

# Public funding impacts progress of human embryonic stem cell research

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Bolstered by supportive policies and public research dollars, the United Kingdom, Israel, China, Singapore and Australia are producing unusually large shares of human embryonic stem cell research, according to a report from the Georgia Institute of Technology in the June 2008 issue *Cell Stem Cell*. Aaron Levine, assistant professor of public policy and author of the book *Cloning: A Beginner's Guide*, studied how countries output of research papers related to human embryonic stem cell research compared to their output in less contentious fields. He found that even though the United States still puts out far more research in this field than any other single country, when one compares the amount of research in human embryonic stem cells to other forms of research in molecular biology and genetics, the U.S. lags behind.

"The U.S. is still the largest producer of research in this field, but compared to other similar fields, our share is smaller," said Levine, assistant professor in Georgia Tech's Ivan Allen College of Liberal Arts. "You have to ask yourself, are we happy producing this relatively small share?"

In comparison, the study showed that the U.K. and Israel were producing substantially more research in this area than in other fields. According to the study, the U.K. produced 5.3 percent more research related to human embryonic stem cells than research performed in other areas of molecular biology and genetics, while Israel produced 4.6 percent more research. Levine attributed that to the long-held public and political support of human embryonic stem cell research in those countries.

"Both the U.K. and Israel have long-standing policies that support research in this field," said Levine, "And this support seems likely to have bolstered scientists' efforts to set up labs and acquire funding for their research."

But the biggest surprise was China and Singapore, with China producing 3.2 percent more human embryonic stem cell research than other areas of molecular biology and genetics, and Singapore producing 2.6 percent more research.

"China and Singapore both showed impressive performance in human embryonic stem cell research," said Levine. "Although these countries are very different, both have been striving to grow their biomedical research communities and it seems likely they focused on human embryonic stem cell research, in part, because they saw that traditional scientific powerhouses like the United States were moving so tentatively in this area."

Australia had a more mixed policy and a more mixed result. While Australia does allow new stem cell lines to be created from fertility treatments, it explicitly banned the use of stem cells derived from somatic cell nuclear transfer from 2002 to 2006. Beginning in 2006 scientists were allowed to use stem cells from somatic cell nuclear transfer, but under strict regulatory guidelines. That may explain why Levine's study found that Australia showed a more modest result of producing only 1.6 percent more human embryonic stem cell research than other areas of molecular biology and genetics.

The United States, however, is significantly under-performing in this area. Although Levine's study found that the U.S. produced 36 percent of the research performed on human embryonic stem cells, far more than any other country, when he compared those studies to other areas of research in molecular biology and genetics, he found that the U.S. had a

deficit of 10 percent.

Although the U.S. government is the funding source for 63 percent of academic research and development, federal funds can only be used for studies on a small number of stem cell lines produced before August 9, 2001. As a result, much research in this area in the U.S. is done either with state money or private money.

Given that scientists have less incentive in the private sector to publish research papers, it's possible that Levine's metric undercounts the amount of research done in this area in the U.S. But even so, the contribution from the U.S. is still reduced since research that isn't published does little to increase public knowledge.

But that may change. Venturing where the federal government fears to tread, states like California, New York, Connecticut and Maryland are becoming places researchers can turn to for human embryonic stem cell funding. But Levine thinks that development may complicate matters.

"There are a variety of funding sources out there now, but it makes the field more complicated for scientists to follow the various rules set forth by the states and foundations," said Levine. "I think scientists would prefer clear oversight from a federal government that's supportive of their research."

Levine plans to follow up this current work with a look at how collaboration is affected by these different state policies.

Source: Georgia Institute of Technology

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