

# What Do We Make of the Stem Cell Debate? A Biblical Perspective

*Heather Zieger looks at the stem cell debate from a biblical worldview perspective. This Christian perspective recognizes the true source of life and the difficulties with destroying many young lives for the hope of being able to save a few older lives.*

## What Are Stem Cells?

If science had a tabloid magazine, then stem cells would grace the cover. And much like the Hollywood celebrities, stem cells are at the center of controversy. How is a Christian to respond to conflicting reports and confusing science? In this article we will discuss the differences between adult and embryonic stem cells, look at some media myths, and evaluate the worldview issues behind the controversy.

First, let's define stem cells. Stem cells are cells that serve as the body's carpenters and mechanics to other cells. Their name comes from the stem of a plant. Think of a rose. From the stem grow the leaves, the thorns, and the flower. The flower does not produce leaves, nor do the thorns produce a flower, but the stem produces all of these things. However, the stem of the rose is still part of the plant. In the same way, stem cells are themselves cells and they produce other cells.

Stem cells can be found throughout our body. Think about when you give blood. Your body will resupply the blood that you lost. It does this by using blood stem cells. When your body needs more blood, signals tell the blood stem cells to make red blood cells, white blood cells and plasma cells. Another

example is our skin. We lose skin every day, but our body has very active skin stem cells that grow new layers. Keep skin stem cells in mind, because scientists have been able to do some amazing things with skin stem cells.

Blood and skin stem cells are examples of adult stem cells, which are different from another type of stem cell called embryonic stem cells. Embryonic stem cells are only found in the inner cell mass of a 5- to 8-day-old embryo. These cells end up making every cell in the human body and can divide indefinitely. They are believed to be much more versatile than adult stem cells. Because of this ability, scientists describe embryonic stem cells as *pluripotent*. Adult stem cells are programmed to only make certain types of cells (like our example of blood stem cells), and adult stem cells have a limited number of cell divisions. Because of this, they are described as *multipotent*.

As we look at some of the scientific research on stem cells, we will find that adult stem cells are more versatile than we once thought, and embryonic stem cells have limitations that scientists still need to overcome.[\[1\]](#)

## **Adult Stem Cells: The Underreported Medical Successes**

One of the two main types of stem cells is adult stem cells. Adult stem cells are named for their abilities, not for their source. We find very helpful adult stem cells in umbilical cord blood and the placenta even though these sources are not from adults. One of the most studied adult stem cell sources is bone marrow. The first bone marrow transplant was performed in 1968. But it wasn't until 1988 that scientists identified the stem cells within bone marrow that caused the transplants to work.[\[2\]](#)

Bone marrow transplants demonstrate one of the biggest

advantages of adult stem cells. Scientists did not know what a stem cell was, let alone how they worked, but the bone marrow transplants were still successful. The stem cells knew where to go in the body to repair the right tissues. This ability to automatically go to the location of repair is characteristic of all adult stem cells.

Bone marrow transplants also demonstrate one disadvantage to adult stem cell therapy. Just like an organ transplant, the stem cell donor must be an exact match to the patient. And the patient will need to take immuno-suppressant drugs for the rest of his life.

However, recent findings with umbilical cord blood have shown that the donor does not have to be an exact match when cord blood is used, meaning that a patient has a better chance of finding a donor. One of the first umbilical cord treatments was for sickle cell disease in a twelve-year-old boy.[\[3\]](#) He responded so well to treatment that a year later doctors declared him cured of sickle cell disease. He does have to take immune suppressant drugs, but does not display sickle cell symptoms.

One way around the donor problem is to use the patient's own healthy stem cells to repair other damaged cells. Parents now have the choice to bank their child's umbilical cord blood in the event that the child may need it. This technique was successfully used to help a child with her cerebral palsy symptoms.[\[4\]](#) Other adult stem cell successes include rebuilding bone, alleviating some cancers and auto-immune diseases, relieving Parkinson's symptoms, and treatments for Type I diabetes.[\[5\]](#)

All of these therapies have happened in real people using stem cells that do not involve the destruction of an embryo, and would be perfectly ethical within a Christian worldview.

# What is the Promise of Embryonic Stem Cells?

The second type of stem cell is embryonic stem cells. Embryonic stem cells come from the inner cell mass of a 5- to 8-day-old embryo. Embryos are formed after the egg and sperm have united, which initiates a directional process that, given proper conditions, can eventually form a baby. At the 5- to 8-day stage, there are only a few cells within the embryo, but these cells are capable of making all of the cells in the human body. To obtain these cells, scientists penetrate the outer protective layer of the embryo and remove the cells. This procedure destroys the embryo.

