The Science, Ethics, and Politics of Stem Cell Research

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Federal funding of stem cell research is a significant controversy, which has caught public attention from every part of society. The complex nature of the debate has led to divisions within religions and political parties, as well as forcing us to reconsider what it means to be “pro-life.” When President George W. Bush used his first televised public address to announce his policy on the federal funding of stem cell research, it brought new exposure to an issue that encompasses moral, ethical, religious, scientific, and economic grounds. Both the House of Representatives and the Senate have presented bills that would repeal the President’s policy. This paper provides an explanation of what stem cell research is, and examines the ethical issues involved. With this background an assessment of the current debate involving the White House, Congress, and religious groups, as well as the public in general, is offered. Finally a recommendation is given that President Bush reconsider his position, and allow federal funding for embryonic stem cell research on excess embryos from in vitro fertilization.

INTRODUCTION

The current discussion regarding stem cell research reminds us that the impact of technological advancements is not limited to the field in which they are achieved. The complex nature of the debate has led to divisions within religions, political parties, and it forces us to reconsider what it means to be “pro-life.” The matter is further complicated because it requires some amount of scientific and ethical understanding to evaluate the claims made by both sides of the argument. President George W. Bush’s policy on stem cell research set forth in August of 2001 served as a catalyst for an ongoing debate that encompasses moral, ethical, religious, scientific, and economic grounds. His policy, which bans federal funding for stem cell research that involves the destruction of embryos, has impacted the course of stem cell research in significant ways. In 2005, House Resolution 810 and its corresponding Senate Bill 471 were presented by Congressmen from both sides of the aisle to repeal President Bush’s policy. Thus the issue has once again been raised at a national level, and it must be addressed. To do so requires a background in the science of stem cell research, and an understanding of the ethical questions that have been raised. Only then is it possible to discuss whether President Bush should stand by his policy, or accept the current proposals.

SETTING THE STAGE

WHAT ARE STEM CELLS, AND WHY ARE THEY IMPORTANT?

Understanding why stem cell research is so controversial first requires an explanation of what stem cells are, how scientists harvest them, and what researchers hope to do with them. Stem cells are “blank cells” in the sense that their function has not yet been fully determined. The possibility exists that they can be programmed to become various types of human cells, because all human beings begin as one cell, known as a zygote. As division of the zygote occurs and one cell becomes two, then two become four, and four become eight, this mass of cells develops into an embryo. It is during this early stage that these cells contain the capability of developing into all types of cells in the body.

Further along in this division process, cells begin to specialize. The result of this specialization is that these cells are no longer “blank,” and can be specifically categorized into lung cells, or skin cells, etc. This process is known as differentiation. After differentiation, cells are no longer capable of transforming into other types of cells. Once a cell has differentiated into a lung cell, it is not capable of transforming into, for instance, a heart cell.

Undifferentiated stem cells have two promising properties: first, undifferentiated cells can divide and multiply themselves for long periods of time, and scientists believe these cells could possibly do so for indefinite periods of time (Holm, 2002, pp. 493-507). Second, undifferentiated stem
cells can differentiate into different types of specialized cells (National Institute of Health (NIH), 2005b).

This first property is rather remarkable because most cells in the body cannot divide indefinitely. The DNA in these cells has a pre-programmed limit that controls how many divisions a cell will make. This limit gives each organ its specific size. For example, a human heart will not continue to grow to the size of a watermelon, because its genetic code does not program it to do so. Undifferentiated cells do not have these limits programmed yet, allowing them to divide for long periods in a process known as proliferation (NIH, 2005b). This property allows scientists to create stem cell lines, or cells that have been copied from the original stem cell. These stem cell lines are genetically identical to the cell from which they were derived.

Stem cells have not yet differentiated, allowing the possibility that they can develop into different types of specialized cells. Scientists are just beginning to understand the interior and exterior signals that control differentiation. The cell’s genetic code controls the interior signals. The code is located in the DNA of the cell and carries instructions for all the structures of the cell and their functions. The external signals that control differentiation include chemicals that other cells release, physical contact with other cells, as well as certain molecules in the environment (NIH, 2005b). The hope is that through stem cell research, scientists will one day be able to control the differentiation of the stem cells, allowing them to create whatever type of cell or organ a person needs. The time frame for this depends greatly on the availability of funding for stem cell research.

**Different Categories of Stem Cells**

A crucial task is to identify and understand the different types of stem cells that are involved in ethical and political discussions. Each type of stem cell has different characteristics and capabilities, and researchers harvest them at different times in the developmental process, thus each type raises different ethical issues. The different types are organized from most flexible to least flexible: totipotent stem cells, pluripotent stem cells, multipotent stem cells, and progenitor stem cells.

