

Trying to Save Lives: Are Embryonic Stem Cells Miracles or Murder?

The first documented case of a person receiving stem cell therapy involved a six-year old girl, Molly Nash. Gerard Magill in his book Genetics and Ethics writes that Molly had “Fanconi anemia, a rare genetic disorder that prevents bone marrow from being made in the body. This condition can kill at a very young age” (254). To help Molly have a bone marrow transplant, her parents had another baby, Adam, born on August 29, 2000. Doctors used blood from the placenta and umbilical cord for a stem cell transplant. “Both baby Adam and Molly flourished,” reports Magill. The problem with this case, however, was that some of the embryos created “to undertake preimplantation genetic diagnosis . . . were discarded” (255). This raises the ethical question of whether it is right to create human embryos as “property for medical research” (255).

Although stem cell therapy has appeared to save Molly Nash’s life, millions continue to suffer diseases. In a local nursing home, my Uncle Bob lives in the Alzheimer’s ward. A once hilarious and passionate man who loved a good story and a good beer, he now drools and sleeps, waiting to die. It’s hard to imagine former President Ronald Reagan howling incoherently like my uncle, but his widow Nancy watched him slowly degenerate from Alzheimer’s like this for ten years. American’s 40th President had no hope of being cured, and neither does my uncle. It’s a lonely way to die.

Yet there is hope that there could be a cure not only for Alzheimer’s disease but also for Parkinson’s and diabetes, even paralysis and cancer. The miracle? Embryonic stem cells. The problem? Embryos are sacrificed to get those stem cells. So in a battle reminiscent of the abortion debate, embryonic stem cells (ESCs) have caused a nationwide clash of morals, politics,

and religion. If the American government doesn't fund ESC research, we could lose out on possible miracles. If they do, we are spending tax dollars on what some consider murder. After examining both sides of this issue, I believe that ESC research is not murder and therefore should be federally funded to ensure the moral and ethical future of stem cell therapy.

Stem Cells and the Battle Line

The hopes of millions rest on the microscopic clumps of cells that make up the human embryo. These cells are called stem cells. Stem cells in embryos are undifferentiated--have not developed into anything at all yet. After eight days, the embryos begin to differentiate--become specific kinds of cells: heart, brain, blood, etc. Before differentiation, stem cells can be removed from the outer layer (which would become the placenta) and cultured to reproduce themselves, creating what is called a stem cell line--thousands of stem cells that match the original cells exactly. These stem cells, called embryonic stem cells or ESCs, are the focal point of the debate because of this fact: removing the stem cells causes the embryo to die; it can never grow into a human being. Many see this as murder, but many see this as no big deal. It is these same ESCs that scientists believe can be introduced into specific tissue in a patient where the stem cells then become that tissue, "join the gang" so to speak, thus creating new brain tissue for Parkinson's and Alzheimer's patients, new heart tissue for those who suffered heart attacks, and new spinal cord tissue for paraplegics. But no one seems able to resolve the battle of whether or not it is ethical to sacrifice embryos to research cures or even treat people. Sharon Begley, in a Newsweek article titled "Cellular Divide," explains the controversy:

The 40 or so cells that constitute the embryo look a little fuzzy, dusty even, as if

they had been rolling around on a dirty floor. But that, of course, is only the beginning of what you see. If you are a passionate right-to-life activist, you see in the cells an incipient human life, one deserving all the rights and respect of any other human, chief among those the right not to be destroyed and not to be used as a means to an end. If, though, you suffer from a currently incurable disease like Parkinson's or Alzheimer's, or love someone who does, then those cells look very different: they look like the seeds of hope, tiny miracles able to dance on the head of a pin. (22-24)

The stakes are high. Leon Kass, chair of the President's Council on Bioethics, argues that "new biotechnologies" such as stem cell therapy threaten "human dignity" (22). He warns, "The evils we face are intertwined with the goods we so keenly seek: cures for disease, relief of suffering, preservation of life" (3).