It is still only a theoretical possibility that human embryonic stem cells can cure diseases. There is one FDA approved human trial that was announced in January 2009 for patients with a recent spinal cord injury.[\[6\]](#) We will have to wait to find out the results of this treatment. In other parts of the world, people have sought embryonic stem cell therapy as a desperate measure. One man in China had embryonic stem cells injected into his brain to relieve his Parkinson's symptoms. Unfortunately, the cells spun out of control and continued to make new cells of varying cell types. They eventually formed a large brain tumor consisting of different kinds of cells [a teratoma], such as skin cells, hair cells, and blood cells.[\[7\]](#) Another boy in Israel had a disease that attacked his spinal cord. His parents took him to Russia for several treatments with embryonic stem cells. Four years later, doctors found tumors in his spine that they confirmed came from the embryonic stem cell therapy.[\[8\]](#)

One of the most difficult hurdles for embryonic stem cell research is trying to program the stem cell to become the particular cell type that they need. The second hurdle is then telling the cell to stop multiplying before it forms a tumor. The signals and mechanisms for this are still being

researched; however, one recent study involving the rebuilding of mouse muscles using embryonic stem cells shows some progress in this area.[{9}](#)

While embryonic stem cells may theoretically have promise, they have not shown this in reality. Time will tell if they actually deliver. However, the ethical issue from a Christian perspective is not whether this research has a practical use, but whether we want to go down the path of using the parts of one human being, deemed less worthy of life, for another.

## Media Myths

Unfortunately, the stem cell debate has turned into a media poster child for the next big scientific miracle. And stem cells have been hot science topics in the political realm. What is striking in all of this are the misconceptions that are repeated in the media.

Let's go over three media myths in the stem cell debate.

The first myth is that President Bush restricted stem cell research. Actually, President Bush was the first president to specifically allow federal funding for embryonic stem cell research.[{10}](#) However, he did put limits on how far they can take that funding. Furthermore, what is often omitted is that private companies have always been allowed to invest in embryonic stem cell research.

The second myth often repeated by the media is that embryonic stem cells have the potential to cure all types of diseases including spinal cord injuries,[{11}](#) Parkinson's and Alzheimer's. So far, the only successful stem cell treatments of spinal cord injuries or of Parkinson's symptoms[{12}](#) have been with adult stem cells.

I want to emphasize that *Alzheimer's will never be cured by stem cell therapy of any kind*. Alzheimer's causes the death of

many types of brain tissues. Stem cells might be able to replace some dead tissue, but tissue death is a symptom, not the cause. Alzheimer's affects the whole brain so deeply and quickly that it really isn't an issue of replacing cells. Therefore, scientists must look to other areas for cures for Alzheimer's.[{13}](#) The perpetuation of the myth that stem cells will cure Alzheimer's is either a cruel misrepresentation in order to sell a story, or else demonstrates a complete lack of understanding on the subject.

The third misrepresentation is the blatant lack of media coverage for adult stem cells. There have been over 70 different diseases, disorders, or injuries that have been helped or cured with adult stem cells in human trials,[{14}](#) yet this has hardly been covered by the media. We have discussed the successes of bone marrow and umbilical cord blood, but where is the media coverage of the latest findings with skin stem cells?[{15}](#) Scientists have found ways to coax a patient's own skin stem cells into acting just like an embryonic stem cell. In other words, these cells have the potential to become almost any cell in the body and they are from the patient's skin. No use of embryos, no immuno-suppressant drugs, and the technique has been refined for patient safety.[{16}](#)

Why this bias? There is a worldview issue at the heart of the matter.

## **Stem Cells from a Christian Worldview**

We have looked at the differences between embryonic and adult stem cells. We have seen the double standard the media has in reporting these types. But the question remains, with all of the successes of adult stem cells, including the ability to create embryonic-like stem cells from the patient's own skin, why insist on continuing embryonic stem cell research? Why does the debate continue?

I believe a major part of the problem is the answer to the question, Who is in authority? There are two broad options: a God-centered authority or a man-centered authority. The man-centered authority in this case is called scientism. It is the idea that science will save us from our problems and tell what we need to know about life, including what is right and wrong.

Don't misunderstand me, I am trained as a scientist, and I think studying nature and pursuing scientific questions is important. But when we prioritize science as the only means of gaining knowledge and make it the guide for our lives and the decisions we make, we aren't studying the world around us, we have essentially invented a religion.

The other perspective is a God-centered authority. In this case all of nature, technology and our decisions are under God's authority. In other words, we determine what is right and wrong from the Bible because it is God's revealed word.

Scientists want to continue studying embryonic stem cells, because they want to explore all possibilities, and they see no reason why they shouldn't. From their worldview, they are in authority. There is no reason to put moral limitations on research. Many people latch onto this idea because they believe science will save them. They have faith in science. Some even believe this to the point of claiming stem cells will cure diseases and ailments that no stem cell therapy could ever do.[{17}](#)

Some scientists argue that we need to study embryos to better understand how a disease can develop in the earliest cells. These studies have been done in animals, but scientists would prefer to use humans because there are several developmental differences between humans and other animals.[{18}](#)

As Christians, we believe scientific study and finding cures for diseases is a great endeavor. But just because we *can* do something, doesn't always mean we *should*. We know what we

should do from God's word. He values the unborn, and values human beings as having inherent dignity because we are made in his image. We therefore cannot judge some humans less valuable than others, and we certainly cannot destroy them for research observations or for removal of their parts. From this perspective, adult stem cell research is ethical, but embryonic stem cell research is not.

