Transhumanism and Artificial Intelligence

Kerby Anderson provides an overview of transhumanism and AI, considering its impact on us and our families.

Over the last few years, we have heard more pundits and futurists talk about transhumanism. What is this philosophy? How will it affect our families and us? How should a Christian think about transhumanism?

Transhumanism is an intellectual and cultural movement that seeks to transform the human condition. The leaders of this movement want to use the developing technologies to eliminate aging and enhance human potential (physical, psychological, and mental).

Nick Bostrom explains that transhumanism views human nature as a "work-in-progress, a half-baked beginning that we can learn to remold in desirable ways." He goes on to explain the transhumanist vision: "Transhumanists hope that by responsible use of science, technology, and other rational means we shall eventually manage to become posthumans, beings with vastly greater capacities than present human beings have."{1}

Two primary ways they want to do this is through genetic engineering and artificial intelligence. They want to genetically create "the new man," and they want to use technology to merge humans with machines.

The genetic part of this equation claims that we can use gene splicing and other genetic modification techniques so that genes can be easily transferred between species. But we should be concerned about geneticists who want to create a superhuman race. Leon Kass warned that "Engineering the engineer seems to differ in kind from engineering the engine."{2}

The other part of the equation concerns technology. The leaders of transhumanism believe we are on the cusp of a technological threshold in both artificial intelligence and human-machine technology.

The "humanism" in transhumanism reminds us that this is a philosophy rooted in Enlightenment humanism. But it is different. Whereas the goal of humanism was to develop the ideal human, the goal of transhumanism is to transcend what we have traditionally considered human.

The Transhumanist Declaration provides eight key points to describe what the signers believe should be the future of humans.{3} It begins with this claim: "Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth."

Two Principles of Transhumanism

Now I would like to look at the two foundational principles of transhumanism.

The first principle is "metaman." Futurists predict that our current human condition will evolve into being a cyborg (short for *cybernetic organism*). Our bodies will be joined to machines as we "evolve" through technological progress.

Transhumanists believe we will have immense knowledge and information because of the rapid advances in artificial intelligence and computing power. These advances will eventually exceed human intelligence. Meanwhile, advances in genetic engineering will allow scientists to modify the human body to keep pace with these technological advances.

This is the two-fold hope of the transhumanists: artificial intelligence and genetic engineering. One represents biological change through mixing and matching genes. The other

presents the merging of human intelligence with artificial intelligence.

In fact, the hope is to create a superorganism through the transference of genes between species. This may even eradicate the differences between species. One scientist even suggested that tampering with the genetic codes of all plants and animals on this planet would cause the "definition of human beings to drift."{4} Humans would merge with the rest of nature, thereby creating a planetary superorganism he calls "Metaman."

In essence, transhumanists would like to erase any distinction between human, other forms in nature, and machines. Humans would now control the future direction of evolution and merge all forms of life and non-life together in one enormous superorganism.

The second principle is "the singularity." Transhumanists wait for the arrival of a technological threshold that will be achieved through artificial intelligence. Futurists predict that sometime in the middle of this century, we will achieve what transhumanists call "the singularity."{5} The current distinction between humanity and nature and machine will fade and there will no longer be any barriers between the natural world and artificial world.

This utopian view assumes that humans will be able to transcend the limitations of our biological bodies and brains. There will no longer be any distinction between humans and machines. And this, say the transhumanists, will allow humanity to no longer be resigned to death as the end. All of this, they predict, will usher in a technological millennium.

History of Artificial Intelligence

The term artificial intelligence was coined in 1956 by the American computer scientist John McCarthy. He defines it as

“getting a computer to do things which, when done by people, are said to involve intelligence.” Unfortunately, there is no standard definition of what constitutes AI. Part of the problem is the lack of agreement on what constitutes intelligence and how it relates to machines.

McCarthy proposes that “Intelligence is the computational part of the ability to achieve goals in the world. Varying kinds and degrees of intelligence occur in people, many animals, and some machines.”{6} This would include such capabilities as logic, reasoning, conceptualization, self-awareness, learning, emotional knowledge, planning, creativity, abstract thinking, and problem solving.

Researchers have for decades hoped to build machines that could do anything the human brain could do. Progress was slow for many decades but has accelerated in the last few years. A significant breakthrough occurred in 2012, when an idea called the neural network shifted the entire field. This is a mathematical system that learns skills by finding statistical patterns in enormous amounts of data.

The next big step came around 2018 with large language models. Companies such as Google, Microsoft, and OpenAI began building neural networks trained on vast amounts of text including digital books, academic papers, and Wikipedia articles. Surprisingly, these systems learned to write unique prose and computer code and to carry on sophisticated conversations. This breakthrough has been called “generative AI.”

These AI algorithms are based on intricate webs of neural networks and allow for what is considered “deep learning.” These advanced AI systems collect huge amounts of data and can correct mistakes and even anticipate future problems.

The benefits are significant. Factory automation, self-driving cars, efficient use of resources, correlating massive amounts of data, and fewer errors in medical diagnoses are just a few

of the many ways in which AI will improve our lives in the 21st century.

Unfortunately, AI poses dangers to us.

Dangers of Artificial Intelligence

Although artificial intelligence offers some significant benefits, it also poses many dangers. The authors of the open letter on AI warn that human beings are not ready for a powerful AI under present conditions or even in the foreseeable future. What happens after AI becomes smarter than humans? That is a question that bothered Eliezer Yudkowsky. In his opinion piece for *Time* magazine, he argued that "We Need to Shut It All Down."{7}

He warned that "Many researchers steeped in these issues, including myself, expect that the most likely result of building a superhumanly smart AI, under anything remotely like the current circumstances, is that literally everyone on Earth will die." He doesn't think this is merely a possibility but believes it is a virtual certainty.

He uses this illustration to drive home his point: "To visualize a hostile superhuman AI, don't imagine a lifeless book-smart thinker dwelling inside the internet and sending ill-intentioned emails. Visualize an entire alien civilization, thinking at millions of times human speeds, initially confined to computers—in a world of creatures that are, from its perspective, very stupid and very slow."

Bill Gates understands both the benefits and dangers of AI. He explains that the "development of AI is as fundamental as the creation of the microprocessor, the personal computer, the Internet, and the mobile phone." While these changes in how we work, learn, and communicate are good, there is also "the possibility that AIs will run out of control."{8}

He asks, "Could a machine decide that humans are a threat,

conclude that its interests are different from ours, or simply stop caring about us?" He recognizes that "superintelligent AIs are in our future" and that they "will be able to do everything that a human brain can, but without any practical limits on the size of its memory or the speed at which it operates." However, these "strong AIs" will "probably be able to establish their own goals." Those would likely conflict with our best interests.

Notice the number of dystopian movies where the machines have taken over. That would include movies like *2001: A Space Odyssey*, *Avengers: Age of Ultron*, *I, Robot*, the *Matrix* series, and the *Terminator* series. That is why many people fear how AI will be used in the future.

Biblical Perspective

How should Christians respond to transhumanism? We should begin by looking at the philosophical foundation of this movement. It begins with a belief that there is no God and we are responsible for our own destiny. It also is based upon an evolutionary foundation that assumes that we are the product of millions of years of chance process.

The leaders of transhumanism see genetic engineering as a tool to be used to speed up the process of evolution. We can use genetics to enhance and improve the human race. If we believe that humans are merely the product of the undirected force of evolution, then certainly intelligent scientists can "improve on nature."