Arguments against Embryonic Stem Cell Research

Those who oppose ESC research are not against progress; they are concerned about maintaining the sanctity of human life. This was President Bush's main concern when he banned federal funding of creating new stem cell lines. John Cloud, in a Time article called "Bush's No-Win Choice," tells of three thirteen-year-old children--once unwanted embryos frozen in an IVF clinic who were adopted and implanted in their mothers' uterus--who appeared before the President to plead for the salvation of those embryos who are not given a chance at life (25). Childless couples everywhere anxiously await the prospect of a child of their own, so to destroy these embryos for research, to them, is nothing short of killing their hopes--and possibly their

children. It isn't right, they argue, to give them life for the purpose of creating babies and then take that life away for research. For "hard-liners who accept no compromise on the notion that life begins at conception . . . destroying an embryo--even to get stem cells that could potentially save lives--is murder" (Cloud 23).

Part of their argument comes from the little-publicized fact that it is not the embryo that is killed but the blastocyst--the name for the embryo in the second stage of development. From one to five days, the embryo does not contain the needed stem cells. John R. Meyer, a priest and doctor who writes for the Journal of Medical Ethics, explains the development of the embryo and why he is against ESC research. He explains that the embryo must be unfrozen and allowed to develop for three or four more days, because "human ES cells can only be identified and cultured after an embryo has developed for a few cell divisions" (167). It's bad enough, he argues, to toss out the frozen embryos and the unwanted cells, but to thaw them, let them get a little closer to being babies and then kill them for their stem cells is going too far. While it is true that ESCs are not human beings per se because they are incapable of developing into a human, a blastocyst, Meyer argues, is capable: "it contains a complete genome and cell that is needed to develop into an adult human being" (167). Martha King, in her Inside MS article "The Stem Cell Story," compares the blastocyst to an acorn with "the potential for all the cell types of an adult, just as an acorn contains a complete oak--roots, bark, wood, leaves" (55). If we are concerned about the sanctity of human life, somewhere a line must be drawn, and many like John Meyer argue that conception is that line, that "a defining circumstance of the right to life is innocence" (168). Meyer describes the ways that we determine when it is acceptable to kill as in times of war or in cases of self-defense, but never have we believed it is right to kill an innocent person. Who

could be more innocent than the unborn? Thus, he argues, it is unethical to kill “innocent” blastocysts in the name of research (168).

Because ESC research requires the death of the blastocyst, many of those who do not advocate federal funding of ESC research find parallels to the abortion issue. Both deal with the rights of the unborn. Abortion has been legalized to allow freedom of choice, but federal funds are not spent on abortion or abortion research. Likewise, ESC research is legal for private research companies to pursue possible cures, but why spend federal funds on it? To do so is to spend the tax dollars of everyone--those both for and against the procedure. Just as some don't want their money spent on abortion, some don't want to support the “killing” of embryos, either.

The ESC issue, of course, differs from the abortion issue in important ways. For one, the argument over abortion concerns the mother's rights versus those of the unborn. With ESC research, the parents merely give their consent, which they often do. Too, ESC therapy is promising, but it is not a reality; the argument is over “killing babies” for research. These microscopic blastocysts are being sacrificed to discover how people might be helped, not to actually help them (yet). There is a big difference, Cloud argues: “Embryonic stem cells are far from a proven technology--developing them into real therapies will require armies of scientists and perhaps many years of work” (26). If there is a moral question, if the possibility exists that we are, indeed, “murdering the innocent,” to do so for something that is merely a hope would be reprehensible.