## Notes

1. An excellent documentary on the basics of stem cells and the controversy around embryonic and adult stem cells: *The Lines that Divide: The Great Stem Cell Debate*. Dir. Brian Godwana. The Center for Bioethics and Culture Network, 2009. See this link for a clip:  
[www.thecbc.org/redesigned/research\\_display.php?id=373](http://www.thecbc.org/redesigned/research_display.php?id=373).
2. "Purification and characterization of mouse hematopoietic stem cells." GJ Spangrude, S Heimfeld, IL Weissman, *Science* Vol. 241, Issue 4861, 58-62.
3. [www.nationalcordbloodprogram.com](http://www.nationalcordbloodprogram.com)
4. [www.foxnews.com/story/0,2933,392061,00.html](http://www.foxnews.com/story/0,2933,392061,00.html)
5. [www.stemcellresearch.org](http://www.stemcellresearch.org)
6. [www.geron.com/grnopclclearance/](http://www.geron.com/grnopclclearance/)
7. "Survival and proliferation of non neural tissues, with obstruction of cerebral ventricles in a Parkinsonian patient treated with fetal allografts." *Neurology*, Vol 46, Issue 5, May 1, 1996.
8.  
[www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029](http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029)
9. "Functional skeletal muscle regeneration from differentiating embryonic stem cells." *Nature Medicine* 14, 134-143, 2008.
10. See Executive Order 13435; for an excellent article on the politics of stem cell research from a Christian worldview, see "Responsible Science & ESCR" by Greg Koukl in *Solid Ground* May/June 2009 (a publication of Stand to Reason).



11. [www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1864811](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1864811) (*Journal of Spinal Cord Medicine* 29, 191-203, July 2006).
12. [www.lifenews.com/bio2751.html](http://www.lifenews.com/bio2751.html);  
[www.bio-medicine.org/medicine-technology-1/Groundbreaking-Paper-Publishes-Long-Term-Results-of-a-Successful-Phase-I-Clinical-Trial-Using-Autologous-Neural-Stem-Cells-to-Treat-Parkinsons-Disease-3848-1/](http://www.bio-medicine.org/medicine-technology-1/Groundbreaking-Paper-Publishes-Long-Term-Results-of-a-Successful-Phase-I-Clinical-Trial-Using-Autologous-Neural-Stem-Cells-to-Treat-Parkinsons-Disease-3848-1/);  
[www.bentham-open.org/pages/content.php?TOS CJ/2009/00000001/00000001/20TOS CJ.PDF](http://www.bentham-open.org/pages/content.php?TOS CJ/2009/00000001/00000001/20TOS CJ.PDF)
13. For an excellent overview of Alzheimer's, see the Alzheimer's association website at [www.alz.org](http://www.alz.org); for their statement on stem cell research see: [www.alz.org/national/documents/statements\\_stemcell.pdf](http://www.alz.org/national/documents/statements_stemcell.pdf).
14. "A 37-year-old-spinal-cord-injured female patient, transplanted of multipotent stem cells from hum UC blood, with improved sensory perception and mobility, both functionally and morphologically: a case study." *Cythotherapy* 7, Issue 4, 368-373, 2005.
15. One person in the popular media who did mention skin stem cells was Dr. Mehmet Oz on the Oprah Winfrey Show: [www.youtube.com/watch?v=lDFJ0zu9SyM](http://www.youtube.com/watch?v=lDFJ0zu9SyM).
16. K. Takahashi, et al., *Cell* doi: 10.1016/j.cell.2007.11.019; 2007; J. Yu, et al., *Science* doi: 10.1126/Science. 1151526; 2007.
17. See Joseph Bottum and Ryan T. Anderson's article in *First Things* for an excellent reference on the history of stem cell research: [www.firstthings.com/article.php?year=2008&month=10&title\\_link=001-stem-cells-a-political-history-27](http://www.firstthings.com/article.php?year=2008&month=10&title_link=001-stem-cells-a-political-history-27). Also see Anderson's article in the *Weekly Standard* for reasons scientists still want to study embryonic stem cell research: [www.weeklystandard.com/Content/Public/Articles/000/000/016/258hdaij.asp?pg=1](http://www.weeklystandard.com/Content/Public/Articles/000/000/016/258hdaij.asp?pg=1).
18. The scientists who conducted the research on skin stem cells that were coaxed into acting like embryonic stem cells did use knowledge from embryonic stem cell research to help identify the general markers for pluripotency. However, it is

unclear that it is necessary to use human embryonic stem cells for this, because the markers for pluripotency were first identified in mouse embryonic stem cells.

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# Human Embryonic Stem Cells Go to Human Trials

January 23, 2009

Just when we all thought that perhaps the wind in the sails of the human embryonic stem cell debate had abated, Geron Inc. announced that it was approved by the FDA to conduct an experimental procedure on human subjects who have suffered from a recent spinal cord injury. The procedure would involve the injection of neural cells derived from human embryonic stem cells into a spinal cord injury site. The patients would receive two months of immune suppressant drugs and will be closely monitored for a year. The stem cells were obtained from some of the oldest lines of human embryonic stem cells that were left over from in vitro fertilization procedures.

## **What if this doesn't work?**

There are many human embryonic stem cell researchers who are worried about Geron doing the first human trials. Dr. Kessler, chairman of neurology and director of the stem cell institute at Northwestern University, is quoted in the *New York Times* as being skeptical that Geron's technique will work on human patients. In trials with mice, Geron showed that mobility increased in the tails and legs of mice with moderate spinal cord damage. Also, the mice showed no formation of tumors, a

problem with embryonic stem cell therapies. However, the mice had “moderate injuries,” and Kessler is skeptical that alleviating moderate injuries in mice will translate in the severe injuries in humans.

