Abstract

Studies over the past decade have shown that stem cell research has clearly opened up a breakthrough in possibilities for treating people with a myriad of serious and chronic diseases. Even though the benefits to such research seem boundless, the disadvantages of obtaining these stem cells weigh heavily on critics' minds. Specifically, embryonic stem cell research has sparked a debate of intense ethical concerns. These debates demand a clarification of the status of the human embryo. Do these undeveloped fetuses deserve the same rights as a living human being? Scientists are now working to expand past these debates by continuing to search for other methods of harvesting human embryonic stem cells without the potential of affecting a "human life." Also, research has recently uncovered the potential for other stem cells that have similar benefits but are not obtained using human embryos.

Embryonic Stem Cell Research:

The Ethics Surrounding the Debate

As biotechnology and research on stem cells continue to make advances, many controversial issues within these fields are rising to the forefront of concern for the majority of modern Americans. Although it is apparent that stem cells will hopefully be used to treat people with a variety of conditions including diseases such as Alzheimer's and rheumatoid arthritis, many skeptics believe that the research surrounding these advances with human embryonic stem cells (ESCs) is morally and ethically wrong (Stem Cell 2008). One of the key ethical debates surrounding human ESC research involves defining the point at which "life" actually begins for a human being. Another concern revolves around whether or not embryos are being "killed" in order to remove the crucial stem cells. The proponents state that the medical benefits outweigh any side effects from tampering with the human embryonic stem cells and argue that the embryos are not yet humans; however, the opponents argue that these embryos should be recognized as human beings. The opponents also state that the "possible" advances do not overcome the ethics of "destroying" a human life and argue that there are simply too many medical risks associated with treatment using the stem cells derived from embryos (Monroe, Miller, & Tobis 2008).

Advocates for Research

The United States National Institutes of Health (NIH) implies that stem cells hold many promises for unlocking life-saving secrets of the cell because of two distinct characteristics: 1) they give rise to different kinds of tissues in the body, and 2) they are "self-renewing" in the body and in the laboratory so that large quantities can be produced for medical purposes (Stem Cell 2008). From the standpoint of one researcher, ESCs are in many ways the *ultimate* stem cell

for scientists. These specific cells are capable of becoming almost any type of cell or tissue and are easy to isolate and grow in the laboratory which can be crucial in cell-based regenerative therapy (Peters 2007).

Scientific Reasonings

According to Richard Mollard, Ph.D., an embryonic stem cell specialist, ESCs are harvested from the inner cell mass of the blastocyst produced from in vitro fertilization and are generally extracted from unwanted, surplus embryos commonly created during medical procedures at these fertility clinics (Mollard 2005). The NIH states that stem cells "are not derived from eggs fertilized in a woman's body." Also, in order to donate these embryos to research, consent must be given by the donors (Stem Cell 2008).

Dr. Mollard also outlines the process of embryonic development: at four to six days old, the human fertilized egg grows into a mass of cells called a blastocyst. The blastocyst continues through many embryonic stages before physically developing into a fetus. During fertility procedures, more eggs are fertilized than necessary and "those blastocysts that are not implanted for pregnancy are usually frozen for future use by the couple who produced them, or are ultimately discarded." The author implies that it would be better to make use of these embryos rather than simply having them "thrown away" (Mollard 2005).

Moral State of the Embryo

Yet another prominent researcher suggests the human state of an embryo: "I do not *remember* being a single cell or a (part of a) blastocyst, so my belief that I developed out of a one-celled animal or a blastocyst is not based on experimental memory" (Monroe et al., 2008). This argument does not, however, have much stability against others as the majority of ordinary people do not even remember what they ate for lunch yesterday.

A scholarly article which proposes yet another theory states that these embryos have no self-awareness, thought processes, or consciousness. Blastocysts are sometimes referred to as "pre-embryos" as they have no brain, central nervous system, heart, lungs, or other internal organ. They are essentially smaller than a pin-point and consist of a number of identical cells containing human DNA. However, these embryos do have the potential to develop into a human being (Bailey 2006).