Many opposed to ESC research emphasize using adult stem cells (ASCs) that don't require the death of anything or anyone. Their source--the patient himself--is uncontroversial. An article “Stem Cell Debate” from Medical Devices & Surgical Technology Week describes the

differences between ASCs and ESCs, some of the benefits and drawbacks of each. ASCs exist in all humans, it explains, in their blood, bones, and skin for example, any part of the body that has the ability to heal itself (1). ASCs are like little blank slates on standby, waiting to take over and become whatever is damaged or lost; thus when we break a bone, lose blood, or cut our skin, our bodies are able to repair themselves (King 53). These stem cells show much of the same promising results as ESCs. Some ASCs have shown pluripotent qualities--are able to become a variety of cells ("Stem Cell Debate" 1). Also, because ASCs come from the patient, they have no possibility of being rejected by the recipient, unlike ESCs which can "provoke immune rejection much like any other transplant" ("Stem Cell Debate" 1). And, while ASCs admittedly aren't as versatile as ESCs, they are promising.

ASCs are actually more than just a promise: they have been used in therapy for a few decades in fact. Michael Fumento, a senior fellow at the Hudson Institute, a public policy think tank, writes in a Detroit News article that "by the 1980s, adult stem cells were curing a variety of cancers and other diseases" (2). While Fumento doesn't explain or elaborate on this claim, he is right. As King explains, "Bone marrow transplantation--which is a form of adult stem cell therapy--cures several forms of leukemia and anemia" (57). Except for the case of Molly Nash and a few other people, ESCs have been used to treat mice and rats; they are still only experimental, and possibly not a good experiment at that. Fumento says, "Implanted embryonic stem cells also have a nasty tendency to multiply uncontrollably, a process called 'cancer.' Oops" (2). Oops is right. Fumento goes so far as to call ESC therapy a "fairy tale" (2).

Those who oppose ESC research are not merely conservatives scared of change, as some may accuse them. They are not trying to prevent suffering people from getting help, having

hope, and finding miracles. Just because President Bush doesn't believe we should fund the creation of new stem cell lines doesn't mean he is against stem cell research completely: an editorial in the New York Times entitled "Stem Cell Battles" notes that Bush "is the only president to authorize federal funding for embryonic stem cell research, leading to \$25 million in federal grants last year" (1). So while some are opposed to killing embryos, they are not against working toward stem cell therapy. They believe that it is unnecessary to cause the death of embryos in order to offer this hope. They prefer that tax dollars be spent on ASC research which many scientists consider just as promising.

Arguments for Embryonic Stem Cell Research

There is no way for us to have any absolute certainty about when "life" begins. We have to determine what we believe based on what we know. Those who support ESC research believe that the "death" of the embryo is not really a death at all. The microscopic cells of the blastocyst have no human characteristics; they are future humans but not humans yet. To "kill" an embryo, then, is no different from "killing" sperm when using birth control. While many conservatives, including the Catholic church, believe that life begins at conception, others feel life doesn't begin until a little later. Others argue that the term conception is not as definitive as some think. Frank Richter, who has researched Alzheimer's at Wayne State University, explains this belief based on several logical arguments. In his Detroit News article "Research Promises to Cure Diseases if Religion Recognizes Cells Can Be Extracted Before Life Begins," Richter says that "fertility specialists view conception not as a single moment in time, but as a process that can take up to 14 days" (1). Part of the argument revolves around the idea of "ensoulment" or the moment that

a developing human becomes more than a mass of tissue. Because an embryo is capable of dividing and becoming identical twins up until fourteen days after conception, some believe it is impossible for ensoulment to occur before this (Richter 2). If an embryo is still capable of becoming two embryos, it would follow, then, that the “soul” is not yet a part of this tiny mass of cells. Too, the embryo can be frozen: but can you freeze a soul? That doesn’t seem possible. Those who are pro-abortion consider fourteen days to be conservative, believing that ensoulment doesn’t occur till almost 24 weeks after conception, the time when the brain actually shows signs of synaptic activity. The argument, then, is that this supposed “killing” of embryos is no such thing. People aren’t being killed. Yes, the embryo is alive just as sperm and egg are alive, but they have a lot of changing to do before they are actually human.