For those of us who are against the use of embryos for research purposes, this would be another example of the difficulty of using embryonic stem cells. This is just one more reason why more research and research dollars should be focused on adult stem cells. Adult stem cell research has been successfully used in humans for years, and is not ethically contentious.

As Christians, we also need to be mindful and prayerful of the fact that there are many people who have placed hope in embryonic stem cell research. The media has portrayed embryonic stem cells as the panacea for everything from spinal cord injuries to diabetes to Alzheimer’s. We need to be sensitive to the pain and disappointment that this could be for many people who have had to deal with permanent injuries or debilitating conditions.

### **What if this works?**

First of all, even if this particular trial works, the scientists at Geron say that there is still many years of work to do. All they are testing now in Phase I clinical trials is if it is safe. Testing for efficacy comes later.

If this procedure works both safely and therapeutically, then we as Christians have the most difficult position. The fact that we believe the embryo is a person, and that it has value and dignity, does not change. Also, the fact that from a biblical perspective it is unethical for us to decide to destroy one life to save another, and to value one life over another, does not change. But anyone who is in this position or has a child, a spouse, or a loved one paralyzed due to a spinal cord injury must make a decision, and no matter what

decision they make there will likely be feelings of guilt, regret and temptations too. Consider two examples:

*1) Your spouse is in a horrible car accident and suffers from a spinal cord injury which will likely leave him/her paralyzed. You have the option of doing embryonic stem cell therapy at the injured site, which may result in your spouse regaining some mobility. You don't think it is right to destroy an embryo because it is a person too, and is made in the image of God so it has inherent value. As you watch your spouse work with his/her injury, learning how to live life without mobility, how likely is it that you will ask yourself, "Did I do the right thing?" "If that embryo was going to die or be used in someone else anyway, why not my spouse?" How tempting would it be to carry that regret and guilt?*

*2) As before, your spouse is in a horrible car accident and suffers from the same injuries. This time you elect to do the embryonic stem cell therapy. Your spouse regains some mobility, but how tempting would it be to wonder about the sacrifice that was made, and the guilt associated with compromising, or to look at your children knowing that they were embryos once too?*

These are not easy decisions. I will not pretend that even though as Christians we believe in the sanctity of human life, somehow it makes one decision any easier or the other decision any less tempting. Thankfully, we do not have to make these decisions at this time, and my prayer is that I hope we never do. It is said that a society can be judged by how they treat their most vulnerable. From the biblical perspective Jesus said, "Truly, I say to you, as you did it to one of the least of these my brothers, you did to me" (Matthew 25:40).

To give you two additional pieces of encouragement:

1) Adult stem cells have alleviated the effects of particular

types of spinal cord injury in human patients (see [www.discovery.org/a/2362](http://www.discovery.org/a/2362) for a great article that was written in 2004, but seems quite timely now).

2) Desiring to alleviate the effects of the fall, including things like spinal cord injuries, is understandable. Whether or not we find a cure within someone's lifetime, we have hope in God's promise that he has conquered death and we will receive a resurrected body (1 Corinthians 15).

For more information on stem cells see these two articles from Probe.org:

[www.probe.org/amniotic-stem-cells/](http://www.probe.org/amniotic-stem-cells/)

[www.probe.org/the-continuing-controversy-over-stem-cells](http://www.probe.org/the-continuing-controversy-over-stem-cells)

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## Amniotic Stem Cells

On January 8, 2007, the Associated Press reported that scientists from Wake Forest University and Harvard University discovered a new type of stem cell found in the amniotic fluid within the wombs of pregnant women. Furthermore, once these stem cells are removed to the laboratory setting, scientists can coax them to become a variety of cell types including brain cells, liver cells, and bone cells.



Within the ethical arena of the divisive stem

cell debate, where do amniotic stem cells fall? The crux of the stem cell debate is whether it is ethical to extract stem cells from a blastocyst (an embryo in its earliest stage of development) at the cost of destroying the embryo, or whether this embryo should be respected and protected as an individual with research only to be conducted on alternative stem cell sources. The debate is exacerbated by emotional appeals and political agendas that are coupled with the media's sometimes uninformed or misconstrued reporting and the scientific community's vying for funds.

This discovery of the amniotic stem cells is exciting because it offers scientists a bountiful supply of stem cells<sup>{1}</sup> without harming mother or child. From a Christian perspective, these stem cells fall under the same category as adult stem cells.<sup>{2}</sup> We applaud the efforts of scientists who conduct alternative, ethical research that does not involve the destruction of another human life deemed less worthy for survival. Scientists have discussed the possibility of setting up a stem cell bank with amniotic stem cells from willing donors, but it will be several years before these stem cells are ready for human trial use. Dr. Anthony Atala, head of Wake Forest University's Regenerative Medicine Institute, suggests that a stem cell bank would allow for genetic matching of up to 99% of the population, meaning that the likelihood for a patient to find a genetic match, without having to be on a waiting list, is very high.