Totipotent stem cells are the most flexible type of cell. They contain all the genetic information necessary to create all the cells in the human body, including the placenta. Human cells are totipotent for only the first three or four divisions of a fertilized egg. After this stage, the cells begin to specialize. It is during this specialization that these cells become pluripotent (Stem Cell Research Foundation (SCRF) Section 13, 2005).

Pluripotent stem cells can become any type of cell in the human body. These cells differ from totipotent cells in that they do not contain the genetic information necessary to make a placenta. These cells are mostly found in the earliest developmental stages of the human embryo. This is the cell type that most people refer to when discussing stem cell research (SCRF Section 13, 2005). Researchers extract these pluripotent stem cells from within the embryo.

Multipotent cells can produce cell types found in the tissue from which they were drawn; blood stem cells can only produce red blood cells, white blood cells, and platelets. A multipotent skin stem cell can only divide and grow into a hair follicle cell or a sweat gland cell; it could not become a lung cell, blood cell, or any other kind of cell. Multipotent stem cells are found in the adult human body (SCRF Section 13, 2005).

The least flexible type of stem cells are progenitor cells, or precursor cells. Like multipotent cells, progenitor or pre-specialized cells are found in adult human beings. These immature cells are pre-coded to specialize into specific cell types that exist in human adult tissues and organs. They have a very limited ability to differentiate, but are considered stem cells because they have not yet differentiated (University of Minnesota Center for Bioethics (UMCB), 2002, p.7).

Stem cells are categorized not only according to their flexibility, but also according to where and when they are derived. Embryonic stem (ES) cells are of the pluripotent class. They are derived from the inner cell mass of a blastocyst-stage embryo. A blastocyst-stage embryo forms about five days after they have undergone in vitro fertilization (IVF). Inside the outer-cell ring of the blastocyst is a mass of about thirty cells known as the inner cell mass. The inner cell mass is a group of pluripotent cells that researchers can extract and isolate.

Scientist James Thomson and his team first extracted and isolated an inner cell mass at the University of Wisconsin in 1998 (CNN, 1998). In order to isolate the stem cells, researchers utilized IVF to create the blastocyst. They then took the inner cell mass and placed it in a medium that encouraged the production of stem cells. This, in turn, produces moral and ethical concerns because the scientists created the blastocyst for the sole purpose of deriving stem cells. Consequently, the extraction of ES cells destroys the embryo from which they are taken.

The type of stem cell research that has received the most attention from the public, as well as from Congress, involves using excess embryos from in-vitro fertilization. When a woman undergoes IVF, multiple embryos are produced. The purpose is to give a woman a better chance at having one of them fertilized. After the woman decides how many embryos she would like to have implanted, excess embryos remain that are not implanted. These embryos are either discarded, or they are frozen for use at a later time. This store of excess embryos provides a source that scientists could use to derive additional stem cell lines.

Scientists can utilize IVF to create embryos, but this is not the only method. Another possibility is to create embryos by way of somatic cell nuclear transfer (SCNT), which is more commonly known as therapeutic cloning. The benefit of SCNT is that the cells produced would be genetically identical to the person who requires the transplant. This would considerably reduce the risk of transplant rejection.
Researchers derive embryonic germ (EG) cells from aborted human embryos or fetuses. These EG cells are extracted from a five to nine week old aborted human embryo or fetus. Scientists at Johns Hopkins University made the first successful extraction of stem cells from an aborted fetus in 1998 (Johns Hopkins University, 2002). EG cells are demonstrating more potential to differentiate than scientists originally believed.

Adult stem cells are found among the already specialized cells of each tissue or organ in the body. Pluripotent, multipotent, and progenitor stem cells are all found in adult stem cells. An adult stem cell must be capable of self-renewal for the lifetime of the organism. These cells function to replace and repair the tissue or organ where they are located (NIH, 2005c). Adult stem cells are rare: only an estimated one in ten thousand to fifteen thousand cells in the bone marrow is a blood-forming stem cell (NIH, 2005b). Adult stem cells are the least flexible type of stem cells, and their behavior varies greatly, depending on their local environment.

Although scientists have engaged in adult stem cell research for more than forty years, it was not until recently that researchers acknowledged that adult stem cells could possibly generate other types of specialized cells than the environment in which they reside. Prior to this, researchers presumed that adult stem cells only had multipotent capabilities. Recent studies have shown that blood stem cells may be able to generate skeletal cells. The research to date demonstrates that adult stem cells may take on the characteristics of cells that have developed from the same primary germ layer or a different layer. Stem cells derived from bone marrow are capable of differentiating into another similarly derived tissue such as skeletal muscle (NIH, 2005b).