Opposition and Resistance

The major tasks among critics of the research have been to decide how to act toward an embryo and whether to recognize it as a "person." One noted researcher and moral philosopher, Philip J. Nickel, argues the ethical debate about stem cells from several vantage points (Monroe et al., 2008). The author proposes the "Loss of Future Life Problem" for human embryonic stem cell research which basically states that if the embryos are destroyed for stem cell research, then what about the "possible people?" Or the "loss of future life?" Nickel proposes the view that disrupting the natural possibility of a person to have a future life is ultimately "bad." The author also proposes a concrete moral example in the relation of harvesting stem cells to harvesting organs: would there truly be an overall benefit to the number of years gained by existing people if we killed other healthy people in order to harvest their healthy organs? This would absolutely defeat the purpose of obtaining the organs or in relation to this argument, the stem cells, in the hope of gaining a significant benefit (Monroe et al., 2008). In other words, scientists are simply just killing humans to help humans.

According to the Catholic denomination, based on an article from The Vatican, some opponents feel that embryos, even prior to implantation back in the uterus, represent potential persons who have rights that include the right to live and not be killed even to save the life of

another (Vatican 2006). This position can lead into an enormous religious debate which is thoroughly addressed in hundreds of readily available books and articles.

Medical Risks Associated with Regenerative Therapy

Even though adult stem cells are currently being used as effective methods for regenerative therapy, embryonic stem cells have yet to be physically tested on human subjects. There are several major risks that must be overcome which are associated with the implantation of human embryonic stem cells. These risks include tumor formation and immune rejection. Obviously, this is a critical problem for understanding and controlling the research. According to the Board of Neuroscience and Behavioral Health, the behavior of embryonic stem cells implanted in a particular organ has yet to be thoroughly tested. However, the differentiation of these stem cells into other particular cells is still under careful observation. Also, an understanding of how to prevent rejection of transplanted cells is fundamental to their being effective in the use of regenerative medicine. These risks associated with the use of embryonic stem cells as therapy are certainly another underlying factor that results in the opposition to their research (NRC 2002).

Accepting Human Embryos: Changing Beliefs

Recent pro-lifers are beginning to understand the benefits of using the human embryo as a viable source of research as these opponents are slowly becoming influenced by the possibility of alternate sources for stem cells. Some accept the use of new cell lines as long as the cells are derived from embryos produced in fertility clinics that are no longer needed for reproductive purposes. Others accept the use of stem cells derived from embryos created specifically for research from eggs and sperm donated by volunteers who are unrelated to each other and have no

reproductive intent. This could be an enormous leap towards quelling the ethical debate (Monroe et al., 2008).

Clearly, the ethical debate surrounding embryonic stem cell research is an issue that has two distinct sides. The terms and policies each side presents for their argument need to be clearly defined in order to formulate an opinion on the subject as a whole, which is becoming harder to accomplish as technology is constantly advancing and new methods of research are beginning to surface. For example, scientists have recently developed a method of "coaxing" adult stem cells into changing into many other types of tissues, hence, induced-pluripotent stem cells (White House 2007). For the advocates, perhaps research will continue past the current restraints and medical feats will one day be accomplished that awe the nation. For the adversaries, the cloud of possible medical advances for some of the world's most debilitating and complex health problems looms heavily over their heads, but they continue to propose and support strong arguments against the research. However, despite what the two sides have to argue, embryonic stem cell research is a serious ethical issue that poses many questions to be taken into consideration before imposing any sort of judgment on the subject.

References

Bailey, Ronald. "Cloned Embryos Are No More than Cells." *Contemporary Issues Companion: Cloning*. Ed. Sylvia Engdahl. Detroit: Greenhaven Press, 2006. *Opposing Viewpoints Resource Center*. Gale. Samford University Library. Retrieved 19 Sep. 2008, from http://find.galegroup.com/ovrc/infomark.do?&content

The author gives his opinion of why stem cells are not developed humans and why they are simply just a mass of cells. He realistically argues both sides of the debate and gives concrete explanation and citation for his persuasions. The author states that each embryo does have the potential to be a human but it requires a suitable environment…not a laboratory. The author uses clear information from politics to religion.

Mollard, R. "Embryonic Stem Cells." International Society for Stem Cell Research. 5 Feb 2005. Deerfield, Illinois. Retrieved 16 Sept 2008, from http://www.isscr.org/ public/ escells.htm

The author goes into a detailed discussion of how stem cells are obtained from human embryos. He descriptively explains the exact process used from the harvesting of embryos through the blastocyst stage and also goes into great detail about the process of in vitro fertilization. His article is published on the International Society for Stem Cell Research's website. This committee was actually created in response to the growing stem cell debate. Dr. Mollard's sitealso articulates the value and research of embryonic stem cells. He provides concise, detailed information without the technicality of in-depth scientific terms. Mollard stresses the importance of continued research on human embryos as an important resource for scientific studies.