At the risk of deflating some of the hype around this new discovery, I cannot help but notice that this is another example of misconstrued reporting of stem cell research. The reports would have the reader believe that this is some kind of breakthrough that may be the solution to all of our stem cell differences, but stem cells have been discovered in fetal tissue before. Stem cells harvested from umbilical cord blood were discovered more than ten years ago, and have been used in several human trial studies to cure sickle cell disease and

alleviate or cure various types of leukemia in adults and children alike. Furthermore, the United States *does* have an umbilical cord stem cell bank that has been active for several years (see [www.cordblood.com](http://www.cordblood.com)—the Web site for the National Cord Blood Registry). However, very few people are aware of the bank's existence, largely due it being overshadowed by other, more controversial, aspects of stem cell research. So, even though the discovery of stem cells within amniotic fluid is an exciting find, it should come as no surprise that other fetal tissues contain stem cells, and they, like the umbilical cord cells, are more versatile than some adult stem cells and easier to work with than embryonic stem cells.

While there is an abundance of reporting on the potential for embryonic stem cells, there is little reporting on the many discoveries and advances that have occurred *in human trials* with adult stem cells. Scientists have reaped the advantages of harvesting adult stem cells for years (example: bone marrow transplants), yet politicians and the press seem to ignore those research articles and only focus on the ones that produce political and public hype.

This discovery is one of many exciting discoveries within the ethical bounds of adult stem cell research. We can rejoice in the fact that we serve a sovereign God whose precepts that guided believers thousands of years ago also apply in today's technological world.

For more information see Dr. Ray Bohlin's article The Continuing Controversy Over Stem Cells [www.probe.org/the-continuing-controversy-over-stem-cells/](http://www.probe.org/the-continuing-controversy-over-stem-cells/). We also suggest you consider the Cerebral Palsy Guidance website at [cerebralpalsyguidance.com](http://cerebralpalsyguidance.com).

## Notes

1. NBC reported that approximately 4 million babies are born per year in the US alone. See [www.msnbc.com](http://www.msnbc.com).

2. Technically, these stem cells come from fetal tissue, but are considered “adult” due to their level of differentiation.

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# Stem Cell Wars

*December 17, 2005*

The political war over stem cell research is heating up as evidenced by two recent events in the media. For the last few weeks, Senate Democrats have blocked action on a bill that would allow the use of umbilical cord blood in stem cell research. Although the bill passed the House by a remarkable vote of 431-1, the democratic leadership in the Senate would not allow a vote on the measure. The bill was even endorsed by the Congressional Black Caucus due to the positive appeal from former basketball star Julius (Dr. J.) Erving.

Also in the news was the decision by University of Pittsburgh's Gerald Schatten to quit the human cloning project of South Korean scientist Dr. Hwang Woo Suk. Dr. Schatten cited ethical concerns about possible coercion in obtaining eggs from female project staffers. Dr. Schatten also demanded that his name be removed from an article he co-wrote with Dr. Hwang for the journal *Science* because he believes it used fraudulent photographs in the article.

## Background

Stem cells are the basic cells in our body. They get their name from their similarity to the stem of a plant which gives rise to branches, bark, and every other part of a plant. Embryonic stem cells are the cells from which all 210



different kinds of tissue in the human body originate. As an embryo develops into a blastocyst, a few layers of cells surround a mass of stem cells. If these stem cells are removed from the blastocyst, they cannot develop as an embryo but can be cultured and grown into these different tissues.

Stem cells are undifferentiated and self-replicating cells that have the potential to become the other differentiated cells in our body. And that is why there is so much scientific and political attention being paid to stem cells.

The potential for stem cell research is enormous and intoxicating. Nearly 100 million Americans have serious diseases that eventually may be treated or even cured by stem cell research. Many diseases (like Parkinson's, heart disease, diabetes) result from the death or dysfunction of a single cell type. Scientists hope that the introduction of healthy cells of this type will restore lost or compromised function.

### **Moral Perspective**

The moral problem with the research is that to obtain human embryonic stem cells, the embryo is destroyed. Embryos needed for human embryonic stem cell research can be obtained from three sources: (1) in-vitro fertilization used to produce embryos, (2) frozen embryos which are spare embryos left over from in-vitro fertilization, or (3) human cloning of embryos.

In addition to the moral problem is the scientific reality that embryonic stem cell research has not been successful. Although human embryonic stem cells have the potential to become any type of human cell, no one has yet mastered the ability to direct these embryonic cells in a way that can provide possible therapy for humans afflicted with various diseases.

Numerous stories are surfacing of the problems with human embryonic stem cells. One example took place in China where scientists implanted human embryonic stem cells into a patient

suffering from Parkinson's only to have them transform into a powerful tumor that eventually killed him.

Often the media has not been telling the truth about embryonic stem cell research. So why hasn't the media accurately covered this issue? "To start with, people need a fairy tale," said Ronald D.G. McKay, a stem cell researcher at the National Institute of Neurological Disorders and Stroke. "Maybe that's unfair, but they need a story line that's relatively simple to understand."

What has been lost in all of this discussion is the humanity of the unborn. Proponents of embryonic stem cell research argue that an embryo or fetus is a "potential" human life. Yet at every stage in human development (embryo, fetus, child, adult), we retain our identity as human beings. We are humans from the moment of conception. We do not have the right to dismember a human embryo because it's unwanted or located in a test tube in a fertility clinic.