POSSIBILITIES
With a basic understanding of stem cells and the way they work, the possibilities that they present become apparent. According to leading researchers James Thomson of the University of Wisconsin and John Gearhart of Johns Hopkins University, stem cells could potentially be used for such things as:

- Growing nerve cells to repair spinal injuries and restore function to paralyzed limbs.
- Growing heart muscle cells to replace useless scar tissue after a heart attack.
- Making brain cells that would secrete dopamine for the treatment and control of Parkinson’s disease.
- Growing cells that make insulin, creating a lifelong treatment for diabetes.
- Growing bone marrow to replace blood-forming organs damaged by disease or radiation.
- Making blood cells genetically altered to resist specific disease, such as HIV, and to replace diseased blood cells (CNN, 1998).

These treatments could be accomplished through various techniques. One method is grafting pluripotent and multipotent stem cells into a human body. Grafting is the process of growing stem cell lines to produce healthy cells. These cells replace damaged cells. Grafting also introduces the possibility of taking cells from stem cell lines and placing them in a coexistent condition with damaged cells, allowing them to repair those cells (UMCB, 2002, p.10).

As stated above, stem cell therapy could possibly make blood cells resistant specific diseases, such as HIV or AIDS. Scientists could accomplish this through a treatment called gene therapy. Gene therapy is the genetic modification of cells to produce a therapeutic effect (NIH, 2005, Chap. 6). Stem cells could serve as vectors, or agents that transfer genetic material from cell to cell. In the case of creating cells resistant to HIV or AIDS, the genetically enhanced cells could act as healthy cells, making the HIV patient more resistant to infection and illness (UMCB, 2002, p.10).

Stem cell research may also influence the way researchers test drugs. Scientists could test drugs for safety and performance on skin or heart cells before they reach the human test phase. Stem cell research promises to increase our understanding of human development (Nuffield Council, 2005). It is important to note that stem cell research cannot guarantee all of these medical miracles. While research has been promising and scientists are making breakthroughs, this does not assure that these initial efforts will become a reality. A great deal of time and money will be required before stem cell research produces beneficial therapies. Caution must be taken to avoid a slippery slope of unrealistic expectations. We cannot assume that stem cell research will result in life saving treatments in a short amount of time. That is why it is stem cell research, because scientists are still discovering what is possible. Thomson, who was the first scientist to derive stem cells from a human embryo states, “The real lasting contribution of human embryonic stem cell research may be increased knowledge of the human body, which could change human medicine ever more dramatically than new transplantation therapies” (Vergano, 2004).

THE DEBATE
Along with possibilities, stem cell research carries with it a tremendous ethical dilemma for some parties. Embryonic stem cell research produces more controversy than the other sources of stem cells—embryonic germ cells and adult stem cells. This is due to several characteristics unique to embryonic stem cells. The debate over whether it is ethical to utilize embryonic stem cells relates to the method in which scientists obtain them. As explained above, researchers derive embryonic stem cells from the inner cell mass of a blastocyst-stage embryo. The process of extraction destroys the embryo. This destruction pushes stem cell research into the debate on the moral status of the embryo.

The Coalition of Americans for Research Ethics (CARE) was founded by prestigious physicians, researchers, and bioethicists, and is perhaps the best example of a group.
favoring research on adult stem cells but is adamantly opposed to embryonic stem cell research. CARE claims that embryonic stem cell research is scientifically unnecessary. The Coalition's website contains various news clips relating successful adult stem cell treatment, and failures in embryonic stem cell research. One of the advantages of adult stem cell research cited is that the use of a patient's own adult stem cells is preferable because it avoids the problem of the body rejecting cells other than its own (Coalition of Americans for Research Ethics, n.d.).

CARE's opposition to embryonic stem cell research begins with the view that the life of an individual begins at fertilization. At that point one's genetic code is complete; one is more than a "bunch of cells" or merely a "potential human being" (CARE, n.d.). From this premise they argue that there is no difference between the rights of the individual and those of the embryo. Research that results in the destruction of the embryo is seen as a form of murder. Moreover, destruction of embryonic stem cells violates existing law and policy on the state level. Homicide laws of all fifty states protect the life and dignity of every human being—especially the vulnerable. Many states specifically protect embryonic beings outside the womb. Utah law currently penalizes the killing or an "unborn child" at any stage of development. This law has also survived legal scrutiny, as in January 2002, a Utah state judge rejected a defense attorney's argument that a 14 week old fetus was not viable outside the womb, and therefore not a person (Murphy, 2003). However these laws exclude legal abortion, and discarding excess embryos from in vitro fertilization is legal.