Even if those against ESC research don’t accept this fourteen-day ensoulment idea, the fact still remains that in-vitro fertilization (IVF) clinics have frozen embryos stored by the thousands that will likely be thrown away. Those who oppose ESC research for moral reasons aren’t up in arms about life being tossed away here. Why not use these frozen embryos for research? Why throw them out when they could possibly provide the answer to cures that would alleviate the suffering of millions? It seems hypocritical to fight against ESC research but not care that thousands of embryos are discarded through IVF. Some argue, too, that the death of an embryo occurs naturally during any normal pregnancy, that in order to get pregnant, several embryos are created to ensure the success of one. The rest? They “die.” The argument, then, is that embryos die naturally in IVF clinics every day, so why all of a sudden the uproar? Shouldn’t they be put to good use? Some see it as similar to organ donation--not being wasteful.

But what about the claim that ESCs are “fairy tales”? Apparently it depends on whom

you ask. If you ask those who enthusiastically support ESCs, they'll tell you the exact opposite of the fairy tale theory: it's those ASCs that are worthless. Begley says, "One scientist even calls them 'crap science'" (27). First of all, many researchers don't believe that ASCs hold the promise of ESCs, that ASCs are too limited because they have differentiated to a degree. Some ESCs, too, are totipotent--are able to become any human cell at all, from cones in an eyeball to the pancreatic beta cells that produce insulin (or rather don't produce insulin in diabetics) ("Stem Cell Debate" 1). In addition, ASCs are much harder to come by because they exist amongst billions of other cells rather than only a few like the blastocyst; finding stem cells in adults is the proverbial needle in haystack search. There are other problems with ASCs, too. Researchers have found that "it's been very difficult to grow sufficient numbers of ASCs to regenerate tissues or create replacement organs" ("Stem Cell Debate" 1). In other words, they work on a small scale but might not succeed when the job is a big one. Because of these ASC pitfalls, many scientists insist on pursuing research on both types of stem cells. Dr. Thomas Okarma, a CEO at Geron (which funds ESC research at Johns Hopkins), says, "It's baloney that adult stem cells are all we need to make regenerative medicine real" (qtd. in Begley 27).

Those pursuing ESC research aren't immoral monsters willing to kill anything for a cure, as they have been accused of, any more than those opposed to ESC research are closed-minded religious zealots who don't care about anyone as long as they have their way. Supporters for ESC research honestly feel that ESCs hold amazing promise for the health and well-being of millions and that the embryo "death" is not murder at all. In a Reader's Digest article called "Cure Me if You Can," Michael Kinsley, who suffers from Parkinson's disease, pleads with his readers to understand the issue. He describes his sufferings, how the disease makes his left side

stiff and his handwriting illegible (104). Kinsley respects those, he says, who have ethical qualms about ESC research but says that “anyone who opposes stem cell research on moral grounds had better be willing to look me in the eye and say: ‘Mike, I know that science might be on the verge of curing your disease. . . . But I would rather ruin your life, health and hopes than allow this miracle research to continue’” (107). The health and hopes of many millions of people are wrapped up in these microscopic cells. Are their hopes misplaced? Is Michael Kinsley anxiously waiting for what will turn out to be nothing? We don’t know. But not pursuing this possibility could be like telling Columbus not to sail to the Indies because we just know the world is flat.

Why ESC Research Must Be Federally Regulated and Funded

Both sides of the ESC battle have valid arguments. Neither wants to throw away life. Both sides are concerned with the sanctity and the quality of human life. Yet it seems impossible to resolve that one controversial issue of whether or not ESC research actually is immoral. In July of 2001, President Bush declared that no public funding could be spent on ESC research with the exception of those stem cell lines already established. His decision, most believe, was meant to be a compromise between his pro-life platform promises and the more liberal plea for continued embryonic stem cell research. But this didn’t stop the arguing: the battle is still on. Why? Because in private corporations, ESC research thrives. While politicians argue over the rights of embryos, scientists at the Virginia Institute and an unnamed “Massachusetts company” create and clone embryos for ESC research (Cloud 24).