Also lost in this discussion is the success of using stem cells from sources other than embryos. Successful clinical trials have shown that adult stem cells as well as umbilical cord blood have been very effective. These sources may provide cures for such diseases as multiple sclerosis, rheumatoid arthritis, systematic lupus, etc. Some studies seem to indicate that adult stem cells create "fewer biological problems" than embryonic ones.

No moral concerns surround the use of human adult stem cells since they can be obtained from the individual requiring therapy. And using blood from umbilical cords of newborns does not raise any significant concerns because the newborn is not harmed in any way.

In the last few years, stem cells have also been found in tissues previously thought to be devoid of them (e.g., neural tissue, nasal passages). And human adult stem cells are also

more malleable than previously thought. For example, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.

Human adult stem cell research is already effective and raises none of the moral questions of human embryonic stem cell research. Even biotech industry proponents of embryonic stem cell research believe that we may be twenty years away from developing commercially available treatments using embryonic stem cells.

All of this, however, seems lost on some in Congress who continue to push for additional funding of embryonic stem cell research. When democratic leaders in the Senate hold up a cord blood bill that will help people just to get a vote on an embryonic stem cell bill, they clearly have the wrong priorities. Adult stem cell research is already effective. Embryonic stem cell research is not.

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# **The Continuing Controversy over Stem Cells: A Christian View**

*Dr. Ray Bohlin brings a biblical worldview to this intersection of ethics and science. From a Christian*

*perspective, is it right to harvest and destroy embryonic stem cells for the hope of possible finding a treatment for some diseases?*

## **Different Kinds of Stem Cells**

Stem cell research grew into a major issue in the 2004 election and will continue to be discussed and argued for years to come as research continues to make progress. Unfortunately, most people continue to be misinformed about the real issues in the discussion.

Most articles in the media fail to distinguish between the different kinds of stem cells and the different ethical questions each of them presents. Several states either already have or are working to get around federal restrictions on embryonic stem cell research in order to keep the research dollars at their state research universities.

So the controversy has far from abated. In order to think our way through this we will need some basic information. First, we need to understand some things about stem cells in general and the types of stem cells available for research.

What are stem cells? Stem cells are specialized cells that can produce several different kinds of cells in your body. Just like the stem of a plant will produce branches, leaves, and flowers, so stem cells can usually produce many different kinds of cells within a particular tissue.

There are over one trillion cells in your body. Most will only divide a few times. For instance, when you were born you basically already had all the brain and neural cells you would need. As you grew, those cells simply got bigger. However, other tissues need a constant renewing of cells. The lining of your intestines, stomach, skin, and lungs constantly slough old cells and need replacements. Your blood cells constantly need replacing. In these kinds of tissues, specialized stem

cells continually produce new cells.

There are skin, bone marrow, liver, muscle, and other types of stem cells in your body. These are referred to as *adult* stem cells. Other common types of stem cells are those found in umbilical cord blood. Even though these are fetal tissues, they are referred to as adult stem cells because they are already differentiated to a large degree. There are no ethical difficulties in using these stem cells for research and therapy.



Now, what are *embryonic* stem cells? Embryonic stem cells exist only in the earliest embryo just a few days after fertilization. This is referred to as the *blastocyst*. The blastocyst contains a small cluster of identical cells called the inner cell mass. These cells eventually form the baby and therefore can produce all the cells of the body. These are embryonic stem cells (ESC). In order to retrieve them, the embryo is destroyed.

Here then is the problem. While adult stem cells offer no ethical difficulties—but are not likely to be as versatile as embryonic stem cells—embryonic stem cells can only be obtained by destroying the embryo.

## The Promise of Adult Stem Cells

What is the overall hope for stem cells? Why are they so sought after?

Essentially, it is hoped that stem cells can be used to treat and even cure diseases like diabetes, Parkinson's, Alzheimer's, and brain and spinal injuries. These are primarily degenerative diseases where certain cells no longer function as designed due to genetic defects or injuries. Generally it has been believed that embryonic stem cells offer

the most hope since we know they can become any cell in the body.

But embryonic stem cells require the destruction of the embryo where adult stem cells can be harvested from the individual that needs to be treated. First, this involves only informed consent and is ethically non-controversial. Second, since the person's own cells are used, there is no chance of rejection of the cells by the patient's immune system.

In the last few years important discoveries have been made concerning certain types of adult stem cells. Essentially, we have learned that adult stem cells can switch tissues. Bone marrow stem cells seem to be the most versatile. They have been coaxed to generate new muscle, neural, lung and other tissues.

Additionally, we have learned that adult stem cells migrate throughout the body in the blood. It appears that adult stem cells are somehow informed of injury in the cell and can migrate from their source to the injury and begin at least modest repairs.

In January 2002, a group from the University of Minnesota announced what they called the ultimate adult stem cell. In creating an immortal cell line from bone marrow stem cells, early tests showed that these stem cells could become either of the three early tissues in an embryo that eventually lead to all the cell types of the body. This showed that adult stem cells are far more versatile than previously believed.