The evolutionary argument goes like this. Humans die due to some technological glitch (e.g., heart stops beating). Therefore, "Every technical problem has a technical solution. We don't need to wait for the Second Coming in which to overcome death. A couple of geeks in a lab can do it. If traditionally death was the specialty of priests and theologians, now the engineers are taking over."{9}

The leaders of transhumanism believe we should use technology to improve the human race so that we are perfect and immortal. In many ways, this technological imperative harkens back to the Tower of Babel (Genesis 11). Instead, we should use technology wisely as we exercise dominion over the world (Genesis 1:28).

Here are a few biblical principles. First, we begin with the reality that each human being in created in God's image (Genesis 1:26-27, Psalm 139:13-16, Isaiah 43:6-7, Jeremiah 1:5, Ephesians 4:24). We have been given dominion and stewardship over the creation (Genesis 1:28, Colossians 1:16) and should reject any form of technology that would usurp or subvert that stewardship responsibility.

Second, humans are created as moral agents. Computer technology can aid us in making moral decisions because of its powerful ability to process data. But we can never cede our moral responsibility to those same computers. God will hold us responsible for the moral or immoral decisions we make (Roman 2:6-8, Galatians 5:19-21, 2 Peter 1:5-8). We should never give computers that authority.

We should reject the vision of transhumanism that looks forward to the day in which man and machine become one in the singularity. We must reject the idea that this is the next step in human evolution. We should reject the worship of technology and reject the idea that AI will make us more human. And we should reject the false utopian vision of a world when machines are given co-equal value to humans created in the image of God (Genesis 1:26-27).

Notes

1. Nick Bostrom, "Transhumanist Values," *Ethical Issues for the Twenty-First Century* (2005): 3-14.
2. Kass, Leon. "The New Biology: What Price Relieving Man's Estate?" *Science*, 19 November 1971, 779.
3. Transhumanism Declaration,

www.humanityplus.org/the-transhumanist-declaration.
4. Gregory Stock, *Metaman: The Merging of Humans and Machines Into a Global Superorganism*, NY: Simon and Schuster, 165.
5. Ray Kurtzweil, *The Singularity Is Near*, NY: Penguin, 2005.
6. John McCarthy, "What is AI/Basic Questions," jmc.stanford.edu/artificial-intelligence/what-is-ai/index.html
7. Eliezer Yudkowsky, "Pausing AI Developments Isn't Enough. We Need to Shut it All Down," *Time*, March 29, 2023.
8. Bill Gates, "The Age of AI has Begun," March 21, 2023, www.gatesnotes.com/The-Age-of-AI-Has-Begun.
9. Yuval Noah Harari, *Homo Deus: A Brief History of Tomorrow*, London: Penguin, 2016, 23.

For Further Reading

Kerby Anderson, *Christian Ethics in Plain Language*, Nashville, TN: Thomas Nelson, 2005, chapter 20.
Kerby Anderson, *Technology and Social Trends* Cambridge, OH: Christian Publishers, 2016, chapter 3.
Jacob Shatzer, *Transhumanism and the Image of God* Downers Grove, IL: IVP Press, 2019.
Lawrence Terlizzese, *Into the Void: The Coming Transhuman Transformation*, Cambridge, OH: Christian Publishers, 2016.

©2024 Probe Ministries

Redesigning Humans: Is It Inevitable?

Is genetic technology just the next step in human discovery about ourselves, or does it mean the end of humanity as we know it? Could we literally redesign humanity out of existence? On the other hand, there are those who maintain

that we are headed down a disastrous technological and ethical road.

 *This article is also available in Spanish.*

The People Are Restless

There is a general unease in the wind. People are a little squeamish concerning the coming revolution in biotechnology. There is a sort of stand-offish fascination where we wonder at the possibilities for curing genetic diseases and even for making ourselves smarter, prettier, or stronger. Yet we shrink from the potential horror of the world we might create for ourselves with no hope of turning back.



We have faced such forks in the road before. Every new technology has presented fantastic benefits and uncertain costs. Gunpowder, electricity, the combustion engine, atomic energy, etc., have all offered tantalizing either/or tensions. Some of these tensions we still live with, such as the threat of nuclear weapons and encroaching pollution from combustion engines.

But for the most part we have been able to develop a stable coexistence between the potential for good and the potential for evil. Weapons have become more precise, minimizing unnecessary collateral casualties, the combustion engine has become cleaner and more efficient, and atomic weapons so far have been remarkably harnessed.

But what about genetic technology? Is this just the next step in human discovery about ourselves, or does it mean the end of humanity as we know it? Could we literally redesign humanity out of existence? There are voices in our culture today that will tell us that indeed we can and we will and it is inevitable and “you’d just better get used to it.”

On the other hand there are those who maintain that we are headed down a disastrous road, and that we have a small opportunity to harness the benefits of the new technologies while minimizing and corralling the hazards.

I recently spent several days at the United World College in New Mexico developed by the late Armand Hammer, one of several upper high schools around the world for the best and brightest. The occasion was a student-led conference organized for discussing the ethics of human genetic engineering and cloning. Three other invited guest speakers and I spent two days with the 200 students from around the world and the UWC faculty and staff.

About fifty of the students were from a variety of backgrounds from here in the U.S., and the other 150 were from almost ninety countries. Their knowledge and perspectives on human genetic engineering ran from those who saw few problems and were perplexed by those with reservations to those who held all such technologies at arm's length and couldn't understand why anyone would want to do such things.

Who's right? Beyond that, What have we done already? And is there any opportunity for science and society to meet together to figure this out? In this program we will hear from several voices and see if we can navigate the coming genetic mine fields.

Is There a Posthuman Future?

One of participants at the UWC conference designated himself a "transhumanist." Transhumanists are among those who welcome with open arms the possibilities of genetic engineering to alter who and what we are. They scoff at the reluctance of others to step into this coming Brave New World. They relish the possibilities of double and triple average life-expectancy, designer babies, and the elimination of genetic disease. They aren't troubled by the necessity of costly

mistakes and failures. That's just the price of research and progress. We accept risk all the time, they say. Why should genetic research be any different? They apply rather consistently a naturalistic worldview which sees human beings as just another species. We certainly aren't made in the image of God, they say, so why is our current genetic structure sacred?

Gregory Stock opened his 2002 book, *Redesigning Humans: Our Inevitable Genetic Future*, this way: "We know that *homo sapiens* is not the final word in primate evolution, but few have grasped that we are on the cusp of profound biological change, poised to transcend our current form and character to destinations of new imagination."{1}

Stock rightly points out that we have already started down the road of genetic manipulation of our species. Several fertility clinics in the U.S. already offer preimplantation genetic diagnosis or PGD. This procedure screens newly created embryos by in vitro fertilization for a few genetic diseases such as Tay Sachs, cystic fibrosis, and hemophilia. You can also have the embryos screened for sex selection. Some clinics even offer sex selection as the sole purpose of your visit to the clinic.

One couple from Wyoming had fourteen embryos created by in vitro. Seven were male, seven were female. They chose three females to be implanted to ensure their fourth child was a girl after three boys. The technique is virtually 100% effective. Less efficient sperm selection techniques are only 91% effective for girls and only 76% effective for boys.{2} But should we be selecting the sex of our children?

Over one million IVF babies have been born worldwide, around 28,000 in the U.S.—roughly 1% of newborns. This may soon become the "natural" way once more procedures become available to design our own babies. We may recoil today at the thought of designer babies, but we also recoiled twenty-five years ago

against the thought of test-tube babies.

