing red blood cells for use in transfusions is cost-effective scale-up.

"If we end up producing a litre of blood at \$5,000, we've failed," he added.

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