Last year the National Institutes of Health spent \$190 million on adult stem cell research and \$25 million on embryonic stem cell research. Clinical trials are already underway using bone marrow (adult) stem cells for treatment of heart attacks, liver disease, diabetes, bone and cartilage disease, and brain

disorders. Adult stem cells can even be injected intravenously in large quantities, and they will migrate to where the injury is located. With such promise coming from adult stem cells it is hard to justify the use of problematic embryonic stem cells.

## **The Promise and Peril of Embryonic Stem Cells**

Embryonic stem cells have always held the greatest promise for research and therapies because we know for certain that they can become any of the over 200 types of cells in the body. All we needed to do was learn how to control their destiny and their potential for unlimited growth.

As mentioned previously, the major ethical problem with embryonic stem cells is that the early embryo, the blastocyst, must be

destroyed in order to retrieve these cells. It is my firm conviction that this earliest embryo is human life worthy of protection. Once the nucleus from sperm and egg unite in the newly fertilized egg, a biochemical cascade begins that leads inevitably to a baby nine months later as long as the embryo is in the proper environment.

But there are other problems aside from the ethical barrier. The proper chemical signals to direct stem cells to turn into the cells you want are unknown. This is certainly the goal of research. Human embryonic stem cells have been coaxed to differentiate but since nearly all of the experimental work to date has been done with embryonic stem cells from embryos leftover in fertility clinics there are immune rejection problems. These foreign cells are treated like they were from an organ donation.

Additionally, these cells are programmed to undergo rapid cell division. In China a man with Parkinson's was treated with human embryonic stem cells which turned into a tumor

(teratoma) in his brain that killed him. The power of these cells is also a source of their peril.

In summary, embryonic stem cells possess uncertain promise. They require the death of the embryo. All therapies with any kind of stem cell are experimental and may not work. Right now, too much is being promised, and coverage in the media has been biased toward embryonic stem cells and is inaccurate.

When these difficulties and question marks are considered in the light of the exciting promise of adult stem cells, which are already producing positive results in human clinical trials, the pursuit of embryonic stem cell research is questionable at best. Just recently a major U.S. journal reported that bone marrow stem cells show great promise in treating the diseased lungs of cystic fibrosis patients.<sup>[1]</sup> CF is the most common fatal genetic disorder in the Caucasian population. Adult stem cells continue to outperform embryonic stem cells.

## **Stem Cells and the Last Election**

The first human embryonic stem cells were isolated from embryos donated from fertility clinics in 1998. Prior to that, Congress had passed—and President Clinton had signed—legislation that prohibited the use of federal money for the destruction or use of human embryos for research purposes. This was seen as worthy even for pro-choice advocates because no one wanted to go down the road of using even the earliest human life for research purposes.

When President Bush took office in January 2001, pressure had already come from the medical research community to revise this restriction so federal grants could be used to explore this promising research avenue. Adult stem cells were still viewed as being too restricted for general research use in humans. In August 2001, President Bush issued his now famous compromise



of allowing federal funds to be used to research embryonic stem cells already isolated from human embryos, but keeping in place the restriction for using federal dollars for destroying human embryos to obtain additional cell lines.

The National Institutes of Health estimated that there were already over sixty human embryonic stem cell lines isolated around the world that would be available for research purposes. The President was criticized by pro-life advocates for allowing any federal money for research on embryonic stem cell lines, and the medical research community criticized the President for not allowing federal research money for the creation of new embryonic stem cell lines. If everybody is unhappy, it sounds like a good compromise!

The events of September 11, 2001 quickly removed this controversy from the public's attention, but the 2004 presidential election brought it back front and center. The Bush administration, supported by the President's Council for Bioethics, continued to argue against federal money for the destruction of embryos.

The Kerry campaign seized what they saw as an opening and began claiming that they would lift the ban on stem cell research. They enlisted Ron Reagan to deliver this message at the Democratic National Convention in July, 2004. Ronald Reagan had recently passed away from Alzheimer's, and many were claiming that embryonic stem cell research could bring a cure for Alzheimer's disease.

There were several problems with this message. First, President Bush never banned stem cell research. The Administration was funding adult stem cell research at about \$190 million a year and embryonic stem cell research at about \$25 million a year. Private money was always legal to use, but private investors were staying away because of the ethical problems and the lack of progress.

Second, researchers had already testified on Capital Hill that Alzheimer's was likely not curable by treating the brain with stem cells since it was considered a whole brain disease and cell replacement would not do much good. The media just couldn't get it right.

## **The Distortion and the Hype of Embryonic Stem Cells**

Those of us who are opposed to the use of embryonic stem cells for research are routinely accused of being hard-hearted toward those whose maladies can be addressed with stem cell research. Of course, this is not the case. We fully support adult stem cell research, but even if adult stem cells prove problematic in some cases I would still not support embryonic stem cell research when the embryo must be destroyed to obtain them.

When we think about saving lives we must count the cost. Is relieving the symptoms of disease worth the cost of the lives of the weakest and most defenseless members of society? Treating embryos with careless disregard will lead to further abuses down the road.

One of the problems with embryonic stem cells was the possibility of immune rejection. To avoid this, many want to clone the affected individual and use the embryonic stem cells from the clone. But this treats the human embryo as a thing, a clump of cells. The basis of this ethic is strictly "the end justifies the means." Even the term "therapeutic" is problematic. The subject is destroyed.