Finally CARE believes that destruction of a human embryo cannot be justified on the basis of potential long range benefits to society. CARE's mission statement contends:

"Stem cell research promises great good and is a worthy scientific priority as long as we pursue it ethically. Obtaining stem cells from people without seriously harming people in the process can be ethical. However, obtaining stem cells from human embryos cannot be ethical because it necessarily involves destroying those embryos" (CARE, Mission statement 2005).

A slight variation from the CARE approach contends that while the destruction of the embryo is not murder, it is seen as "reprehensible an immoral" (UCMB, 2002, p. 15). The view claims to comprehend the incredible results that stem cell research could possibly produce; yet they feel that the ends (or potential benefits) do not justify the means (the destruction of a human embryo), especially because the ends are hypothetical benefits that could possibly result in lifesaving medical treatments (UCMB, 2002, p. 15).

Others hold that embryos do not have the same status as a fetus or a baby, thus research is permissible (UCMB, 2002, p. 16). Those favoring this position acknowledge that embryos are "not nothing," but that they do not deserve the same protection as a fetus or a baby. The rights and benefits of living individuals outweigh the embryo's rights and benefits (UCMB, 2002, p. 16) Proponents of this view believe that embryos have special properties and qualities, but these are outweighed by the potential medical advances of stem cell research that can benefit the living. (UCMB, 2002, p. 16).

Perhaps the most common view held by those in favor of embryonic stem cell research is that embryos should not be created or cloned for research, but they can be used if they are surplus embryos from IVF and are going to be discarded anyway (UMCB2002, p.16). This position can be defended using the nothing is lost principle (Outka, 2002, Para.1). This principle states: "One may directly kill when two exempting conditions are attached: 1) the innocent will die in any case; and 2) other innocent life will be saved" (Outka, 2002). Gene Outka used this principle while discussing the ethics of stem cell research before the President's Council on Bioethics in April of 2002. He argued that we can view embryos in a reproductive clinic that will either be discarded or frozen in perpetuity, as innocent lives who will die in any case (condition one of the nothing is lost principle). Further, third parties with Alzheimer's Disease, Parkinson's Disease, or others who could benefit from stem cell research, are seen as innocent life who will be saved by virtue of research utilizing such embryos (condition two of the nothing is lost principle) (Outka, 2002, Section 2C).

Outka's extension of the "nothing is lost" principle includes embryos conceived to enhance fertility, but which will never be implanted, but it excludes embryos created exclusively for research. Outka acknowledges that excess embryos are a foreseen result of IVF, but the intention is to alleviate infertility, not to create embryos for research (Outka, 2002, Section 2C). This is an important and relevant distinction because it maintains the principle that it is wrong to create embryos only to destroy them. In the case of IVF, more embryos are made than will be implanted, but this is done to increase the chances of a successful pregnancy. If only as many embryos were created as were to be implanted, it would greatly decrease the chances of successful implantation, and it would increase the number of repeated attempts. For the time being, excess embryos are a necessary part of the IVF process. Couples can chose to freeze the excess embryos for future use, or discard them.

The nothing is lost principle also answers many of the arguments previously raised by CARE; specifically that the destruction of embryos is murder. Because it is currently legal to discard excess embryos from and IVF cycle, the nothing is lost application denounces the intentional creation of embryos for research. But for embryos that would inevitably be discarded in the IVF process, less is lost because stem cells might be derived that could potentially revolutionize medical treatment.

Critics of the Outka position see no distinction between using excess embryos created specifically for stem cell research and using excess embryos created during IVF treatment.
(Fitzpatrick, 2003). They feel that it is inconsistent to accept one and reject the other. Michael Sandel, a member of the President’s council of Bioethics, poses the following question: “If the creation and sacrifice of spare embryos in infertility treatment is morally acceptable, why isn’t the creation and sacrifice of embryos for stem cell research also acceptable?” (Fitzpatrick, 2003)

CARE also argues that embryonic stem cells are over-hyped, and that the prospects of adult stem cell research are promising enough that embryonic stem cell research is unnecessary. In March of 2004, two studies in the research journal Nature refuted the claim that adult stem cells are as flexible as embryonic stem cells. Prominent adult stem cell researcher Catherine Verfaillie of the University of Minnesota states: “Some of the published, initial adult cell reports may have been too optimistic, and embryonic stem cells are still the ‘gold standard’ for flexibility” (Vergano, 2004). Dr. Verfaillie and most other researchers prefer to study both types of stem cells. James Thomson adds:

The debate regarding whether adult stem cells or embryonic stem cells are ‘better’ is a creation of politics and the press, not of the scientific community. I know of no credible stem cell scientist that does not believe that both should be studied; human medicine will suffer if either is excluded (Vergano, 2004).

The nothing is lost principle states just that: nothing is lost by conducting embryonic stem cell research. Advances in adult stem cell research are commendable, but research into both types of stem cells will likely lead to more rapid progress in understanding the benefits of stem cells.

