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Embryonic Stem Cell Research: An Investment in Our Medical Future

“Rather than furthering discovery, our government has forced what I believe is a false choice between sound science and moral values,” President Obama states, referring to the running debate on embryonic stem cell research. In recent years, the debate over embryonic stem cell research has been extremely heated. While harvesting embryonic stem cells presents ethical issues, the benefits it promises to yield are numerous; from Parkinson’s disease to spinal cord injuries, stem cells seem to have a cure for nearly everything. The forward movement of embryonic stem cell research has been halted by government policies, as federal funding limits researchers in where and how they obtain their stem cells. Ultimately, embryonic stem cell research should obtain federal funding without limits because these cells have an immense beneficial potential regarding treatment of disease; the debate against embryonic stem cell research is largely grounded in unnecessary moral issues and impedes the development of important medical discoveries.

Generally speaking, stem cells are blank cells with the potential to become any type of cell found in the body. According to Dr. Peter J. Bryant, professor of developmental and cell biology, and Dr. Philip A. Schwartz, stem cell biologist, stem cells are “undifferentiated cells found in the embryos and the later life stages of animals, including humans... they can expand their numbers while remaining

undifferentiated or can differentiate and contribute to the development or repair of tissues of the body” (Bryant and Schwartz 10). This means these cells are precursors to every cell in the human body; they can multiply to make more precursor cells, or they can go on to develop into certain cell types, like heart cells, blood cells, liver cells, and so on.

Stem cells come in two main types, adult stem cells and embryonic stem cells (Skancke 7). Adult stem cells come from the adult human body and can be harvested from bone marrow or the subventricular zone of the brain (Eve, Marty, et al). These cells can only differentiate into a limited number of cell types (Skancke 7).

Embryonic stem cells are the cells that cause controversy. They come from the inner layer of a blastocyst, or mass of cells, that forms four to five days after conception; this means that harvesting embryonic stem cells destroys a human embryo (Eve, Marty, et al). These cells have the ability to differentiate into over two hundred cell types, making them more pluripotent than adult stem cells (Skancke 7). Embryonic stem cells can yield the most medical benefits due to their ability to differentiate into such a large number of cell types, but they also bring up significant moral and ethical questions due to where and how they’re obtained.

The debate over embryonic stem cells isn’t a simple, black and white argument. Much like the debate over abortion, there are many facets to the issue that make it difficult to put forth an easy solution. The issues within the debate have proved to be highly controversial, forcing policymakers to limit federal funding of embryonic stem cell research because many taxpayers don’t feel comfortable with their money endorsing a practice they see as unethical.

One of the main issues at the center of the debate is the question of when human life begins. According to William L. Saunders, Jr., senior fellow and director of the Center for Human Life and Bioethics, life begins at fertilization when an egg and sperm cell unite (Saunders 26). Many agree with this point, but the issue gets complicated because it's hard to define exactly what a life is and what it entails.

At the point of conception, an embryo is formed. This embryo has the potential to go on and eventually become a fully functioning adult human. Because of this, many believe that a human embryo is a living thing and should be protected under every right afforded to living adults. This means destroying an embryo would be taking away a human's right to life and would therefore be murder, making stem cell research a highly unethical process (Brown 41).

Once an embryo is formed, it is true that it does have the potential to eventually create a life and become an adult. In the human body, this would usually be the case as the embryo would implant itself on the mother's uterus and begin developing. In the case of embryonic stem cell research, fertilization typically happens in vitro, or inside a lab. When an embryo is created in vitro, sperm and egg unite outside of the human body. An embryo created this way can't go on to create a living human adult because it can't implant itself on a human uterus and begin development (Nickel 66). Therefore, the embryos used for stem cell research are not the start of a life, but rather a mass of cells created outside of the human body; the potential for an embryo to create a life depends on the conditions in which it is created. In the case of stem cell research, these embryos lack the ability to create life and should not be considered lives themselves.

Yuval Levin, political analyst and fellow at the Ethics and Public Policy Center, believes that embryos are human lives and should be protected as such. In an interview with David Masci, Senior Research Fellow at The Pew Forum, Levin stated, “The protection of human life comes first. And to the extent that the debate is about whether it is acceptable to destroy a living human being for the purpose of science – even for the purpose of helping other human beings – I think that in that sense, the embryo is our equal (Levin).” Bush’s 2001 policy on stem cell research took the same view as Levin, asserting that five-day old blastocysts are equivalent in moral status to adult humans, even though these masses of cells have no human characteristics and lack the ability to implant onto a human uterus (Korobkin). While both Levin and Bush are correct in that these masses of cells have the potential to become human adults in the correct conditions, both are incorrect in setting the two life stages as equivalent.