Monroe, K. R., Miller, R. B., & Tobis, J. (Eds.). (2008). *Fundamentals of the Stem Cell Debate: The Scientific, Religious, Ethical, and Political Issues*. Berkeley: University of California Press.

According to these editors, who have compiled a book which illuminates the debate in a well-informed way, few recent advances in science have generated as much excitement and controversy as human embryonic stem cells. They say that the potential of these cells to replace diseased or damaged cells in virtually every tissue of the body heralds the advent of an extraordinary new field of medicine. Controversy arises, however, because current techniques required to harvest stem cells involve the destruction of the human blastocyst. This book explains why understanding the complex issues--scientific, religious, ethical, and political—is an essential tool in understanding the current public

debate about stem cell research. This book clearly explains this new scientific development and explores its ramifications.

National Research Council (NRC). Institute of Medicine (2002). *Stem Cells and the Future of Regenerative Medicine.* Washington: National Academy Press. Samford University Library.

The compilation of scientific research by several well-known organizations state that stem cells provide a deeper exploration of the biological, ethical, and therapeutic uses of undifferentiated human cells – ESCs. Recent scientific breakthroughs and conflicting religious beliefs come together to bring the state of stem cell research specifically embryonic stem cell research into the political crosshairs. The book also addresses President Bush's watershed policy statement allowing federal funding for embryonic stem cell research but only on a limited number of stem cell lines. The book summarizes what we know about adult and embryonic stem cells and discusses how to go about the transition from mouse studies to research that has therapeutic implications for people. Also, the editors argue the moral and ethical problems that arise from the use of embryonic stem cells.

Peters, T. (2007). *The Stem Cell Debate*. Mineapolis: Fortress Press.

The author reflects on the science of stem cells and the progresses in regenerative medicine. Peters traces the strongly divided ethical debate to three very different and distinct moral frameworks: embryo protection, nature protection, and medical benefits. Through this, the author shows the deepest and most relevant concerns of each, alongside the strict ethical framework employed in most medical practices. His work is unique and a true model for how ethics should be practiced in today's medical world. Peters touches especially on the religious views of stem cell research at several points throughout his book. This also gives a separate aspect on the ethical debate of research.

Stem Cell Basics. In *Stem Cell Information* [World Wide Web site]. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Services, 2008. Retrieved September 18, 2008, from http://stemcells.nih.gov/info/basics/defaultpage

This site by the National Institutes of Health is an excellent resource for basic information on stem cells. It includes a plethora of factual information that is reliable and continually updated. The website also provides links to other reliable sites which further back up the information provided and give the reader the opportunity to explore further research.

Vatican. "All Human Cloning Is Immoral and Should Be Banned." *At Issue: The Ethics of Human Cloning*. Ed. John Woodward. San Diego: Greenhaven Press, 2005. *Opposing Viewpoints Resource Center*. Gale. Samford University Library. Retrieved 22 Sep. 2008, from http://find.galegroup.com/ovrc/infomark.do?&content

The authors make extremely clear statements and argue against stem cell research. Human cloning is referring to the human embryonic stem cells that are being cultured and multiplied in a laboratory setting. The article continues to discuss the background and purposes of cloning. It clearly argues that any form of human cloning should be banned and that all humans have the right to live. The article argues that human cloning is against the dignity of human beings. This was clearly a great source for the adversary argument as it provided insight into the religious perspective.

White House. Domestic Policy Council. January 2007. *Advancing Stem Cell Science Without Destroying Human Life.* Retrieved 17 September 2008, from Samford University Library http://www.whitehouse.gov/dpc/stemcell/2007/index.html

This is an extensive governmental policy and executive summary of the recent advances in stem cell research. It focuses on many political issues and addresses the ethical concerns of research thoroughly. The 67-page document also contains information about the federal funding for research as well as many recent advances that have been made toward researching without destroying the embryo. The two main topics concern the advances of treatment using adult stem cells and treatment of pluripotent stem cells.