**POLITICAL IMPLICATIONS**

On August 9, 2001 President Bush made his first televised public address as president, announcing his policy on stem cell research. In this address he compared the embryos in question to snowflakes, commenting that each embryo is unique, and has the unique genetic potential of an individual human being. President Bush then prefaced his recommendation with the following statement:

I strongly oppose human cloning, as do most Americans. We recoil at the idea of growing human beings for spare body parts, or creating life for our convenience. And while we must devote enormous energy to conquering disease, it is equally important that we pay attention to the moral concerns raised by the new frontier of human embryo stem cell research. Even the most noble [sic] ends do not justify any means (Bush, 2001).

He stated that he would allow federal funding of research on 64 existing stem cell lines. He reasoned that these lines were already privately created, and the decision between life and death had already been made. This decision did not fund the destruction of any additional embryos. President Bush also announced that he would place more emphasis on alternate forms of stem cell research, such as umbilical cord, placenta, adult, and animal stem cells. None of these types of research require the destruction of a human embryo, thus avoiding the ethical dilemma of embryonic stem cell research (Bush, 2001).

President Bush’s policy established the following guidelines for eligibility to receive federal funding:

1. The derivation process (which begins with the destruction of the embryo) was initiated prior to 9:00 p.m. EDT on August 9, 2001.
2. The stem cells must have been derived from an embryo that was created for reproductive purposes and was no longer needed.
3. Informed consent must have been obtained for the donation of the embryo and that donation must not have involved financial inducements (NIH, 2005a).

Bush’s policy received mixed reviews. This policy upset some conservatives who saw any type of funding towards stem cell research as morally wrong. Scientists saw this policy as a modest success, because federal funding had not been completely banned. But others charged that Bush’s restrictions would cause research to proceed much slower than if it had been fully funded (Goldstein & Allen, 2001).

The importance of federal funding cannot be overstated. The federal government supplies about 45% of medical and health research in this area. Private business, foundations, and donations fund the other 55%. The United States government is the largest funding source for this type of research in the world (UMCB, 2002, p. 20). It is unlikely that the companies engaged in stem cell research will be profitable in the short term, and there is also the risk that the research will not produce a product or treatment that can be sold. Federal funds would allow the necessary resources to conduct the research. Federal funding is not only a more reliable source; it also allows agencies to place ethical guidelines or restrictions on the private sector (UMCB, 2002, p. 20).

The restrictions set in place have limited the United States’ ability to be competitive with other countries. South Korea has taken the lead in stem cell research with the support of their government. It is illegal to perform abortions in South Korea, but forces that oppose abortion have not united against stem cell research as they have in the United States (Kirk, 2005.) This restrictive atmosphere could lead American scientists to leave the United States to conduct their research.

**PUBLIC OPINION**

Since President Bush announced his policy, interest in stem cell research has increased until today it is a commonly discussed topic, one with distinct divisions in opinion. A CNN/USA Today Poll taken from August 5-7, 2005, with a sample of 1,004 asked the following question: “Do you think the federal government should or should not fund research that would use newly created stem cells obtained from human
embryos?” 56% of those polled said that the federal government should fund stem cell research, while 40% said the government should not. Only 4% responded that they were unsure (CNN, 2005). Another related poll taken from May 20-22, 2005, asked how closely the participants followed the debate about government funding of stem cell research. 12% responded “very closely,” 46% responded “somewhat closely,” 27% responded, “not too closely,” and 15% responded, “not at all” (CNN, 2005). Thus the majority of Americans are concerned with stem cell research, and few are unsure of their position (4%).

THE AFTERMATH

After President Bush set the tone, scientists set out to research the 64 existing lines. Unfortunately, these 64 stem cell lines did not prove to be as durable as expected. At least one third of the lines were so young and fragile that scientists found little value in researching them. Days after the announcement scientists around the world expressed disappointment and confusion about the existing lines. The National Institute of Health (NIH) identified Goteborg University in Sweden, as holder of the largest collection of stem cell lines, claiming the University had 19 lines. Neurobiologist Peter Eriksson, a member of the six-person team assigned to develop stem cells refuted this claim: “I was a little surprised to see the NIH calling them 19 lines, maybe they misinterpreted a little bit” (Connolly & Weiss, 2001). Eriksson said that only three of the 19 lines could be classified as stem cells. Furthermore, small companies controlled many of the stem cell lines identified in President Bush’s policy. It was only weeks before the announcement that companies were informed that their lines would be expected to furnish stem cell lines for the United States (Connolly & Weiss, 2001). Others criticized the amount of funding that was set aside for research. The $25 million that President Bush allocated is on par with the amount of federal grant money that a large department of medicine at a single medical school might receive in one or two years (Caplan, 2004). It should also be noted that all of the stem cell lines included in President Bush’s policy were developed with mouse cells. The Food and Drug Administration (FDA) has stated that they will not approve of trials that involve the use of animal cells. Thus, although these lines may prove to be of some benefit for research purposes, the FDA will never allow use of these cells in human trials (Kelley, 2005).