Kristen Philipkoski, in her article “Stem-Cell Cash on a Winding Road,” reports that

Genentech, a private biotech company, donated “\$500,000 to the California Stem Cell Initiative,” a bond measure which, if passed, will “give \$295 million per year to stem cell researchers over 10 years” (1). The Multiple Sclerosis Foundation, the American Diabetes Association, and the Parkinson’s Disease Foundation, to name a few, are funding private researchers to continue with ESC research. Up until Bush’s decision, “most people in Washington thought embryonic stem cell research was confined to embryos left over from couples seeking in-vitro fertilization. At least IVF embryos were created as an end in themselves; now scientists were concocting embryos to serve as little more than lab equipment” (Cloud 22-23). The fact is, with or without government funding of ESC research, it isn’t illegal, so it continues--ethical or not.

Those hoping for stem cell cures are all for this, excited that if the government isn’t going to help them, at least someone will. The fact is, they shouldn’t let themselves get too excited. While the ESC issue closely parallels the abortion issue, there is one important difference: abortion results in no saleable commodity, nothing to own or buy. With abortion, the only “thing” sold is a service, but not so with ESC research: embryos are property. Biology professor Scott F. Gilbert voices his concern in an article from Ascribe Medical News Service: “The products of these embryonic stem cell studies become part of a market economy in which economics, not morals, decide what is done and who can use the procedures” (“Swarthmore College Biologist” 1). Should ESC therapy become a reality, what would be the implications of this “market economy” commodity? For one, argues Gilbert, we could find ourselves on a “slippery slope wherein any technological procedure that can be done should be done” (1). In other words, what will stop corporations from using ESCs to create anti-wrinkle creams and

muscle enhancers? After all, there could be a lot of money in it. While most who favor stem cell research using embryos consider the possible benefits of curing disease a morally acceptable choice, the idea of killing embryos to get rid of wrinkles--an actual possibility--is just taking it too far. But for money? It could happen. Without federal regulation of ESC research, where would the embryonic stem cell slope slide off to? The possibilities seem endless, with some envisioning everything from complete replacement of body parts to the possibility of eternal life.

Again there are parallels to the abortion issue. Even some who were against abortion for ethical reasons supported its legalization because they knew that it was happening anyway. "Back-alley butchers" were performing abortions, risking lives, and profiting from it. Many saw the future of abortion being akin to illegal drug trafficking. It is better, they reasoned, for the government to let it happen legally and make sure it is regulated. Moral--not economic--choices can then be made. Governmental regulation could ensure an ethical line is drawn.

Governmental regulation could also prevent the price of future stem cell therapies from being ridiculously costly. While those who privately contribute to current stem cell research claim no financial interest, that it's about "giving back to society and advancing a field of medical science that could be helping millions of people," the fact remains that if ESC therapy does what is hoped, these donors will have quite a return on their investment (Philipkoski 1). Right now researchers are operating on the belief that stem cell therapy could cure millions of people of several diseases--virtually any disease that could be cured by regeneration of new, healthy body tissue. But if stem cell therapy becomes a marketable commodity outside of governmental regulation, it will not be cheap. Just a vial of ESCs costs \$5,000, and that's just for them to exist in a refrigerator ("Stem Cell Debate" 1). The therapy itself could easily be out

of financial reach for most Americans so that, no matter how amazing the cure, only the rich could afford it. The embryos, too, would become a commodity. Imagine people selling their embryos, clinics cloning embryos, hundreds of thousands of embryos sitting in freezers just waiting to die for stem cell research. Should ESC therapy become a reality, those opposed to it would shudder at the implications of its privatization. Avoiding federal participation because of possible immorality does not “save lives”--private companies will continue to “kill” in hopes of a cure. They could end up making great money off these once-living embryos. Gilbert likens this revolutionary science to atomic energy, saying “once the genie is unleashed, you can’t put it back in the bottle. It must be regulated” (“Swarthmore College Biologist” 2).