Stock closes his book by saying, “We are beginning an extraordinary adventure that we cannot avoid, because, judging from our past, whether we like it or not this *is* the human destiny.”{3} But is it?

What’s So Wrong With Tinkering With Our DNA?

Couples are already being given the power to choose the sex of their child, even at the cost of simply rejecting the embryos that are the wrong sex. But our technology is advancing rapidly to allow a far broader array of genetic choices.

Gene therapy, the ability to transfer a normal human gene into the affected tissues of a person affected by a single gene disease, has been pursued for over ten years. So far results have been disappointing. That is partly the reason why many are looking for improved ways to add genes to the earliest one cell stage embryo so the gene can be spread to all tissues at once. This process is also rather inefficient in animals, successful only about 1% of the time.

But this does not deter some because they already view the embryo, before fourteen days after conception, as little more than reproductive cells and not yet worthy of being declared human. If this definition holds, embryos can be wasted as long as a supply of human eggs is readily available. In addition to preimplantation genetic diagnosis (PGD) for sex selection and selection of embryos that are free of cystic fibrosis, Tay Sachs, hemophilia, and other genetic diseases, other genetic technologies are on the near horizon.

Researchers have already devised artificial chromosomes. These chromosomes pass on stably over several generations in mice. They have been tested successfully in human tissue culture, and have remained stable over dozens of cell divisions. No one

has added foreign genes to these chromosomes, but that is the plan: to provide a safe and effective means of adding genes to embryos and have them distributed to all tissues and to succeeding generations.

Genetic futurist Gregory Stock summed it up when he said, "Breakthroughs in the matrixlike arrays called DNA chips, which may soon read thirty thousand genes at a pop; in artificial chromosomes, which now divide as stably as their naturally occurring cousins; and in bioinformatics, the use of computer- driven methodologies to decipher our genomes—all are paving the way to human genetic engineering and the beginnings of human biological design."{4}

Some may scoff at these projections, but people seem quite willing around the world to consider taking advantage of technologies that can genetically enhance themselves or their offspring. "In a 1993 international poll, Daryl Mercer, director of the Eubois Ethics Institute in Japan, found that a substantial segment of the population of every country polled said they would use genetic engineering both to prevent disease and to improve the physical and mental capacities inherited by their children. The numbers ranged from 22 percent in Israel and 43 percent in the United States to 63 percent in India and 83 percent in Thailand."{5} So what's the problem?

What's Our Next Step?

I believe that being able to genetically redesign human beings is far closer than most people realize. Not only is the technology developing at an ever-increasing rate, but people are also far more willing to consider using such technologies than most would want to think.

I hope my tone in this article has indicated that I have deep reservations about this seemingly inevitable future. But why do I say this is inevitable? And why would I have reservations

about taking this next step?

I believe that at least trying to alter ourselves genetically is inevitable because the technology is developing rapidly using animal models. And whatever we have done in animals, we eventually do in humans. The naturalistic worldview says quite strongly that we are just another animal species. If our understanding of our own genetics continues to increase and we gain the technology to correct our defects and faults, the naturalist says, Why not?!

Society and governments have put few barriers in the way of scientists and researchers from simply taking the next logical step. So far, we have been unwilling to say that there are some experiments we will not do. Even though most will say they are against human cloning—even scientists—that figure is changing, and we have few reasons for our objections besides the fact that it is not yet safe. If it does become safer, the public will have little room to say no. We've painted ourselves into a bit of a corner.

In regard to genetic engineering, we are easily swayed by appeals to eliminate genetic diseases without considering how difficult it is to delineate between curing genetic disease and producing genetic enhancements. James Watson, co-discoverer of the structure of DNA and Nobel Laureate, exposes our difficulty with two penetrating statements. Concerning curing genetic disease he said, "What the public wants is not to be sick and if we help them not to be sick, they'll be on our side."{6}In another context Watson would have left most people dead in their tracks when he said, "No one really has the guts to say it, but if we could make better human beings by knowing how to add genes, why shouldn't we?"{7}

Leon Kass, chairman of President Bush's Council on Bioethics, put it quite succinctly when he said, "The first thing needful is a correction and deepening of our thinking."{8} When I speak to young people in particular, I almost plead with them

to pay attention in biology class. These genetic choices will probably begin to be available to today's high school students as they marry and begin their families. They and we need to be better prepared.

How Will the Church Be Challenged?

There are just a few voices warning of the coming challenges and opportunities of the developing crisis over human dignity as the diesel engine of human genetic technology gains momentum and steam. Some fear it may already be beyond the point of no return and believe we'd better figure out how we are going to cope with our inevitable future of redesigned humans.

Leon Kass's book, *Life, Liberty, and the Defense of Dignity,* is a good place to start. Though not a Christian, Kass dances around the edges of a Christian or theistic worldview that at least acknowledges that there is a human design in place that we need to be mindful of before we head out at breakneck speed to change who and what we are.

Kass sees that our efforts to redesign humans challenge our very dignity and identity as human beings. If parents have constructed the best child for them using the best available technology they can afford, are they still parents, or creators and owners with additional rights and privileges? A child becomes a commodity to be designed, manufactured, and even sold. Love and nurture will turn to management and stimulation.

Gregory Stock is the director of the Program on Medicine, Technology and Society at the UCLA School of Medicine. His book, *Redesigning Humans: Our Inevitable Genetic Future*, will sober you up quite quickly. Stock is a naturalist and has little patience with those who would hold back our genetic future. He is knowledgeable and unflinching about the possibilities. One commentator wrote; "This is the most

important book ever written about what we could do to make better people. I could not put this book down because it challenged everything I knew about human nature." I would agree.

In my travels I have found the church to be largely unaware of how close we are to Stock's vision of redesigning humans. Within a few short decades our children will be pressured to alter their children genetically to keep up with society. Scientific research may well make use of human embryos as matter of fact research subjects. This may likely extend to developing fetuses, and it will all in the name of furthering health and eliminating disease.

How will we react? The Barna Research Group tells us over and over again that the Christian community does not think or act in an appreciatively different manner than society at large. That means these genetic technologies will find their way into the church. There will be a new source of discrimination to deal with. No longer will churches be segregated by economic status and race but by genetic pedigree as well.

Do we really think we can improve on or maybe at least recover the original design? There may be a new Tower of Babel on our horizon. We must take seriously this threat to our future, both of humanity and the church.

Notes

1. Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (New York: Houghton Mifflin, 2002).
2. Claudia Kalb, "Brave New Babies," *Newsweek,* 26 January, 2004, 45-53.
3. Stock, 197.
4. Ibid., 13.
5. Ibid., 58.
6. Quoted in Leon Kass, *Life, Liberty, and the Defense of Dignity: The Challenge of Bioethics* (San Francisco: Encounter

Books, 2002), 7.
7. Quoted in Stock, 12.
8. Kass, 8.

© 2004 Probe Ministries

"I'm a Girl Because That's What Mommy Wanted!" – The Ethics of Screening for Gender Using IVF

The brave new world of the future is not so far away anymore. Fertility clinics, originally created to assist infertile couples have children, can now screen for numerous genetic traits. Are we ready for the responsibility and future ethical questions? My experience says we are woefully unprepared. In our consumer oriented society of the 21st century, we want what we want, when we want it. If a couple has the financial resources and says they are willing to take the medical risks, who can say what they can and can't do?