When embryos are created in vitro, they do not have the means to develop into adults because they have no uterus on which to implant. Destroying an embryo in vitro is not comparable to murdering an adult because they’re two very different things. Philip J. Nickel, assistant professor in ethics and technology at the Eindhoven University of Technology, puts it perfectly when he states, “not implanting an embryo fertilized in vitro does not cause it to lose future life that it otherwise would have had; rather, it simply omits to confer future life that the embryo otherwise would not have had (Nickel 66).” In other words, an embryo created in the lab for the purpose of research is not going to become a human adult. While it may have the *potential* to become an adult, it does not have the means because it’s outside of the

human body. These embryos are not equivalent to human adults because they do not yet possess any human characteristics and they do not even have the ability to create a life; they themselves are hardly alive. To consider an embryo and an adult as equivalent beings is a substantial flaw in logos; they are two very different life stages with very different characteristics. One is a functioning human being, while one is a mass of cells created in a lab. Destroying in vitro embryos for stem cell research is not unethical because they are hardly alive and hardly human. The benefits stem cell research promises to yield are much greater than the issue of ‘murdering’ something that isn’t even yet alive.

While many incorrectly place an embryo and an adult as equal in moral status, sometimes it’s taken a step further as the moral status of an embryo is seen as more important than a living human. This issue can be seen in Cox and Forkum’s political cartoon, “Culture Club.”



Figure 1: Cox and Forkum’s depiction of one of the major flaws in the embryonic stem cell research debate. <<http://www.coxandforkum.com/archives/000593.html>>

This cartoon depicts President Bush in a tree house labeled “Culture of Life Club”

with a sign outside that reads, “embryos welcome.” A child in a wheelchair that says “stem cell research” looks defeated as he reads the sign and sees he isn’t welcome. A speech bubble indicates that Bush is saying, “Sorry Billy... Some life stages are more sacred than others.”

As illustrated in this cartoon, the debate over embryonic stem cell research often places more importance on the embryo being destroyed than the patients of disease the harvested stem cells could potentially treat. This is a large flaw in logos; it makes more sense to sacrifice a few human embryos created in vitro for the sake of treating a large population of individuals with disease than it does to ignore the needs of those suffering just to save a few embryos that don’t even have the ability to develop into adults. The death of a human embryo is used as a red herring to capitalize on ethos and distract from the numerous other issues at play in the debate. Destroying an embryo is often thought of as taking life away before it has begun, and the ‘murder’ of something so innocent and pure overshadows the needs of living children and adults with disease. It seems that the embryo is given so much importance because it holds the potential for life that the benefits of stem cell research are overlooked. The needs of people living with disease are cast aside to save the ‘lives’ of masses of cells that don’t even have the means to develop into functional human beings.

Since embryonic stem cells cause so much controversy due to the idea that embryos are human lives, adult stem cells are often brought up as an equal alternative. Dr. Leon Kass, former chair of the President’s Council on Bioethics, argues that adult stem cells can yield the same benefits as embryonic stem cells. He

claims that adult stem cells are showing greater potential than previously thought because researchers have recently been able to differentiate these cells into liver, bone, muscle, and brain cells. (Kass). While this may be true, adult stem cells won't solve the issue because they simply don't have the same characteristics as embryonic stem cells; Adult stem cells have many issues that embryonic stem cells don't have. According to Dr. David Eve, a stem cell researcher at the University of South Florida College of Medicine, adult stem cells are limited in the number of cell types they can become, unlike embryonic stem cells (Eve, Marty, et al). Even though adult stem cells may have the ability to become liver, bone, muscle, and brain cells, they may not have the ability to become other types of cells, limiting the options for research and treatment using these cells. Adult stem cells also have an accumulation of abnormalities that embryonic stem cells don't have. Over the years, abnormalities build up in adult stem cells from DNA replication errors, contact with viruses, and exposure to certain environmental stimuli (Eve, Marty, et al). With aging, these cells accumulate flaws that can inhibit their function. It's true that adult stem cells can be useful for limited research, but research using embryonic stem cells proves to be necessary because it can lead to treatment of a much wider range of disease.

Many of the same people that advocate the use of adult stem cells also assert that the medical benefits stem cell research promises are exaggerated. In an interview with national editor, Ken Adelman, Dr. Leon Kass stated, "If cures are forthcoming, they're probably decades away. And we don't know which diseases might be cured (Kass)." Kass also claims that Alzheimer's surely won't be cured

through the use of embryonic stem cells; he says that replacing damaged cells isn't the type of cure the disease needs (Kass).

