

Stemming Research



Feds Won't Fund Stem Cell Research, But States Will

President George W. Bush's first-ever veto retained limitations on federal funding for embryonic stem cell research. The vetoed bill that would have allowed—with restrictions—such research was passed with overwhelming bi-partisan support. States, however, continue to fund embryonic stem cell research.

By Kristi Guillory

In July, President Bush vetoed legislation that would have lifted some of the restrictions on federal funding for embryonic stem cell research. However, several states, including California, New Jersey, Maryland, Connecticut and Illinois, use state money to fund such research.

The issue of embryonic stem cell research is one of the most divisive among policymakers.

Funding stem cell research and new developments in the science of isolating cells from embryos has added fuel to the debate.

Although there are restrictions on federal funding for stem cell research, some states continue to financially support such endeavors.

Some policymakers advocate limiting research to adult stem cells. For them the issue is an ethical one because they believe deriving stems cells from embryos is unethical.

Others believe that restricting research to adult stem cells will limit the potential promise that stem cells hold in treating degenerative diseases such as Alzheimer's, juvenile diabetes and Parkinson's disease.

There are no restrictions on funding adult stem cell research. Bone marrow transplants, for example, are adult stem cell therapy. But adult stems cells are not as useful to researchers. Adult stem cells lack the ability to divide multiple times, have a shorter life expectancy and may not be able to develop into as many tissues as embryonic cells.

Federal funding for human embryonic stem cell research was approved by legislation in August 2001. However, the measure limited research to "existing stem cell lines"—those lines that existed before Aug. 9, 2001.

Treatments based on stem cell research are estimated to be at least a decade away, and questions—such as how stem cells repair damaged tissues and how to use stem cells in transplants—remain.

Meanwhile, new developments, and the involvement of states in funding research, could change the tenor of the debate on the issue.

Latest Research Developments

In August, researchers announced a new method of obtaining stem cells from an early stage human embryo. The researchers described the technique in an article for *Nature* magazine in which they implied the experiment was completed without destroying any embryos. The researchers believed that if cells could be extracted from embryos without destroying the embryo, they would be addressing the ethical arguments against stem cell research.

Shortly after *Nature* issued a press release about the study, the magazine issued a clarification stating that all the embryos in the experiment were destroyed.

Advanced Cell Technologies Inc. (ACT), a biotechnology company in Alameda, Calif., stands by its study, contending that the technique holds promise for someday extracting cells without destroying embryos.

Researchers previously conducted experiments by taking clumps of cells from five-day-old embryos that were frozen during in vitro fertilization, a process that destroys the embryos. ACT officials say their technique offers the advantage of developing new stem cell lines derived from a single cell of a two-day-old embryo after the fertilized egg has divided into eight cells, called blastomeres.

ACT maintains in vitro fertilization clinics that look for genetic flaws in newly fertilized embryos are using the process.

Taking one cell or two cells doesn't seem to interfere with later fetal development, but there is still a risk of damaging the embryo. ACT worked with 16 embryos and extracted 91 individual cells. Based on those 91 cells, the researchers were able to produce two stem cell lines.

Dr. James Battey, head of the stem cell task force at the National Institutes of Health, said it is not clear if this new method will be compatible with the federal restrictions because removal of a blastomere still places the embryos at risk.

It is also still unclear whether the stem cell lines created by ACT differ significantly from other stem cell lines.

State Initiatives

Meanwhile, several states continue to fund embryonic stem cell research.

In 2002, California enacted the first state law permitting research involving embryonic stem cells as well as cloned human embryos. In November 2004, voters approved Proposition 71 amending the state constitution to facilitate stem cell research and to establish the California Institute for Regenerative Medicine (CIRM).

Proposition 71 also established a funding stream for stem cell research by authorizing a bond sale to generate \$3 million for research over the next 10 years, with the funds limited only to scientists and facilities in California. CIRM could potentially face a challenge in November when a state Senate bill, if passed, would require CIRM to conduct more open meetings and return a minimum royalty to the state.

New Jersey became the second state to enact a law permitting embryonic stem cell research in January 2004. While New Jersey appropriated funds for adult and embryonic stem cell research, it nonetheless simultaneously endorsed the Bush policy of banning reproductive cloning.

In May 2004, the Stem Cell Institute of New Jersey was established and received funding totaling \$15 million in fiscal years 2005 and 2006. New Jersey recently created the nation's first publicly funded bank for umbilical-cord and placental blood for use in treatment and research.

Illinois Gov. Rod Blagojevich bypassed the legislature two times to allocate state funds for stem cell research. Last year the governor allocated \$10 million for research. This year he announced 10 grants totaling \$10 million for both embryonic and adult stem cell research.

The state health department awarded 10 grants to seven research centers in Illinois. The governor is also supporting legislation to allocate another \$100 million from the state's tobacco settlement to fund such research over the next five years.