Watch Dr. Bohlin on WFAA-TV video

In July 2015 an article appeared on Yahoo Parenting{1} about a couple in Frisco, Texas, north of Dallas. Rosa (36) and Vincent (37) Costa spent $100,000, enduring seven rounds of In Vitro Fertilization (IVF), including one miscarriage, just to ensure their third child would be a girl. Numerous fertility clinics allow infertile couples to

genetically screen their embryos for nearly 400 genetic disorders. One additional benefit is that the embryos can also be screened for gender. Gender is a fairly simple assessment. Males will contain an X chromosome and a Y chromosome. Females are XX. These chromosomes are easily identified and distinguished.

This service is becoming more commonplace for couples since a round of IVF can cost around $12,000. If for an additional $6,000, screening can focus on healthy embryos, why not? Identifying the sex of the embryos is an added bonus. But in the last few years, couples like the Costas have mushroomed. Some clinics report a rise of 250%. As one who has addressed the issue of genetic engineering for over twenty years, I have regularly discussed the possibility of choosing the sex of your next child. The primary method used by fertility clinics is to assess gender before implantation. If you desire a girl, then only female embryos are implanted. Embryos of the "wrong" sex can be discarded, frozen for later use, made available for adoption or donated to "science" for stem cell research. Most frozen embryos end up in limbo. They do not stay viable forever. Some frozen embryos have been successfully revived after 5 years in storage. But many are simply discarded. Embryos donated for stem cell research are also ultimately killed. In order to retrieve the valuable embryonic stem cells, the embryo is destroyed.

Consequently, this IVF procedure to guarantee the sex of your child ultimately results in the death of numerous perfectly healthy embryos. So you have perfectly healthy parents sacrificing healthy embryos just to get the male or female child they desire. This cost is far more consequential than the dollar amount. I'm opposed to even discarding genetically challenged embryos for healthy embryos. Now we have crossed the line to create human life in the laboratory with the full intention of sacrificing embryos of the wrong sex. In another article{2}, fertility specialist, Dr. Jeffrey Steinberg,

acknowledges he has had the technology to screen for eye-color since 2009. He delayed making it available then due to an outcry from the public. Saying he has a waiting list of 70-80 people, he's getting ready to make it available again.

But despite the clear loss of innocent human life in our search for a "balanced family" or even worse, children of the preferred eye color, we run into the specter of facing up to responsibilities too few have considered. The Costas, for instance, want a little girl. There is nothing wrong with that necessarily. But what are they really expecting? After all, they've spent $100,000 in the effort. The article mentions they will be decorating the new nursery in pink. But what if Olivia, their chosen name, ends up not liking pink? What if she's a tomboy who doesn't even like dresses? Or even more extreme, what if she decides as a little girl, she's really a boy! What do you do then? Even when selecting a child's gender, you likely have some concept in your mind of what a boy or girl will be like-otherwise, why choose gender at all?

It seems we are unwilling to ask the hard questions. Fertility experts will likely cater to what their clients want. There is competition, after all. One fertility specialist even believes that withholding these technologies puts him in the role of "playing god." He won't withhold something a client wants when the technology is available. That equates the consumer as a "god." The American Idol is not just a performer looking to win a contest to land a lucrative recording contract. The American Idol is personal choice. As I said earlier, if someone says they understand the risks, has the money and wants to pursue a medical technology, whose is going to say no? Should we say no? We have known for some time that absolute power corrupts absolutely. Do we just stand by and allow people to make choices that show an utter disregard for innocent human lives in the pursuit of personal preferences? Life becomes cheap across the board. Everyone is suddenly at risk. Where do we draw the line?

My great concern is that public demand, not reasonable ethical considerations, will guide medical decisions. Do we really not have the collective will to say there are some medical procedures or even experiments we will not do?

Notes

1. Why One Mom Spent 100K to Guarantee Baby No. 3 Is a Girl Accessed July 14 2015.

2. Couple Spends 50K to Choose Baby's Sex, Shining Light on Trend Accessed July 14, 2015.

©2015 Probe Ministries

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

Oneof 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.
2. "Purification and characterization of mouse hematopoietic stem cells." GJ Spangrude, S Heimfild, IL Weissman, *Science* Vol. 241, Issue 4861, 58-62.
3. www.nationalcordbloodprogram.com
4. www.foxnews.com/story/0,2933,392061,00.html
5. www.stemcellresearch.org
6. www.geron.com/grnopc1clearance/

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
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 (*Journal of Spinal Cord Medicine* 29, 191-203, July 2006).
12. 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/; www.bentham-open.org/pages/content.php?TOSCJ/2009/00000001/00000001/20TOSCJ.PDF
13. For an excellent overview of Alzheimer’s, see the Alzheimer’s association website at www.alz.org; for their statement on stem cell research see: 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.” *Cytotherapy* 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=lDFJOzu9SyM.
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. 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.
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.

© 2009 Probe Ministries

Animal/Human Hybrids

Editor's Note: The bulk of Heather Zeiger's study in bioethics has focused on the major issues addressed in American media, politics and science, such as stem cells, cloning and euthanasia, which is why she so anticipated this year's theme for the Center for Bioethics and Human Dignity Conference: Global Bioethics. The global context brought a broader perspective on the issues surrounding bioethics: India's medical tourism and black market organ donations, treating AIDS/HIV in Africa with limited resources, and euthanasia laws in Australia. One country that has been at the forefront of bioethics news is Great Britain because of their lenient

legislation on issues concerning human dignity and "human exceptionalism" *(the idea that humans have a higher moral status than any other species). This is the first article emerging from her studies and experience at the Global Bioethics conference.*

Dr. Calum MacKellar of the Scottish Council on Human Bioethics, who has represented Scotland at the Council of Europe and UNESCO, discussed human/animal hybrids, which can be legally created for research purposes in Great Britain. This article reports the major points of Dr. MacKellar's lecture and unless otherwise noted, all facts and statistics are drawn from his extended report on the Scottish Council on Human Bioethics Web site (www.schb.org.uk).

What Are Hybrids? What Are the Possibilities?

True Hybrids are embryos formed when the gametes (egg and sperm) are from different species. For example a human/chimp hybrid would be formed from the combining of a human egg with a chimpanzee sperm, or vice versa. These true hybrids create a new entity or species. One familiar example brought about by breeding is a mule, which is produced from horse and donkey gametes. In nature animal/animal hybrids tend to be less fit than their parents. Experiments to combine human and animal gametes have not been successful.

Cybrids are formed when the nucleus of an egg from one species is removed and filled with the nuclear material of another species. This mimics the technology of cloning, except one is using nuclear material from one species and a cell from a different species. The term *cybrid* comes from the combination of "cytoplasmic hybrid" because the genetic material in this new embryo is 99.9% of the nuclear species and 0.01% of the species that donated the egg [Michael Cook, "Soft Cell: How Scientists Are Easing away Opposition to Animal-Human Hybrids"

Salvo, Issue 4, Winter 2009]. Most genetic material is found in the nucleus, but a little bit is left in the cytoplasm of the egg. Scientists have been able to insert human genetics (a nucleus) into a cow's egg (an enucleated egg). The resulting embryo survived for twelve days. Other experiments have involved inserting human genetic material into a frog's egg and into a rabbit's egg. Neither of these survived beyond a week and never reached the blastocyst stage.

Chimeras (kī-'mir-uhz) are formed when the cells of one species are added to the embryo of another species. This results in an animal that has distinct parts from one species or the other. Think of the centaur in fantasy fiction. Fictional centaurs exhibit distinct parts that are human and distinct parts that are horse. This has actually been done in the lab with a goat and sheep. The resulting animal did survive and had distinctive goat legs and a distinctive sheep head.

