

Debrief: The Embryonic Stem Cell Debate

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The big story today, of course, is the president's action on embryonic stem cell research. But while many of us have an opinion on the issue, we don't necessarily fully understand the questions surrounding it. Below, a debrief on where things now stand.

First off, let's talk about what embryonic stem cell research entails. An embryo is "a clump of cells that would fit barely on the head of a pin," as Susan L. Solomon, CEO of the New York Stem Cell Foundation, says. The embryos are created in a lab through artificial insemination of an egg, usually for the purposes of in vitro fertilization. If this pre-implantation embryo is not used for fertilization, it can be used to create a stem cell "line." This takes place within six days of insemination.

What researchers then have is a clump of perhaps 200 cells that have split multiple times since day one, says Dr. Lorenz Studer, a stem-cell biologist with Memorial Sloan-Kettering Cancer Center.

Perhaps ten of those cells are used to create a stem cell line, which then – and this is crucial – can exist, in theory, forever, since the cells continue to split in perpetuity. You might remember back in 2001, President Bush banned federal funding for research into stem cell lines, but he allowed research to continue on the 21 lines that had been created before his decision. Since the lines could continue to create stem cells forever, the argument went, there was not a need for new lines to be created from embryos.

The problem, says Studer, is that every time cell divides, "there is a chance it accumulates defects – it's not always a perfect copy of itself." So the 21 lines are eventually of less and less use. In addition, the lines made before 2001 were not created with the benefit of the advances of the last few years, and are not as well-designed for laboratory use as more recent lines. In addition, the 21 lines did not make for a very diverse pool of options for scientists to choose from.



Because private creation of stem cell lines has continued since Mr. Bush's decision, there are now roughly 1,000 stem cell lines in existence. (The exact number is nearly impossible to determine.)

President Obama's action today means that federal funding can go to research on these 1,000 lines. The National Institutes Of Health, which will accept applications for research grants involving embryonic stem cell research, must now act to set guidelines for the ethical use of these lines – ensuring, for example, that they were created with the proper consents. They have 120 days to do so.

And while scientists are lauding the president's action today, many still feel that the government is standing in the way of the full benefits of stem cell research. That's because of something called the

Dickey-Wicker amendment, which was first introduced in 1996 and is reintroduced every year.

Dickey-Wicker makes it illegal to use federal funds for research “in which human embryos are created, destroyed, discarded, or knowingly be subjected to risk of injury or death greater than allowed for research on fetuses in utero.”

In other words, even though federal funding can now go to the study of existing stem cell lines, government-funded scientists cannot create new lines, because they cannot create or destroy embryos.

“We are very much opposed to Dickey-Wicker, and feel very strongly that it needs to be removed,” said Sean Tipton of the American Society for Reproductive Medicine.

Tipton argues that scientists are not sufficiently knowledgeable about embryos and that removing Dickey-Wicker could lead to advances in success rates for in-vitro fertilization and advances in dealing with birth defects and diagnosing genetic diseases. And Solomon says new lines above and beyond the 1,000 in existence are needed for the purposes of better drug screening and creating better models for fighting disease. To keep scientists from creating new lines with federal money, she says, is akin to making them “run a one-legged potato sack race” while people are dying from potentially-treatable diseases.

Because of the potential uproar inherent in not reintroducing Dickey-Wicker – it’s part of the appropriations bill each year – it is unlikely that Congress will elect to abandon the amendment.

The president, notably, has not taken a position on the issue – though he did today say members of Congress “are still going to have some work to do” on the stem cell issue, which could be read as a subtle signal that he would not oppose getting rid of it. It could also mean, however, that the president simply wants his action today codified so it cannot be overturned in the future.

There have also been breakthroughs with adult stem cells, which can theoretically be transformed into embryonic form – something embryonic stem-cell research opponents say means there is no longer a need to harvest stem cells from embryos. But while the research is promising, embryonic stem cell research backers like Solomon say the adult cells are not an adequate substitute, and that embryonic stem cells are “absolutely the gold standard” for research purposes.