In the years after the policy announcement, private institutions have conducted research on alternative stem cell lines. President Bush’s policy only dictated federal involvement in stem cell research funding; it left the door open for states to establish their own funding policy. On November 2, 2004, Californians passed Proposition 71, which dedicated three billion dollars over ten years to stem cell research. California was the first state to fund such research. The proposition was supported by 59% of the state’s voters (Timeline of Stem Cell Debate, 2005). Three months later, on January 11, 2005, New Jersey’s governor announced that the state would fund a $150 million dollar stem cell research center and promised to back a ballot initiative to provide another $230 million.

POLITICAL AND RELIGIOUS DIVISIONS

The stem cell debate brought about some interesting developments in Congress. There was no clear-cut way to determine what stance each legislator would take. Some senators that were notoriously pro-life and vehemently opposed to abortion became strong advocates of embryonic stem cell research. One example is Orrin Hatch (R), the senior senator from Utah. In an article written for the Salt Lake Tribune, Hatch described his perspective: “I have come to my position on this matter after many months of study, consultation, reflection and prayer. I analyzed this issue from a pro-life, pro-family perspective, with the conviction that being pro-life demands helping the living” (Hatch, 2002). Hatch elaborated stating his opposition to nuclear transplantation, but that he supports therapeutic cloning, which does not require the embryo to be implanted in the mother’s womb: “I support regenerative medicine research because I believe that human life requires and begins in a mother’s nurturing womb, not a petri dish” (2002).

The issue of stem cell research forces political leaders, as well as their constituents to clarify their definition of “pro-life” and “pro-choice”. Both President Bush and Senator Hatch identify themselves as pro-life, yet they are directly opposed on the issue of using stem cells derived from embryos to conduct research. President Bush opposes any destruction of life, and is thus categorized as pro-life. But Senator Hatch’s definition of pro-life includes a charge to seek to improve life. The therapies that could result from stem cell research would definitely improve the lives of millions, and thus Senator Hatch categorizes himself as pro-life. This unique feature of stem cell research has led to unpredictable divisions among politicians.

Similarly, religions organizations provide no clear consensus on whether embryonic stem cell research is morally acceptable. The U.S. Roman Catholic Bishops oppose embryonic stem cell research as “immoral, illegal, and unnecessary.” They view life as sacred from the moment of conception. The Lutheran Church-Missouri Synod and the Southern Baptist Convention also oppose the research for the same reasons. Alternatively, the Presbyterian Church USA is in favor of the research when its goals are “compelling and unreachable by other means.” The Union of Orthodox Jewish Congregations supports this view saying, “An isolated fertilized egg does not enjoy the full status of personhood”. The Religious Action Center of Reform Judaism also approves of the research, saying that it would be “immoral and unethical” to cut off funding for promising medical research (Abemethy, 2001). Under most interpretations of Islamic Law, an embryo is not considered a person, and stem cell research on embryos is not seen as morally wrong (Weckerly,
Buddhism has not issued a statement on the issue (Keown, 2004).

The Christian Coalition strongly opposes embryonic stem cell research, and instead favors adult stem cell research, which does not involve the destruction of embryos. They do little to mask their feelings on the issue, referring to it as “human-embryo-stem-cell-destruction research.” They also make it clear that they do not support candidates who are in favor of embryonic stem cell research. They encourage people to call the U.S. Capitol switch board, and remind their senators that “any vote for the destruction of human embryos in the House and Senate will be scored in the Christian Coalition’s 2005 Congressional Scorecards and 2006 and 2008 Voter guides as a pro-abortion vote” (Christian Coalition of America, 2005).

**CURRENT LEGISLATION**

The stem cell debate and the use of federal funds regained national attention on February 15, 2005, when Representative Michael Castle (D-), along with 200 co-sponsors, introduced House Resolution 810. This resolution, titled the Stem Cell Enhancement Act of 2005 contained the following provisions: “Amends the Public Health Service Act to require the Secretary of Health and Human Services to conduct and support research that utilizes human embryonic stem cells, regardless of the date on which the stem cells were derived from a human embryo, provided such embryos:

1. have been donated from in vitro fertilization clinics;
2. were created for the purposes of fertility treatment;
3. were in excess of the needs of the individuals seeking such treatment and would never be implanted in a woman and would otherwise be discarded (as determined in consultation with the individuals seeking fertility treatment); and
4. were donated by such individuals with written informed consent and without any financial or other inducements.