Transgenic embryos are created by adding a few genes from one species into the embryo of another species. However, only a few genes can be added before the embryo collapses, providing self-limitations for this technique. Scientists have inserted human genes into pigs to create human insulin for diabetes patients. Scientists have also attempted to replace damaged human heart valves with animal heart valves. This is using animal parts in a mechanistic sense, and is known as *xenotransplantation*.

Although the media and legislation discuss human/animal hybrids, they are really talking about human/animal cybrids. While there are examples of hybrids in nature, thus far all experiments with human/animal hybrids have proven unsuccessful, even using *in vitro* fertilization technology.

Is This Legal?

Very few countries have passed specific legislation pertaining

to any kind of combination of human and non-human material. Most laws either single out humans or animals. However, several recent initiatives have been discussed:

• **Council of Europe:** ***Embryonic, Foetal and Post-natal Animal-Human Mixtures, Doc. 10716*** (October 11, 2005)—This document encourages the participating states to consider the ethical ramifications of creating human/animal hybrids, and also encourages the formation of a steering committee within the Council of Europe to address these ethical issues.

• **Canada:** ***Assisted Human Reproduction Act 2004*** —This act prohibits the creation of a chimera or a hybrid and prohibits the transfer of a chimera or hybrid into a human being or a non-human life form.

• **USA:** ***Draft Human Chimera Prohibition Act of 2005 (S.1373)*** —This draft, introduced by Senator Sam Brownback, would prohibit "any person to knowingly, in or otherwise affecting interstate commerce: (1) create or attempt to create a human chimera; (2) transfer or attempt to transfer a human embryo into a non-human womb; (3) transfer or attempt to transfer a non-human embryo into a human womb; or (4) transport or receive for any purpose a human chimera." In this case, some hybrids would fall under the category of chimera.

• **United Kingdom:** ***Human Fertilisation and Embryology Act (1990)***—This legislation states that the creation of human/animal entities would exist in a "legal vacuum" and hybrids could be formed if a proper license is obtained. The importance of this act is the fact that it makes it unclear whether the human/animal entities fall under human or animal legislation.

What Are the Consequences of Using This Technology?

Legal Consequences

There are several legal issues to consider, but probably the most troubling is whether the entity produced should fall under human or animal legislation. Several questions follow this, such as “What percentage of the being needs to be human to fall under human legislation? What if the human/animal entity began as 30% human and 70% animal, but the human cells grew faster and the entity ended up being 70% human and 30% animal?” Dr. MacKellar preferred erring on the side of caution and giving the entity the protection and dignity entitled to a human being, however this is only a protective declaration and does not solve the myriad legal issues surrounding the creation of this new entity.

Societal Consequences

The formation of an entity that is both animal and human raises questions of personhood and challenges our definition of humanness. These beings will inevitably be met with challenges that go beyond identification with a minority group. Would protections such as the Fourteenth Amendment apply to these creatures, and how human would they have to be for them to possess rights and privileges? Would society want to grant them rights and privileges? Would the military want to create a human/ape hybrid soldier in hopes that they would be bigger, stronger, and easier to feed? Given human history, the temptation to relegate these beings to a lower class would be inevitable.

There are risks associated with diseases that may cross the species barrier. As Dr. MacKellar pointed out, we have several examples of diseases crossing the species barrier including HIV, swine flu and bird flu. We also know that these diseases can sometimes be more harmful or even fatal to one species than they were to another. If an entity is part human and part animal, and a disease is very contagious among either type of animal it shares characteristics with, it will likely infect the hybrid. At this point, the disease may adapt to human DNA, posing a great health threat to all humans, not just hybrids.

Do Hybrids and Cybrids Have Souls?

I believe, from a biblical perspective, the creation of hybrids, cybrids, and chimeras is unethical. However, some instances of transgenic technology, namely *xenotransplantation*, may be ethical, especially since there are built-in biological limitations regarding how many genes can be inserted into another species.

Do these procedures violate the sanctity of human life? Several thoughts:

• Humans are created in God's image (Gen 1:26);

• We were created separately (Gen 1:25, 26). We were created differently than the animals ("Let the earth bring forth living creatures…" Gen 1:24; "then the Lord God formed the man of dust from the ground and breathed into his nostrils the breath of life, and the man became a living creature" Gen 2:7);

• We humans were given dominion over the animals (Gen 1:29, 30). Therefore, these procedures do seem to violate the sanctity of human life as revealed in Scripture.

Are scientists attempting to bridge the gap in created kinds?

God directly created animals according to their kind, and it is implied in the flood account that He intended for them to reproduce according to their kind (Gen. 1:21; Gen. 8:17).

The Bible indicates that man has dignity and worth. If we try to create a being that might be less-than-human by combining it with animal cells or gametes, this would diminish such God-given qualities. It is from a naturalistic perspective that people believe animals are better than man because they seem to be stronger, faster, or heartier. This is not the Biblical perspective.

Do these procedures have something in common with bestiality?

One could argue that the creation of human/animal hybrids may constitute an instance of bestiality. Biblically, bestiality is a type of fornication with animals; it is a type of intimacy that perverts the real intimacy that God designed between a husband and wife. I find bestiality to be a particularly distasteful subject, and perhaps we get an indication of God's distaste for this since it is a sin that was punishable by death (Ex. 22:19; Lev. 18:23; Lev. 20:15, 16; Deut. 27:21). Procreation and consummation are not distinctly separate in the Bible. It is only through modern technology that procreation can occur in the laboratory apart from consummation. I think an argument could be made that procreation with human and animal gametes is a connection with animals that man was not meant to experience.

But what about…?

This article is a short report on hybrids and variations on combining human and non-human species, but we have not even discussed the multiple questions that arise from this type of experiment, such as:

• Why are scientists doing this?

• What are the implications for common descent if human and animals can breed?

• How does this affect the definition of species?

Also, I did not really deal with whether hybrids have souls or not because we just don't know. Personally, I think it will be biologically impossible to create a true human/animal hybrid, but cybrids may be a possibility. I think that, much like clones, a cybrid that grows beyond the embryonic stage would be very unstable and unhealthy as well as incredibly expensive and inefficient to make. And much like clones, I can't answer if they would have a soul.

I am thankful for groups like the Scottish Council on Human Bioethics for addressing this topic in secular language within the public square, but with an underlying Biblical perspective. It is groups like this that enable us to interact in a well-informed way in our places of influence. Whether it is voting for legislation or simply talking with our friends at Starbucks, you don't have to work for the Council of Europe to champion the Biblical perspective within the public square.

You can find Dr. MacKeller's full report on the Scottish Council of Human Bioethics Web site: www.schb.org.uk.

© 2009 Probe Ministries

Dr. Ray Bohlin Engages in Embryonic Stem Cell Debate

Dr. Ray Bohlin was recently (3/11/09) a guest on a radio talk show concerning President Obama's Executive Order expanding federal funding for embryonic stem cell research. This was on station KPFT in Houston, a "Progressive" (liberal) radio station. The other guest was Dr. P.Z. Myers, in his own words "a godless liberal," a biologist at the University of Minnesota at Morris. He hosts what is called the most popular science blog in the nation, Pharyngula. The host of the program, Geoff Berg, could probably also be described in the same way. The hour-long show is archived here. You might be interested to listen to Dr. Bohlin explain his viewpoint in a sometimes hostile environment.

