Banning federal funding for human embryonic stem cell research would derail related work

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Researchers analyzed more than 2,000 scientific papers and found adult stem cells are not replacing human embryonic stems cells in the laboratory. Instead, the two cell types have proven to be complementary. Credit: © 2011 JupiterImages Corporation

(PhysOrg.com) -- Banning federal funding for human embryonic stem cell research would have "disastrous consequences" on the study of a promising and increasingly popular new stem cell type that is not derived from human embryos, according to a University of Michigan researcher and his colleagues.

Human induced pluripotent stem cells, known as iPS cells, are reprogrammed adult cells that display many of the most scientifically valuable properties of embryonic stem cells while enabling researchers to bypass embryos altogether. Scientists hope to harness the power of both cell types to understand and treat disease, and possibly to grow new

tissues to replace diseased organs.

When they burst onto the scene in 2007, iPS cells were heralded by some as likely replacements for the controversial human embryonic stem cells they mimic.

But a new analysis of more than 2,000 scientific papers by U-M sociologist Jason Owen-Smith and his colleagues finds that iPS cells are not replacing human embryonic stems cells in the laboratory. In fact, the two cell types have proven to be complementary, interdependent research tools, according to a commentary article scheduled for online publication June 9 in the journal *Cell*.

"The incentives to use both types of cell in comparative studies are high because the science behind iPS cells is still in its infancy," Owen-Smith said. "As a result, induced pluripotent stem cells do not offer an easy solution to the difficult ethical questions surrounding embryonic stem cell research."

Because use of the two cell types has become so intertwined, any federal policy that would deny funding for embryonic stem cell research "would derail work with a nascent and exciting technology," said Owen-Smith, who worked with colleagues at Stanford University and the Mayo Clinic.

In August 2010, a Washington, D.C.-based district judge, Royce Lamberth, ruled that federal funding for embryonic stem cell research is illegal because it violates a law that bans public spending on research in which human embryos are damaged or destroyed. Human embryonic stem cells are derived from days-old donated embryos left over from fertility treatments; the embryos are destroyed in the process.

On April 29, a federal appeals court blocked Lamberth's decision and ruled that federal financing of human embryonic stem cell research can

continue, for now.

"We now have new data pointing to 'collateral damage' that could be caused by ill-conceived and politically motivated policy prescriptions," the authors of the Cell paper conclude. "According to the data presented here, an entirely new technology, forged out of the crucible of political controversy, is at risk."

Owen-Smith and his colleagues examined stem cell research papers published between 1998 and 2010. They found that the proportion of papers using iPS cells and human embryonic stem cells together is growing faster than those using iPS cells alone.

In 2008, only 5.1 percent (15) of all papers analyzed used induced pluripotent cell lines, and only three of those papers combined the use of iPS cells with human embryonic stem cells. By 2010, 28 percent (161 of 574) of the papers involved the use of iPS cell technologies, and 62.1 percent of those papers paired induced and embryonic cell lines.

Embryonic stem cells and iPS cells both display pluripotency, the ability to produce all the cell types in the adult body. In interviews conducted as part of the study, researchers said they often compared their iPS cells to human embryonic stem cells to verify that the iPS cells display all the characteristics of pluripotency.

"If federal funding stops for human embryonic stem cell research, it would have a serious negative impact on iPS cell research," said Stanford University bioethicist Christopher Scott, one of the co-authors. "We may never be able to choose between iPS and ES cell research because we don't know which type of cell will be best for eventual therapies."

Provided by University of Michigan