This bill passed in the House on May 24, 2005 with a count of 238-194 (Congressional Homepage H.R. 810, 2005). The bill requires that President Bush’s policy be repealed and replaced with measures that allow federal funding to support stem cells derived from excess embryos from IVF.

Less than two weeks after the House bill was introduced, on February 28, 2005, Senator Arlen Specter introduced a corresponding Senate Bill 471. Forty senators, from both sides of the aisle, cosponsored this bill. Cosponsors included Orrin Hatch, Hillary Rodham Clinton, Edward Kennedy, John Kerry, and Harry Reid (Congressional Homepage S. 471). This bill was read twice and then referred to the Committee on Health, Education, Labor and Pensions (Congressional Homepage S. 471, 2005).

To supplement this bill, Senator Orrin Hatch introduced Senate Bill 876, the Human Cloning Ban and Stem Cell Research Protection Act of 2005. This bill prohibited human cloning, and set forth penalties for violations (Congressional Homepage S. 876, 2005).

After Congress returned to session in September, 2005, there were multiple competing Senate bills. Each division makes it more difficult to unite supporters behind the same bill, something that would be necessary for any bill to have a chance of passage and to override a presidential veto. Alta Charo, a professor at the University of Wisconsin medical and law schools observed that for lawmakers “who want to appear to support embryonic stem cell research without alienating their conservative base, it gives them something they can vote for even if it continues to trade patient interests for political symbolism” (Connelly, 2005b). Herein lies a troubling aspect of the stem cell debate. It is possible that this issue could be decided not by what is best for the country, but by what keeps legislators in power. The immense positive and negative possibilities attached to what stem cell research can do are too important to be ruined by partisan power plays.

**THE WHITE HOUSE RESPONDS**

On May 20, 2005, four days before House Resolution 810 passed, President Bush reaffirmed his position on the stem cell debate. He promised that he would veto any legislation that went against his established policy. This potential veto would be his first (Baker, 2005). On May 24, 2005, President Bush held a press conference in response to the passage of House Resolution 810. The President attempted a different approach with this press conference, inviting 21 “snowflake” families. These were families that had either adopted or given up for adoption frozen embryos that remained after in vitro fertilization. With those 21 couples were the “snowflake” babies, the children that resulted from those embryos that were not destroyed. President Bush made the point that each embryo is unique and is capable of producing a child:

> The children here today remind us that there is no such thing as a spare embryo. Every embryo is unique and genetically complete, like every other human being. And each of us started out our life this way. These lives are not raw material to be exploited, but gifts. And I commend each of the families here today for accepting the gift of these children and offering them the gift of your love (Bush, 2005).

**SENATOR FRIST ROCKS THE BOAT**

On August 3, 2005 Senate Majority Leader Bill Frist announced that he supported the aforementioned legislation that would reverse President Bush’s policy. Some members of Congress, as well as former first lady Nancy Reagan, an outspoken advocate of stem cell research, supported Frist’s decision. Their approval was in contrast to the disapproval of pro-life conservatives who felt that Frist went against his anti-abortion stance (Connelly, 2005a).
Frist’s background as a transplant surgeon led him to be heavily involved in the stem cell debate. One month before President Bush announced his policy in August of 2001, Frist set forth an agenda that would promote research on stem cells derived from both embryos and adults. After President Bush announced his policy that restricted embryonic stem cell research, Frist backed down and supported Bush’s policy (Connelly, 2005a). Frist cited the poor quality of the remaining stem cell lines as his motivation for changing his stance.

Whether or not Frist had political motives behind his shift (a definite possibility as Frist has been identified as a possible presidential candidate in 2008), the decision unquestionably had political implications. Both sides of the debate agreed that the announcement would most likely convince some undecided members of Congress to support the legislation, and possibly lead President Bush to rethink his stance (Connelly, 2005a). The Christian Defense Coalition withdrew their support of Frist in the 2008 Republican presidential primaries, and other conservative groups voiced their disapproval, labeling Frist as a “sell-out” (Connelly, 2005a).

ANOTHER ADVANCE
On Sunday, August 21, 2005, the journal Science made an important announcement on the journal’s website. Researchers at Harvard Stem Cell Institute were able to convert skin cells in to embryonic stem cells, without destroying existing embryos (Weiss, 2005). Because this method does not require the creation or destruction of the embryos, it is eligible for federal funding under the current policy, and it does not carry the same ethical problems that extracting cells from embryos does.

