

Activity 1: The Public Profile of Stem Cell Research

"Stem Cell Research: Cell Plasticity or Political Rigidity?" by Katayoun Chamany.

Despite long-standing cries of immorality, stem cell and human cloning research are moving forward at a dizzying pace. In the 1950s, scientists working on model organisms, such as mice and frogs, identified cells capable of differentiating into any cell type of an adult organism. In 1996, Dolly, the first animal clone, was made using a sheep egg devoid of nuclear DNA and genetic information from a sheep mammary cell. This chimeric cell went on to produce all the cells of the adult sheep Dolly. Two years later cells isolated from early human embryos demonstrated their potential to differentiate into any cell type as well. More recently, scientists discovered cells in the adult human which may be malleable enough to adopt different cell fates and have been used to treat Parkinson's in humans and a variety of disorders in mice (1-4). Collectively, these discoveries enabled scientists to envision new avenues for basic scientific and medical research.

Cloning and stem cell research might seem to have little in common, but the boundaries between these two fields have blurred as new techniques for obtaining stem cells emerged. Cloning offers a limitless supply of embryonic stem cells (ESC) capable of becoming any cell in the adult organism. Although some research has been done with adult stem cells, their capacity to become any cell type is in question asking scientists and ethicists to consider alternative means of producing ESCs.

It was the destruction of human embryos to procure ESC lines that placed scientists at the center of an ethical debate. In 2001, President Bush limited stem cell research by placing restrictions on the use of federal funds to construct future stem cells lines, and in 2006 he vetoed a bill that would expand these lines (5). His decisions resulted in an exodus of research dollars to countries with more lenient laws towards this research (6). Many scientists have forged collaborations with foreign colleagues and, in some extreme cases, relocated their labs to foreign lands (7).

As proclamations of human clones emerge from foreign news headlines, the debates surrounding federal funding of human stem cell research in the United States will continue to escalate (8-10). The House and Senate continue to draft and review numerous bills that would provide federal funding for research on human embryos that are less than 14 days old, and some that would allow scientists to use therapeutic cloning techniques for medical research (S. 1893, S. 2439, and S. 1758) (11, 12). As the United States struggles to come to consensus on human cloning and stem cell research, many countries have passed legislation that may leave the U.S. in the dust. The U.K., Singapore, Australia, and Japan are moving quickly to establish human stem cell lines for therapeutic and basic science research purposes while placing moratoriums or strict ethical guidelines on human cloning for reproductive purposes. The U.K. went so far as to establish a government run repository of human stem cell lines (13-15). Regardless of whether government or private monies are used, any individual or organization who derives a human stem cell line must provide a stock for the government

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repository and make this stem cell line freely available to any member of the U.K. scientific community.

To keep the scientific edge at home, Stanford, MIT, Harvard, and other established universities balked at the President's decision, and used private dollars to set up stem cell research institutes that will continue to derive stem cell lines from both embryos and adult cells (16-18). These efforts have only fueled the war between those against and those in support of embryonic stem cell research technology. Many states in the U.S. have committed funds towards stem cell research(7, 19).

Theologians have joined patient advocacy groups to discuss the meaning of such research and the impact that it will have on society as a whole. The arguments are varied and far reaching and include new definitions of life and aging. Some weigh potential life saving cures against loss of potential lives. Others find the pursuit of knowledge for the sheer sake of expanding our understanding of fertilization, embryogenesis, and cell differentiation to be an immoral luxury.

Furthermore, the level of public international debate over the use of stem cells for reproductive and/or therapeutic uses has become entangled with many other debates that include patenting of biological material, infringement of intellectual property rights and human rights, and the use of cloning to avoid the loss of endangered species. These concerns have led to civil action. For example, a federal lawsuit was brought up against the Bush administration for halting vital stem cell research (11). The number of lawsuits claiming other human rights violations will most likely increase in coming years.

The United Nations, deciding to focus on only one aspect of this issue, formed the Ad Hoc Committee on an International Convention Against the Reproductive Cloning of Human Beings (20). Though a legal ban against cloning as a form of reproduction is strongly supported by all member states, progress on legislation was stymied. Both the Vatican and the United States sought to ban cloning for any purpose, including stem cell research, while other members felt strongly that cloning should be permitted for this purpose. A non-binding declaration was issued, but the decision to legally ban was slated to be revisited in the future (21, 22).

Not since the self-imposed moratorium on recombinant DNA research in 1972, has the government and the public taken such active roles in influencing the direction of scientific research. The roles that scientists, patients, lobbyists, businessman, and religious leaders play in decision making will only become more significant. Though the disbandment of the Congressional Office of Technology Assessment and NIH Embryo Research Panel/Ethics Advisory Committee was of concern to stem cell researchers, a newly minted President's Bioethics Council released a report in March 2004 that supported stem cell research for therapeutic purposes(23). Meanwhile, the controversy over federal funding for stem cell research split the Democratic and Republican presidential campaigns in the United States (16). Internationally, the world was stunned by the announcement that a major human stem cell researcher falsified data and used unethical protocols to procure human eggs for his cloning studies (24, 25). This scandal

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was predicted by a numbers of bioethicists who remain concerned about the ethics of oocyte donation and the challenges involved in establishing public stem cell banks the ensure equal access to stem cell therapies (26, 27).

The situation serves as an exemplar of the urgent need for civic understanding of science and technology. Without an engaged populace capable of making informed decisions on a social and personal level, some believe that we may live to see a real life enactment of the cloning horrors portrayed in the film "Boys from Brazil." If national or international guidelines are not put in place soon, embryonic stem cell research may move into the frays of the unregulated private sector and set precedent for other controversial scientific pursuits.

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