Articles you may find helpful:

Human Embryonic Stem Cells Go to Human Trials [Heather Zeiger]

The Continuing Controversy over Stem Cells [Dr. Ray Bohlin]

Stem Cell Wars [Kerby Anderson Commentary]

Stem Cells and the Controversy Over Therapeutic Cloning [Dr. Ray Bohlin]

Stem Cell Commentary [Dr. Ray Bohlin]

Cloning and Genetics: The Brave New World Closes In [Dr. Ray Bohlin]

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 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/

www.probe.org/the-continuing-controversy-over-stem-cells

© 2009 Probe Ministries

Personhood and Origins

Does One’s View of Origins Really Matter?

In the midst of carpools, meetings, appointments, and everything else that life throws at us, does it really matter whether someone is a Darwinist or a Creationist, or holds some position in between?

Whether we are aware of it or not, we all filter our life experiences through the lens of our worldview. Nancy Pearcey, author of *Total Truth*, describes a worldview as the "mental map that tells us how to navigate the world effectively."{1}

As technology advances, we find ourselves wading through very murky waters that deal with questions of personhood at the edges of life. Questions about embryos and human experimentation and euthanasia and physician-assisted suicide are no longer speculative theories for ethicists to ponder in their ivory towers, but something that ordinary people have to deal with either through voting or through very personal decisions. And it can be confusing—which is precisely why we need a map to guide us!

Consider this: The state of Washington recently passed a law approving physician-assisted suicide. Many are lobbying congress to vote on lifting restrictions on funding for embryonic stem cell research. Great Britain is voting on funding for research on human/animal hybrids. And many of us will have to make difficult decisions about a loved one in the hospital. Just last week, a British couple used in vitro fertilization to select from a group of their own embryos one who did not have the genetic markers for breast and cervical cancer which ran in the family, leaving the other embryos to be destroyed. One's view of origins, and particularly who man is within that view, has a profound impact on how we make decisions regarding such bioethical issues.

Characteristics of the Map

Pearcey says that every worldview, or mental map, has to answer these three questions: 1) How did we get here? 2) What happened to us? and, 3) How do we make things right? *Christian theism* answers these questions with the biblical record of:

1) Creation,
2) Fall of mankind from favor and fellowship with God,

> *3) Redemption of fallen mankind through salvation in Jesus Christ.*

Naturalism would answer these questions with:

> *1) Macro-evolution, natural selection randomly acting on chance variations, (no one to answer to)*
> *2) No right or wrong, just "survival of the fittest," (no inherent law to be held to), and the*
> *3) Evolving and passing on of our DNA (no over arching plan or ultimate meaning to life than to just continue living).*

The answers to these questions directly affect our view of personhood. Both secularists and Christians would agree that "a person" is valued as having a right to life and in the United States; we would agree with our founding Fathers that they have certain inalienable rights. But the answer to the question "What is a person and how should they be treated?" is very different under each worldview, and will guide you to very different waters.

The Christian Theism Map

From the Christian view of origins, we find that man is created in the image of God{2} and that he is a special part of creation, above all other creatures.{3} Part of being made in the image of God is that humans are more than the sum of their physical parts. People are made up of both body and mind (or soul), and these physical and spiritual components are integral to a person's identity.{4} James 2:26 says that the body apart from the spirit is dead. The story of Jesus raising Jairus' daughter in Luke 8:55 makes clear that when her spirit returned to her body, she was once again alive. Also passages about the resurrection, such as 1 Corinthians 15, make a distinction between the spirit and the body.

If people are both spiritual and physical, then their value is

not just placed in physical abilities or in their genetics. There is value beyond the body. We would still consider a disabled person, or a person in a coma, or a victim of a horrible accident as a valuable person. Even if their body became functionless or mangled, they would still be valued as a person because their value and identity entails more than the physical self. The body is important and a crucial part of their identity, but it is not the only measure.

The Naturalism Map {5}

From the naturalistic view of origins, popularly embodied in Darwinism, man is part of a long heritage that began with natural selection acting first on chemicals, then cells, then simple animals, and now on the current assortment of animals, including *homo sapian*. Man is considered another animal, and does not necessarily deserve any more rights or privileges than any other animal. Because the naturalistic worldview denies the supernatural or spiritual, man is seen as merely a physical being. Therefore, his value stems entirely from in his physical capabilities and genetics.

This mental map has led to such murky waters as the *eugenics movement*, through which scientists engaged in sterilization of prisoners, the intellectually weak and the poor because they wanted to improve the human race and purge "bad genes" from the gene pool. They also considered certain races as more advanced, or more evolved, than other races. The logical end of the *eugenics movement* was realized in Nazi Germany. Darwinism is not necessarily the cause of eugenics, but eugenics is an unsurprising logical possiblility under that particular worldview.

From the naturalistic view of personhood, one man can value another man based solely on his physical appearance or capabilities. Logically, from the naturalistic worldview, one can justify almost any action because "survival of the fittest" is the reigning ethic.

The eugenics movement is widely considered a black mark on American history, and many would consider it long gone with our lessons learned. However, many bioethicists, doctors and medical health professionals still practice medicine and make decisions based on a worldview and values that were used to justify eugenics. It is common to discuss a person's "quality of life" and make decisions on how to treat—or even if they should treat a patient—based on this measure. "Quality of life" criteria are often arbitrary measures of a person's worth based on how well they function physically and mentally compared to what is deemed "normal." Unfortunately, such subjective "quality of life" ratings and scales likely reflect what the doctors or authors' personally value more than the dignity or sanctity of the individual they are measuring. Quality of life measurements and our example of the Great Britain couple choosing an embryo based on its genetic markers are examples of people practicing a type of eugenics, whether they wish to call it that or not.

So Origins Does Matter. . .

These are two very different views of man, and lead to widely varying conclusions about personhood or the sanctity of human life.

The Bible may not contain the words "stem cells" or "euthanasia" but it does speak to the value and sanctity of human life. It also addresses how we should value one another and why it is so tempting to judge each other based on our own standards instead of God's standards. Whether we are talking about the Pharisee who was thankful he was not like the tax collector or the person who decides that embryos and the elderly should not continue living because they're worth more dead than alive, one person is placing a value on another person based on his own criteria of values as opposed to God's. In fact, he is putting himself in the place of God.

I am reminded of a passage when God was directing Samuel to

anoint a new king. Samuel was judging the sons of Jesse based on physical standards only, "But the Lord said to Samuel, 'Do not look on his appearance or on the height of his stature, because I have rejected him. For the Lord sees not as man sees: man looks on the outward appearance, but the Lord looks on the heart.'"{6} Samuel judged Jesse's sons based on their physical features, but God reminds him that he has standards that are beyond what man can see. The naturalistic worldview of personhood is similar to Samuel's standards of who would be a fitting king, but the Christian theistic worldview holds that it is God's standards, not man's, that dictate how we are to value a person. God values individuals despite their physical features and while we may not see their value right away (David was a young shepherd), God does. Thus, we must trust that what he values is what we should value.

Again, our worldview is like a mental map. Personally, if I had to navigate murky waters, I would rather have a map made by the Creator, himself—a God's—eye—view of the waters—than the limited perspective of someone standing right there in the middle of it. Whose map are you going to use?