Government regulation would prevent such misuse of ESCs--of using them for wrinkle creams, of trafficking embryos like cocaine, of charging patients exorbitant sums for treatment. But is federal regulation enough? Many think it isn’t. The concern centers around the tiny supply that Bush’s ban left to researchers, those 11-21 (sources vary) stem cell lines that they have to work with. George O. Daley, a doctor from Harvard Medical School, illuminates the problem with this limited supply in his article “Missed Opportunities in Embryonic Stem-Cell Research.” He says that “the science of human embryonic stem cells is in its infancy, and the current policies threaten to starve the field at a critical stage” (628). Cloud points out that “the nation’s best scientists work on (federal) funding,” so if tax dollars were spent on ESC research, those at Harvard and MIT for example would be working toward a cure (24). Gilbert has the same concern: “My fear is that if there’s no public funding for embryonic stem-cell research, the only scientists who can do it are those in corporations” (“Swarthmore College Biologist” 1). Also, because all ESC recipients must be genetically matched with the stem cells they receive,

researchers fear that these few already established lines aren't nearly enough; at the Wisconsin clinic they already have a few hundred established lines. Daley says the few stem cell lines that are federally funded "have limited potential for use in clinical therapies. All were cultured in contact with mouse cells and bovine serum, which renders them inferior to newer lines, derived under pristine conditions, for potential therapeutic applications" (627). Governmental regulation and funding of ESC research would solve a host of problems.

But there is one even bigger problem: patenting. Joseph Fins and Madeleine Schachter discuss the issue of stem cells' patentability in their journal article "Patently Controversial: Markets, Morals, and the President's Proposal for Embryonic Stem Cell Research." They argue that President Bush's decision to allow research only on already established stem cell lines, "in an attempt to protect embryos that he regards as future persons . . . paradoxically invokes patent protections normally used to protect private property" (266, emphasis theirs). Embryos, whether created in IVF clinics or for the sole purpose of research, are such property, owned by the scientists with petri dishes or the parents who donated sperm and eggs. And if you own the embryo, you own the cure you discover from that embryo. Yet to own the cure for a disease is morally reprehensible to most people. Jonas Salk, for example, discovered the polio vaccine but said that "the people" owned the cure: "There is no patent," Salk said. "Could you patent the sun?" (qtd. in Fins and Schachter 267). Such treatment, most believe, is not meant to be a marketable commodity. Salk's discovery prevented one disease; stem cell therapy promises to cure many, even more reason for no one to "own" it. But without federal funding of ESC research, without the ability for government-funded scientists to create new stem cell lines, private companies will surge ahead with the research on their own. They'll make discoveries.

They'll patent them so they can make the money. In the book Who Owns Life?, Glenn McGee and Elizabeth Banger caution that private funding of stem cell research means that companies will have "little incentive to open their labs to peers, the media, or ethical scrutiny" (260).

The possible trafficking of embryos and the likelihood of companies selling cures for diseases for exorbitant amounts of money, while the world's best scientists sit with their hands tied--these realities make the "saving of embryos" a moot point: these "future persons" are dying anyway. And that's what they are--future people, possible people, but not people. Yes, we must draw a line to ensure ethical practices. We must preserve the sanctity of human life. But we need to make sure that it is actually human life we're working to preserve. To draw the line so early, to call ESC research murder when the extracted cells have not differentiated into any human parts, to say that embryos that can be frozen or can divide into twins are already whole persons with souls--these arguments are to misunderstand human reproduction.