In March 2006, the Maryland legislature passed a bill providing \$15 million in stem cell research funding for one year. The bill also establishes a panel to authorize and award grants.

In 2005, Connecticut Gov. Jodi Rell signed legislation providing for \$200 million in funding for stem cell research over the next 10 years.

Other states have enacted legislation prohibiting funding for this type of research. As of July, 26 states have laws imposing some restrictions on stem cell research. South Dakota is the only state that forbids stem cell research entirely.

Latest Developments in Federal Stem Cell Policy

Prior to the Bush Administration policy, no federal funds had been used to support stem cell research. Congress had attached a rider to funding legislation for the National Institutes of Health in 1996. This rider, known as the Dickey amendment, prohibited the U.S. Department of Health and Human Services from using funds for the creation of human embryos for research or for research in which the embryos were destroyed. The Dickey amendment was placed into appropriations bills for the department from fiscal years 1996 to 2006.

The U.S. Senate in 2006 considered three pieces of stem cell legislation.

The Fetus Farming Prohibition Act of 2006 (S. 3504) prohibited the sale or use of tissue from fetuses gestated for research purposes. In fetal farms, human embryos can be made in a nonhuman uterus or from human pregnancies that were created specifically for the purpose of research. This bill was unanimously approved by the House and Senate, and later signed by the president.

A second bill, "The Alternative Pluripotent Stem Cell Therapies Enhancement Act," (S. 2754) failed to pass due to a procedural move by the House of Representatives, after it was easily passed in the Senate. The bill sought to encourage research into methods of obtaining stem cells with the same properties as embryonic stem cells, but without the destruction of embryos, such as using adult stem cells.

Of the three bills in the stem cell package, H.R. 810, the "Stem Cell Research Enhancement Act of 2005," was perhaps the most important.

H.R. 810 would have allowed federal financing for the derivation of new stem cell lines by using embryos left over from in vitro fertilization procedures. This is important because federal support of research of this kind is only limited to stem cell lines created before 2001. This bill was passed in the House in May 2005, but it took a year of negotiations before Senate Majority Leader Bill Frist of Tennessee was able to bring it to the Senate floor.

Most of the language of the bill focuses on ethical requirements for obtaining stem cells to be used for research. This bill had overwhelming bipartisan support, with 200 co-sponsors. The bill placed the following restrictions on embryos used in stem cell research:

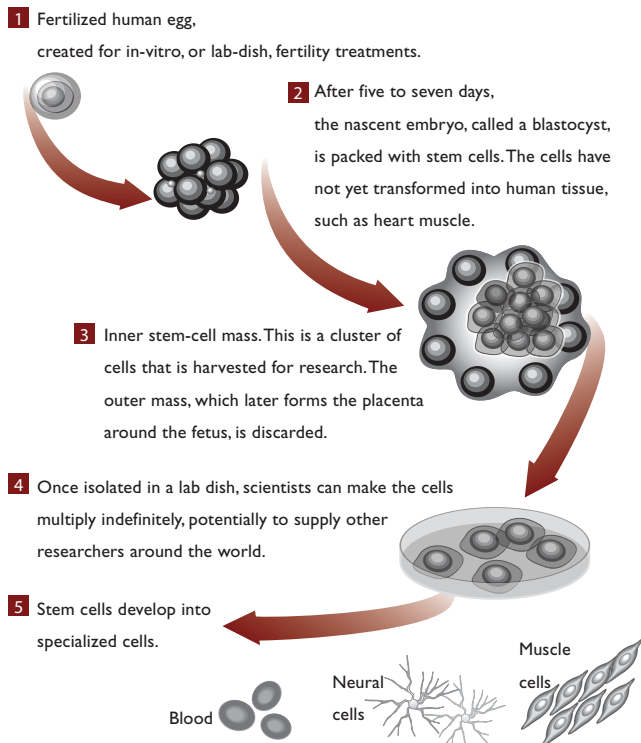
- The stem cells must be derived from human embryos donated from in vitro fertilization clinics, created for the express purpose of fertility treatment, and in excess of the clinical need of individuals seeking fertility treatment;
- The embryos would never be implanted in a woman and would be discarded; and
- Embryo donations must be obtained through written consent from the individual seeking treatment and consent must be obtained without monetary compensation or other inducements.

President Bush vetoed H.R. 810 July 19. This was the first veto of his presidency. The House was unsuccessful in its attempt to override the veto.

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Where stem cells come from

Scientists believe stem cells from human embryos have the potential to cure disease because they can morph into any cell in the body. In theory, stem cells could someday be used to replace damaged brain cells in Alzheimer's patients, for instance. The research raises ethical questions, however, because stem cells are taken from embryos. Here is an outline of how the stem cells are harvested.



Source: University of Wisconsin-Madison

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