Notes

1. Pearcey, Nancy, *Total Truth*, Crossway Books, 2005, p. 23. See Probe's review of *Total Truth* here: www.probe.org/total-truth.
2. "So God created man in his own image, in the image of God he created him; male and female he created them." Genesis 1:27 (ESV Bible).
3. "And let them have dominion over the fish of the sea and over the birds of the heavens and over the livestock and over all the earth and over every creeping thing that creeps on the earth." Genesis 1:26 (ESV); See also Genesis 1:28-30.
4. See Probe's article on The Spiritual Brain: www.probe.org/the-spiritual-brain.
5. For more information on Darwinism, see Probe's articles at: www.probe.org/category/faith-and-science/origins/.

6. 1 Samuel 16:7 (ESV Bible).

© 2009 Probe Ministries

Healthcare and the Common Good

One of the hot topics in the presidential election campaign is healthcare and healthcare reform, but is there a Christian perspective on healthcare? If so, what is it? I had the privilege of attending the annual bioethics conference hosted by the Center for Bioethics and Human Dignity and Trinity International University this past July. Guided by this year's theme, "Healthcare and the Common Good," some of the health profession's leading practitioners discussed issues of healthcare and the health profession from a Christian perspective.

What Is "The Common Good"?

Dr. Edmund Pellegrino, chairman of the President's Council on Bioethics, began the conference by distinguishing between first-order healthcare questions and second-order healthcare questions. First-order questions in this case involve the moral or ethical implications of healthcare. These questions include: What do we do with the poor and ill? What are our moral obligations to them? By what criteria do we judge healthcare programs? And, is the healthcare system providing for basic human needs? Second-order questions, often covered by the media, include economic issues, systems, and politics. Usually, this level of inquiry seeks to answer questions like "How is healthcare to be structured?"

Dr. Pellegrino used Aristotelian philosophy to discuss the idea of common good. He describes common good as everyone being enabled to fully achieve their own perfection as men. Essentially, everyone is valuable because he is a human being, and part of giving them value is to provide for them relief from suffering and the opportunity to flourish, whether they merit it or not. Dr. Pellegrino asserts that this is similar to the biblical idea of being not only your brother's keeper, and your enemy's keeper, but also ministering physically to those who are irresponsible. As Christians we have an obligation to care for the weak and the infirmed, and we, furthermore, cannot make value judgments on the worth of someone's life because of their personal behavior.

Human Dignity

Underlying any area of bioethics based on a Christian worldview is the concept of man as a special part of creation made in God's image.{1} This means that our views on healthcare should reflect the inherent dignity of the individual. Dr. Pellegrino discussed this essential element that part of common good is valuing man because he is man, and I would add that it is expressly because he is made in the image of God.

Many of the sessions at the conference, whether they were on doctor/patient relationships or public policy, centered on this point that man is made in the image of God and that individuals should be valued as unique and important. This presupposes a theistic worldview.

During my paper session at this conference, I emphasized the importance of a worldview approach for laying the foundation of how to evaluate specific bioethical issues. This is also essential in evaluating healthcare policies and our moral obligation to the weak and infirmed. How does one's worldview affect their various views on healthcare?

As Nancy Pearcey points out in *Total Truth*,{2} every worldview answers three basic questions: Where did we come from? What happened to us (why is there evil)? And, how can things be made right? As Christian theists we would answer these questions with "Creation-Fall-Redemption." Naturalists, on the other hand, would answer with the triad "Darwinism–Evil is an illusion–Survival of the fittest." A naturalist's creation story is that of Darwinism.{3} Therefore, man is nothing more than a product of natural selection. He does not hold a unique position above other animals, and he was not specifically created with a purpose.

One's view on origins is fundamental to how man is regarded, and it determines which ethical system is used to determine right and wrong views on healthcare. The tension is between the theistic view that man has inherent dignity and worth, despite his capabilities or lack thereof, and the naturalistic view that man's worth is based on whether or not he is a burden on society as a whole.

One view places an absolute value on a person while the other places a relative value. This, in turn, determines whether or not we share a moral obligation to help the weak and infirmed.

But We Vote on Second-order Questions!

While the ethical implications on healthcare are of primary importance, usually we are asked to evaluate healthcare based on second-order questions: How much does healthcare cost? Who should get subsidized? How are they subsidized? Should healthcare and health insurance be privatized? Which candidate's plan do I agree with?

Several of the speakers at this bioethics conference addressed specific plans by candidates and their opinions about them (For more information on second-order analyses, see the *Women of Faith Blog post* which summarizes Dean Clancy's discussion on McCain/Obama Healthcare plans. See also James Capretta's

discussion on policy analysis, PowerPoint® presentation from the conference and a related article.) But the emphasis at the conference was not in endorsing one candidate over another as much as evaluating healthcare from the perspective of a Christian worldview. In other words, we first must answer the primary questions and then use that analysis to guide our views on the secondary questions in healthcare.

I came away from the conference with an understanding that there are several problems with the current healthcare system, from overuse of technology to doctor/patient relationships to how the government subsidy system works. However, these problems are really the fruits of a deeper problem having to do the worldview approach that medical health professionals, politicians, and we, as a culture, take on the issue of health and healthcare. Healthcare is becoming more and more a consumer business or a commodity, and less and less a moral obligation to help those that are weak and infirmed (or a moral obligation to help prevent people from becoming weak and infirmed).

There is no one solution; thus, no one candidate has *the* solution to all of our healthcare problems. And deciding between expanding government subsidies and privatization is not the root of the problem, so it is not the ultimate solution. As Dean Clancy, former member of the President's Council on Bioethics, pointed out in his session on "Solutions," society can achieve four levels of "happiness": 1) the ultimate good, 2) good beyond oneself, 3) personal achievement, and 4) immediate gratification.

As a culture we are stuck at levels 3 and 4 (personal achievement and gratification), and this means our priorities and decisions are stuck there. This is directly tied to our worldview. From a naturalistic vantage point, it would be logically inconsistent to move beyond levels 3 and 4. However, on a theistic worldview, 1 and 2 follow from the biblical perspective on priorities such as, "You shall love the Lord

your God with all your heart and with all your soul and with all your mind…You shall love your neighbor as yourself."{4} God is the ultimate good, and then we are to love others by doing good beyond what benefits ourselves.

What Can I Do?

We can serve a witness to our culture by modeling the biblical perspective on healthcare and human dignity. Maybe not necessarily on the voting ballot, but oftentimes this mindset is modeled on a very personal level by providing for the weak and infirmed in our churches and communities. Or by treating individuals with value, even if they are irresponsible with their health. Or through the way doctors and nurses treat their patients. These are all very tangible ways that people can see the love of Christ and may very well be one way to change some of the problems in our healthcare system from the grassroots level.

Notes

1. "So God created man in his own image, in the image of God he created him; male and female he created them" Genesis 1:27 (ESV).
2. Pearcey, Nancy, *Total Truth: Liberating Christianity from Its Cultural Captivity*, Crossway Books, 2004, pgs. 45-46.
3. This is referring to Darwinism as a philosophy: The presupposition that there is no God, only nature.
4. Matt 22:37, 39 (ESV).

© 2008 Probe Ministries

Stem Cells for Everyone: A Breakthrough?

As far as dramas go, the stem cell saga contains all the elements of a juicy prime-time soap opera. The excitement, the promises, the characters, the politics, the lies, the scandal, the moneythe only thing missing is sex, but thats the point, isnt it?

On November 20, 2007, the journals *Science* and *Cell* announced a truly major discovery. It was a way to convert human skin cells taken from a simple skin biopsy into *stem cells* that behave like an *embryonic stem cell*but the byproduct is not an embryo and can in no way become one.{1} This has the effect, say many, of sidestepping the ethically troublesome practice of creating then destroying human embryos in order to treat diseases.