We are right to hesitate. We are being responsible when we insist on a thorough understanding of what ESC research entails. But we're being archaic if we look into a microscope, see a tiny blob of cells no bigger than a pixel, and worry about whether or not it is murder to let it die. Because while we're worrying, "good science" loses control, and we face the possibility of an economic nightmare. There seems to be little doubt that stem cell therapy will soon cure a host of diseases. Lifting the ban on federal funding will force researchers to practice within ethical boundaries, will enable the best researchers to work toward a cure, and will prevent the immoral patenting and marketing of human embryos and the possible cures that come from their stem cells. Lifting the ban could actually save embryos--and millions of sick and suffering people. As Begley puts it, "By banning [ESC] research, we uphold the most extreme

view of the sanctity of life, but at a price: foreclosing the possibility of doing all we can to improve the lot of the living” (27). But if we support all stem cell research, in generations to come there may be no Christopher Reeve stuck in wheelchairs, no children shooting insulin into their legs, and no Alzheimer’s wards.

Works Cited

- Begley, Sharon. “Cellular Divide.” Newsweek 9 July 2001: 22-27.
- Cloud, John. “Bush’s No-Win Choice: Why the President’s Stem-Cell Decision Could Define His Term.” Time 23 July 2001: 22-26.
- Daley, George Q. “Missed Opportunities in Embryonic Stem-Cell Research.” New England Journal of Medicine 351 (2004): 627-28.
- Fins, Joseph J., and Madeleine Schachter. “Patently Controversial: Markets, Morals, and the President’s Proposal for Embryonic Stem Cell Research.” Kennedy Institute of Ethics Journal 12 (2002): 265-278.
- Fumento, Michael. “Adult Cell Lines Already Cure a Variety of Diseases; Embryonic Cells Treat No One, Can Result in Cancer.” The Detroit News 15 Aug. 2004. 10 Oct. 2004 <<http://www.detnews.com/2004/editorial/0408/15/a17-242314.htm>>.
- Kass, Leon. Life, Liberty, and the Defense of Dignity: the Challenge for Bioethics. San Francisco: Encounter Books, 2002.
- King, Martha. “The Stem Cell Story.” Inside MS 21.4 (2003): 52-58.
- Kinsley, Michael. “Cure Me If You Can.” Reader’s Digest Aug. 2003: 102-07.
- Magnus, David, Arthur Caplan, and Glenn McGee, eds. Who Owns Life? Amherst, N.Y.:

Prometheus Books, 2002.

Magill, Gerard, ed. Genetics and Ethics: An Interdisciplinary Study. Saint Louis: Saint Louis University Press, 2004.

Meyer, John R. "Human Embryonic Stem Cells and Respect for Life." Journal of Medical Ethics 26 (2000): 166-70.

Philipkoski, Kristen. "Stem Cell Cash on a Winding Road." Wired News 23 July 2004. 9 Oct. 2004 <<http://www.wired.com/news/medtech/0,1286,64302,00.html>>.

Richter, Frank. "Research Promises to Cure Diseases if Religion Recognizes Cells Can Be Extracted before Life Begins." Detroit News 15 Aug. 2004. 10 Oct. 2004 <<http://www.detnews.com/2004/editorial/0408/15/a17-242363.htm>>.

"Stem Cell Battles." Editorial. New York Times 15 Aug. 2004, late ed., sec. 4: 10.

"Stem Cell Debate: Conflicting Views on Stem Cells Reviewed in Special Report." Medical Devices & Surgical Technology Week 18 July 2004: 204. LexisNexis Academic. Central Michigan Univ. Lib., Mt. Pleasant, MI.. 9 Oct. 2004 <<http://web.lexisnexus.com>>.

"Swarthmore College Biologist Says Bush Decision Ignores History: All Stem-Cell Research Must Be Regulated." Ascribe Medical News Service. 13 Aug. 2001. Health Business Fulltext Elite. FirstSearch. Central Michigan Univ. Lib., Mt. Pleasant, MI. 8 Oct. 2004 <<http://newfirstsearch.oclc.com>>.