



## Human Cloning

### Overview

Human cloning is the laboratory creation of a human being who is genetically identical to another human being already in existence. There are two purposes for cloning – “reproductive” and “therapeutic.”

In reproductive cloning, a cloned human embryo is implanted in a womb with the expectation of producing a live birth. In therapeutic cloning, the cloned human embryo is created to increase the available supply of embryonic stem cells (“ESCs”) for research. Once the ESCs are extracted from the cloned human embryo, the embryo is destroyed. Today, only ESCs from unused embryos from in-vitro infertility clinics are used for research.

Human cloning is not needed for either reproductive or therapeutic purposes. To date, scientists have found adult stem cells (“ASCs”) to be a better research alternative to ESCs. ESCs have shown to be unstable, not as viable, and prone to develop into tumors and abnormal cells. This finding is supported by an overwhelming majority of peer-reviewed scientific research that is addressed in the following text. Utilization of ASCs also avoids the serious ethical/moral dilemmas sparked by human cloning and avoids the ethical quagmire of destroying one life to aid another.

A major breakthrough in this arena occurred in November 2007 when Professor Ian Wilmut, famous for cloning Dolly the sheep, announced his discovery of a process for creating stem cells from human skin. At the time of his announcement, he made it known that he no longer wished to pursue embryonic stem cell research. Instead, he stated that he saw the future of science being in a new technique wherein adult stem cells are modified to have embryonic properties. In this way, all controversy is avoided.<sup>1</sup> This new technique is already showing some success. In December 2007, scientists announced they used the technique to cure mice of sickle cell anemia.<sup>2</sup>

A San Diego biotech firm, Stemagen, announced in January 2008 that they have become the first to document cloning a human being by inserting DNA from the skin cells of an adult male into a donated egg cell.<sup>3</sup>

## **Federal Response to Cloning**

In August 2001, President Bush signed an order to prevent federal funds from being used on any new stem cell lines. Only the existing 60 lines could qualify for federal grants. In 2002, President Bush created, through an executive order, the President's Council on Bioethics to examine both sides of the cloning issue from a scientific and ethical perspective and to present a report on their findings. The report (found at [www.bioethics.gov](http://www.bioethics.gov)) detailed arguments for both sides of the bioethics debate and is used as a tool for lawmakers and scientists engaging in these issues. President Bush also announced in August 2001 that federal funds may not be used to fund any creation or cloning of human embryos.<sup>4</sup>

Many in Congress have taken the information found in the Council's report and applied it to policy. Senator Sam Brownback (R-KS) has been at the forefront of this debate and introduced many pieces of legislation to control or ban many of these scientific endeavors. One example is Senate Bill 658, which bans human cloning, participating in any human cloning experiments, and shipping cloned embryos.<sup>5</sup> In addition, Brownback introduced Senate Bill 1373, which would prohibit human chimeras, or human-animal hybrids. This bill prohibits the creation and transfer of chimeras and establishes a large fine and potential jail time for violations.<sup>6</sup> Brownback has repeatedly tried to pass legislation on these issues, but the bills have been held in committee.

Congress has responded to these developments by passing legislation on this issue, which President Bush signed. The Stem Cell Therapeutic and Research Act of 2005 provides a mechanism to promote umbilical cord blood donations and research.<sup>7</sup> This blood has proven to be very effective as a substitute for bone marrow and contains "embryonic-like" stem cells, which could be used for research on such diseases as Alzheimer's and multiple sclerosis without actually using the cells of a human embryo.<sup>8</sup>

In July 2006, the United States Congress considered three bills related to stem cell research.<sup>9</sup> The first, S.2754, would provide funding for non-embryonic stem cell research and was passed unanimously in the Senate but failed in the House. The second, S.3504, bans the practice of "fetal farming." Fetal farming is the practice of creating human embryos with the intent of destroying them and using the cells for research. This bill was passed unanimously and signed into law. The third, H.R. 810, would have allowed federal funding for embryonic stem cell research on embryos originally created for reproductive purposes and was passed by Congress but vetoed by President Bush because of ethical concerns.<sup>10</sup> In 2007, Congress passed more legislation to fund embryonic stem cell research, and President Bush vetoed the bill. The Senate also passed the Hope Offered through Principled and Ethical Stem Cell Research Act, or "HOPE Act" in 2007, which encourages adult and non-embryonic stem cell research. The bill is currently in the House of Representatives.