Although some belittle the potential benefits of embryonic stem cell research, many researchers believe these cells have the potential to cure a wide range of conditions and have empirical data to back up their claims. Embryonic stem cells have proved to be useful nearly everywhere in the human body because they can differentiate into so many different cell types. Conditions such as Alzheimer's disease, Parkinson's disease, spinal cord injuries, heart disease, and cancer have been shown to respond to stem cell therapy (Skancke 7). Researchers have found that embryonic stem cells can differentiate into neural cells with the ability to restore the myelin sheath around damaged cells, meaning damaged nerve cells can be restored, providing treatment options for those affected by Alzheimer's disease and multiple sclerosis (Liu, Qu, et al). Embryonic stem cells have been shown to differentiate into neurons that secrete dopamine, which can play a large role in treating Parkinson's disease (Kim, Auerbach, et al). When embryonic stem cells are transplanted into patients with leukemia, these cells can differentiate into blood cells or cells of the immune system and take over the function of cells destroyed by the cancer (Bryant and Schwartz 37). Cardiac cells derived from embryonic stem cells have been shown to repair heart tissue injured by a heart attack (Murry and Keller). When differentiated into islet cells of the pancreas, embryonic stem cells can even produce insulin, treating type I diabetes (Bryant and Murry 43). With results like these, it's easy to see the potential embryonic stem cells have. It would be ridiculous to ignore these discoveries and put embryonic stem cell research on the

back burner, and it would be unreasonable to keep these benefits from extending to the millions affected by these diseases. The positive outcomes of embryonic stem cell research greatly outweigh the moral issues at hand; it seems more ethical to research treatments to benefit thousands than it does to halt research to save a few masses of cells.

The positive benefits of embryonic stem cell research greatly surpass the moral and ethical implications involved in how they're obtained. Embryonic stem cell research is necessary to further the development of important disease treatment, and federal funding is necessary to keep this research going. It's flawed to believe that it's ethically and morally just to put the 'life' of an embryo before the lives of millions affected by debilitating diseases and injuries. Without the furthering of embryonic stem cell research, we will never fully reach our potential in curing and treating disease. Embryonic stem cell research is a crucial step in saving and improving the lives of millions.

Works Cited

- Brown, Judie. "Stem Cell Research is Murder." *Stem Cell Research*. Ed. Jennifer L. Skancke. Farmington Hills: Greenhaven Press, 2009. 39-46. Print.
- Bryant, Peter and Philip Schwartz. "Stem Cells." *Fundamentals of the Stem Cell Debate*. Eds. Kristin Monroe, Ronald Miller, Jerome Tobis. Los Angeles: University of California Press, 2008. 10-36. Print.
- Bryant, Peter and Philip Schwartz. "Therapeutic Uses of Stem Cells." *Fundamentals of the Stem Cell Debate*. Eds. Kristin Monroe, Ronald Miller, Jerome Tobis. Los Angeles: University of California Press, 2008. 37-61. Print.
- Cox, John, and Allen Forkum. "Culture Club." Comic Strip. *CoxandForkum.com*. 26 February 2012. <<http://www.coxandforkum.com/archives/000593.html>>.
- Eve, David J, Phillip J Marty, Robert J McDermott, Stephen K Klasko, and Paul R Sanburg. "Stem Cell Research and Health Education." *American Journal of Health Education* 39.3 (2008): 167-179. Web. 20 February 2012.
- Kass, Leon. Interview by Ken Adelman. *Washingtonian.com*. The Washingtonian, 2005. Web. 26 February 2012.
- Kim, Jong-Hoon, Jonathan M Auerbach, Jose A Rogriguez-Gomez, Ivan Velasco, Denise Gavin, Nadya Lumelsky, Sang-Hun Lee, John Nguyen, Rosario Sanches Peraute, Krys Banklewics, and Ron McKay. "Dopamine Neurons Derived From Embryonic Stem Cells Function in an Animal Model of Parkinson's Disease." *Nature* 418.6893 (2002): 50-56. Web. 6 March 2012.

- Korobkin, Russell. "Embryonic Histronics: A Critical Evaluation of The Bush Stem Cell Funding Policy and The Congressional Alternative." *Jurimetrics Journal* 47 (2006): 1-26. Web. 6 March 2012.
- Levin, Yuval. Interview by David Masci. *Pewforum.org*. The Pew Forum, 2008. Web. 26 February 2012.
- Liu, Su, Yun Qu, Todd J Stewart, Michael J Howard, Shushovan Chakraborty, Terrence F Holekamp, and John W McDonald. "Embryonic Stem Cells Differentiate Into Oligodenrocytes and Myelinate in Culture After Spinal Cord Transplantation." *Proceedings of the National Academy of Sciences of the United States of America* 97.11 (2000): 6126-6131. Web. 6 March 2012.
- Murry, Charles, and Gordon Keller. "Differentiation of Embryonic Stem Cells to Clinically Relevant Populations: Lessons from Embryonic Development." *Cell Press* 132.4 (2008): 661-680. Web. 6 March 2012.
- Nickel, Philip. "Ethical Issues in Human Embryonic Stem Cell Research." *Fundamentals of the Stem Cell Debate*. Eds. Kristin Monroe, Ronald Miller, Jerome Tobis. Los Angeles: University of California Press, 2008. 62-78. Print.
- Saunders, William. "Embryos Used in Stem Cell Research are Human Beings." *Stem Cell Research*. Ed. Jennifer L. Skancke. Farmington Hills: Greenhaven Press, 2009. 25-31. Print.
- Skancke, Jennifer, ed. *Stem Cell Research*. Farmington Hills: Greenhaven Press, 2009. Print.