This development provided additional support for those who agree with the current policy. “All this is confirmation we will see breakthroughs without compromising ethical standards,” said Senator Tom Coburn (R-OK), a physician who has led opposition to embryonic stem cell research. “We’re not going to have to go that way if we can just be patient and fund the basic science” (Connelly, 2005).

The new method is still unproven, and some barriers must be overcome. The way in which these cells are formed creates one such barrier. These cells require the fusion of a stem cell with a skin cell, thus they retain the DNA of the skin cell donor and the DNA from the embryonic stem cell (Weiss, 2005). Before this technique becomes viable, researchers will have to develop a way to remove the extra DNA. Lead stem cell researchers have been cautious to overestimate these findings: “I think that we need to keep our eye on the ball here,” said John Gearhart a stem cell researcher at Johns Hopkins Medical Institute. He continued, “If this stuff proves to work, that’s wonderful. But we’re just not there yet, and it’s going to take a long time to demonstrate that. Meanwhile, other techniques already work well. So let’s get on with it” (Weiss, 2005). The lead author of the report, Kevin Eggan cautioned: “This technology is not ready for prime time. This is not a replacement for the techniques that we already have” (Weiss, 2005).

DISCUSSION AND CONCLUSION
One important fact that needs constant emphasis in this debate is the process of in vitro fertilization. A woman has multiple embryos created, and then from those embryos, a few are implanted, usually with the hope that one will survive. The remaining embryos are discarded or frozen. For the time being this is the best way to ensure success in implantation. If only one embryo was created, it would greatly decrease the chances of implantation. IVF is an expensive procedure, so it is beneficial to the parent(s) to have additional embryos, as they increase the odds of successful implantation. This treatment goes largely unquestioned and is generally accepted. It provides couples an opportunity that they could not have otherwise.

It seems that one who is opposed to embryonic stem cell research on the grounds that it is morally impermissible to treat embryos in such a manner should also object to in vitro fertilization. President Bush included “snowflake” babies in his May 24, 2005, press conference emphasizing that each embryo has the potential to become a unique person. This is a striking image, but these “snowflakes” are a definite minority, especially in comparison to the total number of embryos that have been placed in storage in the United States. As of April 11, 2002, there have been 396,526 embryos placed in storage (Rand Law and Health, 2002). It is highly unlikely that all of these embryos will become “snowflake” babies. This prospect is even more unlikely because these frozen embryos cannot stay viable indefinitely. The Human Embryology Authority (2003) in the United Kingdom determined that the maximum storage time of embryos to be five years. Thus the creation and destruction of embryos is an unavoidable byproduct of IVF. If it is unacceptable to destroy these embryos for stem cell research, it should be unacceptable to do so for IVF. Likewise, if this sacrifice is acceptable in the case of IVF, it should be acceptable for embryonic stem cell research as well. While President Bush opposes the destruction of embryos for stem cell research, he has not commented on IVF.

But IVF has been an important part of thousands of people’s lives, and embryonic stem cell research could likewise prove to be a life changing development. Most people refer to “slippery-slopes” when engaging in this debate. The slippery slope works in both directions. Many fear that providing federal funding for embryonic stem cell research will be one more step toward the commodification of human life, and that we will become a “Brave New World,” where humans are grown for spare body parts. While it is true that we must proceed with caution, the best way to guarantee that this research does not go down this slippery slope is to provide federal funds and impose regulations to control what can be done. If not, the private sector will continue to do the research, though at a slower pace, and the federal government will have far less influence when the rulebook is written of.
what is permissible or not.

Likewise we cannot be carried away with the incredible potential of stem cell research. Most of the possible benefits are ahead in the future, and there is no guarantee that the research will result in the treatments that many supporters imagine. That is why for now it is stem cell research, not stem cell therapy. Scientists must make great advances in almost every aspect of the research, from controlling the rate of cell growth, to directing those cells to become useful in different areas in the body.

But these amazing possibilities will remain only mere speculation until federal funds are made available for embryonic stem cell research. No other type of stem cells, whether they are adult stem cells (including cord blood stem cells), or those derived from skin cells have the same potential that embryonic stem cells have. This issue is not likely to go away until federal funds are provided for this research, or another method is developed that results in treatment. Until that point is reached, or it is conclusively determined that stem cell research is not beneficial, this issue will continue to be a pressing matter. The prospects of potential treatment are enticing, and warrant full investigation. States such as California and New Jersey have taken the lead by providing state funding for embryonic stem cell research. It is imperative that Congress and the White House follow their example and allocate federal funds to this important research. James Thomson, a pioneer of stem cell research, provides the most fitting conclusion “It is difficult to estimate just how damaging the current restrictions have been to the field to date, but if the current restrictions are not eventually lifted, patients will suffer needlessly” (Vergano, 2004).

REFERENCES


Human Cloning Ban.