## **State Responses to Cloning**

Many states have also taken steps to regulate or encourage cloning and biotech research. In 2003, New Jersey became the first state to legalize embryonic stem cell research ("ESCR"), provided there is written consent from the donor. The cells may be used for research only and may not be used to clone a human being.<sup>11</sup> Currently only New Jersey and California allow ESCR, but it is being considered by several legislatures nationwide.<sup>12</sup> Voters in New Jersey, however, rejected a

referendum to authorize \$450 million on ESCR in November 2007.<sup>13</sup>

Other states have chosen to ban human cloning and ESCR altogether. To date, 15 states have a statute banning human cloning, at least for reproductive purposes.<sup>14</sup> Six of these states (Arkansas, Indiana, Iowa, Michigan, North Dakota, and South Dakota) have also banned "therapeutic" cloning. In 2005, Arizona joined Missouri by enacting a law that banned public funding for human cloning and cloning research. In November 2006, however, Missouri voters passed a state constitutional amendment which was billed as a measure to ban cloning. The actual language of the amendment only bans human reproductive cloning, thus, cloning for the purpose of creating embryonic stem cells for research and "therapeutic" uses is legal in Missouri.

## **Conclusion**

Cloning is risky. According to an early January 2002 statement from the lead scientist of the team that cloned the first sheep, Dolly became lame from arthritis and had to be euthanized. Although arthritis is not unknown in sheep, it developed at an unusually young age, suggesting it may have been the result of a genetic defect.

Cloning also has a high failure rate. Scientists readily admit that nearly all attempts to clone animals fail. Attempts to clone humans will use the same technology used to clone animals. Dolly's live birth occurred after 276 previously failed attempts. Most clones that develop past the embryonic stage will die in utero or are born with severe, life-threatening abnormalities.

Human cloning is unnecessary and unjustifiable. It takes a utilitarian view of human embryos, viewing them not as people, but as a commodity. Allowing therapeutic cloning technology to be perfected will also lead to future reproductive cloning activities because stored in-vitro embryos would be indistinguishable from stored cloned human embryos.

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- <sup>3</sup> Somers, T. (2008, January 17). Successful embryo cloning documented. *The San Diego Union-Tribune*. Retrieved January 23, 2008, from [http://www.signonsandiego.com/uniontrib/20080117/news\\_1n17embryo.html](http://www.signonsandiego.com/uniontrib/20080117/news_1n17embryo.html)
- <sup>4</sup> "Fact Sheet: Embryonic Stem Cell Research." Issued by The White House on 9 August 2001. <http://www.whitehouse.gov/news/releases/2001/08/20010809-1.html>
- <sup>5</sup> Brownback, Sam. S. 658. 109<sup>th</sup> Congress, 1<sup>st</sup> Session, 2005. [thomas.loc.gov](http://thomas.loc.gov)
- <sup>6</sup> Brownback, Sam. S.1373. 109<sup>th</sup> Congress, 1<sup>st</sup> Session, 2005. [thomas.loc.gov](http://thomas.loc.gov)
- <sup>7</sup> "House and Senate Pass Stem Cell Cord Blood Bill; New Hope for Treatment of Devastating [sic] Illness, Enzi Says." U.S. Senate Committee on Health, Education, Labor, and Pensions press release. December 17, 2005. <http://help.senate.gov/121705.htm>
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- <sup>10</sup> Bush, George W. "President Vetoes HR 801, the 'Stem Cell Research Enhancement Act of 2005.'" <http://www.whitehouse.gov/news/releases/2006/07/20060719-5.html>
- <sup>11</sup> New Jersey Revised Statutes. C.26:2Z-2. 2 January 2004. [http://www.njleg.state.nj.us/2002/Bills/PL03/203\\_.PDF](http://www.njleg.state.nj.us/2002/Bills/PL03/203_.PDF)
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