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Somatic Cell Nuclear Transfer (Therapeutic Cloning)

Cloning is the creation of multiple copies of a single molecule, cell, or virus. There are many different kinds of cloning, most of which are now commonplace in science. Cloning has allowed scientists to develop powerful new drugs and to produce insulin and useful bacteria in the lab. It also allows researchers to track the origins of biological weapons, catch criminals and free innocent people, and produce new plants and livestock to feed an undernourished world population.

Somatic Cell Nuclear Transfer (SCNT) or therapeutic cloning involves removing the nucleus of an unfertilized egg cell, replacing it with the material from the nucleus of a "somatic cell" (a skin, heart, or nerve cell, for example), and stimulating this cell to begin dividing. Once the cell begins dividing, stem cells can be extracted 5-6 days later and used for research. The AAMC supports on-going research into SCNT and has endorsed legislation that would allow such research to flourish.

Reproductive cloning, on the other hand, is intended to create human beings by cloning human embryos. The AAMC and the National Academy of Sciences recommends a legally enforceable ban on all forms of this type of cloning.

Congressional Action

Congressional interest in issues related to human cloning remains high. A number of hearings have been held and several bills have been introduced in the 107th Congress.

On July 31, 2001, the House of Representatives passed H.R. 2505, introduced by Reps. Dave Weldon (R-Fla.) and Bart Stupak (D-Mich.), by a vote of 265 to 162 after rejecting an alternative bill (H.R. 2608) crafted by Reps. Jim Greenwood (R-Pa.) and Peter Deutsch (D-Fla.) by a vote of 178 to 249. The major difference between the proposals is that the Weldon-Stupak bill would ban all human cloning (whether for reproductive or research/therapeutic purposes) while the Greenwood-Deutsch bill would only prohibit cloning intended to create a human being. Supporters of the Greenwood-Deutsch bill fear that an all-out ban on cloning research would also impede research using pluripotent human embryonic stem cells. The AAMC endorsed an earlier version of the Greenwood-Deutsch bill (H.R. 2172) on June 27, 2001.

In the Senate, there are two major proposals under consideration. Senator Sam Brownback (R-Kan.) has introduced the "Human Cloning Prohibition Act of 2001" (originally introduced as S. 790 and reintroduced as S. 1899 on January 28, 2002) as a companion bill to H.R. 2505. The Brownback bill defines human cloning as "human asexual reproduction, accomplished by introducing nuclear material from one or more human somatic cells into a fertilized or unfertilized oocyte whose nuclear material has been removed or inactivated so as to produce a living organism (at any stage of development) that is genetically virtually identical to an existing or previously existing human organism." The bill also prohibits shipping or receiving "for any purpose an embryo produced human cloning or any product derived from such embryo," a provision some fear would limit the transfer to the United States of therapies developed overseas.

Violators would be subject to fines or imprisonment or both and civil penalties of not less than $1 million. For cases involving a financial gain greater than $1 million, civil penalties cannot exceed more than twice the amount of the gain. S.1899 includes a limited research protection provision, covering "research in the use of nuclear transfer or other cloning techniques to produce molecules, DNA, cells other than human embryos, tissues, organs, plants, or animals other than humans." The Brownback bill also calls for a General Accounting Office study of new developments in technology "for human cloning and somatic cell nuclear transfer, the need (if any) for somatic cell nuclear transfer to produce medical advances, current public attitudes and prevailing ethical views concerning the use of somatic cell nuclear transfer, and potential legal implications of research in somatic cell nuclear transfer…."

On May 1, a bipartisan group of senators, led by Senators Arlen Specter (R-Pa,), Dianne Feinstein (D-Calif.), Orrin Hatch (R-Utah) and Edward Kennedy (D-Mass.) introduced legislation to prohibit human cloning while preserving the use of cloning technology to produce stem cells. S. 2439 would make it illegal to implant or attempt to implant the product of nuclear transplantation into a uterus or "the functional equivalent of a uterus." Violators would be subject to criminal penalties of up to 10 years in prison and civil penalties of at least $1 million. The bill would also prohibit shipping the products of nuclear transplantation to conduct human cloning in the United States or overseas.

The bill would permit research using nuclear transplantation to produce embryonic stem cells, and would apply federal ethical requirements - including informed consent, ethics review board review, and protections of the safety and privacy of research participants - to all nuclear transplantation research. Violations of the ethics requirements are subject to a $250,000 civil penalty.

S. 2439 is a revised version of legislation introduced last December by Senators Feinstein and Kennedy as an alternative to the proposal by Senator Sam Brownback (R-Ka,) that would ban both reproductive cloning as well as the use of nuclear transplantation to produce stem cells.

AAMC President Jordan Cohen, M.D., April 30 issued a press statement endorsing S, 2439, saying, "[W]e will never see the fulfillment of any of this promise [of stem cell research] if we choose to take the perilous and

Related Resources

- Coalition for the Advancement of Medical Research
- President's Council on Bioethics Report on Cloning
- Faculty Petition on SCNT

AAMC Documents

- May 10, 2002 AAMC Letter on Specter Legislation (S.2439)
- April 30, 2002 AAMC Press Releasease
- March 29, 2002 AAMC Statement on Human Cloning
- January 24, 2002 AAMC Letter on Feinstein Legislation
- November 27, 2001 AAMC Letter on SCNT Legislation
- July 27, 2001 AAMC Letter on Greenwood Legislation
- July 27, 2001 AAMC Letter on Greenwood Legislation

unprecedented path of banning through legislation research on nuclear transplantation to produce stem cells."

To date, members of the Senate have failed to reach time and procedural agreements that would allow cloning-related legislation to be considered on the Senate floor.

President's Council on Bioethics

The Council on Bioethics, appointed by President Bush as part of his stem cell research funding decision last August, issued its cloning report on July 11, 2002. The 18-member panel was unanimous in its opposition to reproductive cloning, but split on somatic cell nuclear transfer (SCNT) research (or therapeutic cloning). The panel mustered 10 votes in favor of a four-year moratorium on such research. Seven members of the panel recommended allowing SCNT research to go forward and one member abstained from making any recommendation.

There is no legislation pending in Congress to impose a moratorium on SCNT research. On July 12, 2002 Dr. Maxine Singer, President of the Carnegie Institution, presented the Council on Bioethics with a petition against a moratorium and a ban on SCNT. Over 2,000 medical schools and university science department faculty members signed the petition.. "The petition signals that a large group of informed medical and scientific opinion in this country does not agree with the Council's call for a moratorium," said Dr. Singer. "The petition amounts to an urgent request to allow this promising research to go forward in the interest of millions who are afflicted with severe childhood and adult illnesses." The Council for the Advancement of Medical Research organized the petition.