Many try to get around the destruction of the embryo problem by claiming the blastocyst is just reproductive cells and not a person. Medical mystery writer Robin Cook gave us an example in his most recent thriller, *Seizure*.[\[2\]](#) In the book a medical researcher appears before a Senate committee and says, "Blastocysts have a potential to form a viable embryo, but

only if implanted in a uterus. In therapeutic cloning, they are never allowed to form embryos. . . . Embryos are not involved in therapeutic cloning.”{3} Hm!

Later in the epilogue, Cook, who is an MD, says, “Senator Butler, like other opponents of stem-cell and therapeutic cloning research, suggests that the procedure requires the dismemberment of embryos. As Daniel points out to no avail, this is false. The cloned stem-cells in therapeutic cloning are harvested from the blastocyst stage well before any embryo forms. The fact is that in therapeutic cloning, an embryo is never allowed to form and nothing is ever implanted into a uterus.”{4}

Cook is greatly mistaken. A 1997 embryology text states plainly that “The study of animal development has traditionally been called embryology, referring to the fact that between fertilization and birth the developing organism is known as an embryo.”{5} So let’s be very careful and pay attention to what is said. Some are trying to manipulate the debate by changing the “facts.” We must promote the incredible success and continued promise of adult stem cells while continuing to spell out the long term peril of embryonic stem cells.

## Notes

1. Wang, Guoshun, Bruce A. Bunnell, Richard G. Painter, Blesilda C. Quiniones, Nicholas A. Lanson Jr., Jeffrey L. Spees, Daniel J. Weiss, Vincent G. Valentine, Darwin J. Prockop, “Adult stem cells from bone marrow stroma differentiate into airway epithelial cells: Potential therapy for cystic fibrosis” PNAS online, [www.pnas.org](http://www.pnas.org) (accessed December 22, 2004).
2. Robin Cook, *Seizure* (New York: Berkeley Books, 2003), 429.
3. Ibid, 32-33.

4. Ibid, 428.

5. Scott F. Gilbert, *Developmental Biology*, 5th ed. (Sunderland, Mass.: Sinauer Associates, Inc., 1997), 3. Later in the same text, Gilbert clearly equates the blastocyst and embryo when he says on page 185, "While the embryo is moving through the oviduct en route to the uterus, the blastocyst expands within the zona pellucida." Gilbert seems to have had a change of heart between his fifth edition and the sixth. In the sixth edition of his textbook Gilbert defines embryology differently. "The study of animal development has traditionally been called embryology, from that phase of organisms that exists between fertilization and birth." This is on page 4 of the new edition and curiously leaves the word embryo out of the definition of embryology. Perhaps Cook and Gilbert know each other!

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**See Also:**

- [The Controversy Over Stem Cell Research \[2001\]](#)
- [Putting the Brakes on Human Genetic Engineering](#)
- [Stem Cells and the Controversy Over Therapeutic Cloning](#)
- [Probe Answers Our E-Mail: "Your Anti-Stem Cell Research Position Disregards Diabetics"](#)

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# **"Your Position Against Stem Cell Research Disregards Diabetics"**

I know that you don't think it's right to use stem cells and you have that right, it's granted to you in the constitution.

But do you have diabetes? Do you know what it's like to have to get blood 4 times a day to know what your blood sugar is so that you can make good decisions so you don't die and every time you get in a car to drive? Then have to stick a needle into your skin to give yourself insulin to survive because your body does not produce insulin anymore. Do you know what that's like? Do you? The way I see it from your webpage you're not looking at the 16 million Americans with diabetes that have to live with this. If the stem cell research was to succeed then there would be no more Diabetes, Parkinson's and many other diseases.

I appreciate your passion for a desire to cure diabetes. It is a difficult disease, and I am sorry to learn that you suffer from it. However, allow me to reframe the argument.

We need to make a distinction between embryonic stem cells and adult stem cells. We have no problem with using adult stem cells to research treatment and cures of disease. What if embryonic stem cell research *doesn't* succeed? There are no guarantees. We haven't even cured a mouse, let alone treated any human disease with embryonic stem cells. Then we have will have wasted thousands of human embryos for nothing. Not to mention all the women who had to endure hormonal treatments to obtain their eggs to make the embryos. How much is their sacrifice worth to you?

What if adult stem cell research (research with no ethical questions and much hope of success) achieves a treatment before embryonic stem cell research? Again, we will have wasted thousands of human embryos for nothing.

I have a genetic disease myself, hemochromatosis, excess iron in the blood and organs. When left untreated it can lead to liver disease and cancer. I simply need a pint of blood withdrawn every 2-3 months to keep my iron levels under control. This is not the inconvenience of diabetes. But I am not without understanding of the issues. My health and

convenience is not worth the sacrifice of human embryos who have no option of informed consent. I refuse to sacrifice the next generation in any way for my convenience. It's always been the other way around, the current generation sacrificing for the next.

You are also entitled to your opinion. But don't assume I have callously tossed aside the suffering of others. I simply choose the life of human embryos, embryos who have every potential to form a human being if left in their natural surroundings, over my convenience. To suggest that these early embryos are simply reproductive cells like sperm and egg is disingenuous and medically incorrect.

Respectfully,

Ray Bohlin  
Probe Ministries