This new method is efficient. One biopsy can produce 20 stem cell lines, and can be taken from the patient himself, eliminating the risks associated with tissue rejection. We hear about stem cell breakthroughs all the time; how is this one different? Is this method ethical? Will it save as many lives as embryonic stem cells promise to? Is this the end of the stem cell controversy?

The Saga

Stem cells are simply cells that make other cells. Their job is to be a cell factory. By analogy, think of a rose. From the stem of the rose grows leaves, the flower, and thorns. The thorns dont produce flowers, the leaves dont produce thorns, and the flower doesnt produce leaves, but the stem does. The stem is versatile; it can make many parts of the plant. Stem cells operate the same way. Some stem cells are more versatile than others. In other words, some stem cells can make many

types of cells and others can only make one type of cell.

The history of embryonic stem cells dates back to the 1950s when two scientists isolated a teratoma from a mouse. A teratoma is a tumor that is composed of various types of cells from hair cells to eye cells to teeth to nails, so the scientists aptly named it a *teratoma*, or monster. When investigating this tumor, the scientists found that the stem cells that produced this array of cell types had very similar properties of embryonic cells. Thus began the investigation into embryonic stem cells.{2}

Before the term stem cells had become popular, bone marrow transplants had been used to treat patients with leukemia. Whenever a patient receives a bone marrow transplant from a donor, they are really receiving a type of stem cell therapy. At this point, scientists could only use bone marrow stem cells for very specific cell replacement. These stem cells were not very versatileat least that was the theory at the time. Since then, bone marrow stem cells have been found to be quite versatile, and can be coaxed into becoming a variety of cells. Scientists have now found a variety of adult stem cells throughout the body and have been using them in humans to cure or alleviate a number of diseases or conditions (see www.stemcellresearch.org for a complete list).

Another breakthrough with stem cells arose from tissues such as umbilical cord blood, placental tissue, amniotic fluid and even menstrual bloodall obtained without harming the life of the baby at any stage of development. Each of these stem cells are a little more versatile than the adult stem cells, meaning that they can become two or three different types of cells, and in many cases the donor/recipient need not be an exact match. The National Cord Blood Program is just one group that allows parents to put their babys umbilical cord blood in a bank so that he or she could use it for therapy sometime in the future, or they can donate the umbilical cord for others to use. See www.nationalcordbloodprogram.org for a list of

patient success stories.{3}

If these are *adult* stem cells, then what are *embryonic* stem cells? These are cells removed from the eight-day-old embryo. When these cells are removed, the embryo dies. These cells produce almost all of the cells in the human body, and therefore are the most versatile stem cells. You may have heard of these cells as being pluripotent. That simply means that they are very versatile. Some scientists believed that embryonic stem cells (ESC) research was where time, money and resources should go since we know that these cells have the potential to become any cell type.

Numerous success stories of treatments with adult stem cells have been under-reported by the media, while the supposedly cure-all ESC were hypedeven though they have shown no actual success in humans. Ironically, adult stem cells have been saving patients lives for years (bone marrow transplants), while ESC scientists have yet to control the growth rate of the ESC. In what shouldnt be a surprise to anyone, ESC tended to form grotesque tumors (teratomas) composed of various cells found in the body.

Debate over the ethics of using embryos became heated within the political arena. The individuality and dignity of the embryo came into question. Scientists wanted unfettered research{4} so that all options can be explored to cure diseases, while others considered the embryo a very vulnerable life that has the right to be protected from experimentation. Both sides claimed to be arguing for the good of humanity.

These debates, however, have taken a slightly different turn with the recent discovery of converting skin cells into pluripotent stem cells mentioned above.

Skin Cells

As mentioned, now scientists have isolated human stem cells that are as versatile as embryonic stem cells, but no embryos were used to obtain these stem cells. While more studies are needed to confirm that these cells act like ESCs in the human body, they behave just like ESCs in the lab.

There are a few concerns with this procedure. One of the biggest concerns is the way these stem cells are made. Both research groups had to use a type of virus to insert the right code into the skin cells to tell it to become a stem cell. This virus may be harmful to humans. However, both scientists are researching safer methods for coaxing the skin cells into stem cells.{5}

So is this method ethical? I strongly believe the answer is yes. As Leon Kass, former head of the Presidents Council on Bioethics, stated in a *National Review Online* symposium, Reprogramming of human somatic cells to pluripotency is an enormously significant achievement, one that boosters of medical progress and defenders of human dignity can celebrate without qualification.{6} Sanctity of life advocates can celebrate because no embryos are created or destroyed for research.

Both scientists who first published on this new discovery, Dr. James A. Thomson from the U.S. and Dr. Shinya Yamanaka from Japan, said that this research could not have been done without the knowledge that we already had from embryonic stem cells. And Thomson, who was one of the first scientists to remove a stem cell from a human embryo,{7} has specifically stated that embryonic stem cell research should continue.{8} We must keep this point in mind, but we must also remember that, contrary to what some in the scientific community are saying, both scientists had more than just economic reservations about using embryos in their research:

> *Thomson: If human embryonic stem cell research does not make you at least a little bit uncomfortable, you have not thought about it enoughI thought long and hard about whether I would do it.{9}*

> *Yamanaka: When I saw the embryos, I suddenly realized there was such a small difference between it and my daughtersI thought, we cant keep destroying embryos for our research. There must be another way.{10}*

Is This Match Point?

Most people agree that this changes the political and scientific culture of the stem cell debate. Surprisingly, some major players have come around.

Jose Cibelli, research scientist whose successful primate cloning was overshadowed by the skin cell announcement states, If their method is as good as the oocyte (the cell that forms a human egg)we will be no longer in need of the oocytes, and the whole field is going to completely change. People working on ethics will have to find something new to worry about.{11} Even Ian Wilmut, the scientist famous for creating Dolly the Sheep [see Probe article], decided to abandon cloning and work with reprogramming cells instead. As the Britains *Telegraph* reports, The scientist who created Dolly the sheep, a breakthrough that provoked headlines around the world a decade ago, is to abandon the cloning technique he pioneered to create her. I decided a few weeks ago not to pursue nuclear transfer, Prof Wilmut said.{12}

Several of the participants of *National Review Online* Symposium agree that this removes the ethical concerns from researching pluripotent cells, and, pragmatically, this seems to be significantly more efficient than cloning embryos to remove stem cells. Case closed? Not quite.

Not all agree that this is the end of using embryos to extract stem cells. As Wesley Smith, bioethicist, vocal ESC critic and Discovery Institute fellow, points out on his blog, www.bioethics.com:

> *If anyone thought that the pro-human cloners would fold up their tents and steal away after the news was released that patient-specific, pluripotent stem cells had been derived from normal skin cells, they just dont understand how fervently some scientists and their camp followers want to clone human lifeand how hopeful some are that the stem cell issue can be the vehicle that wins the culture war.{13}*

Recall that we are dealing with scientists careers and, for the most part, scientists with a utilitarian worldview. A scientist whose worldview is dictated by whatever is for the greater good and has built his entire career and reputation around embryonic stem cell research is not going to readily abandon it. To see the interplay of both career and worldview choices, Dr. Hans Keirstead, neurobiologist and stem cell researcher at the University of California-Irvine, had this to say in an interview for the *Arizona Daily Star*:

> *I do think a great deal of this work could be done with the skin-cell derived stem cells. But wed have to start completely over, from scratch, and we are not going to slow down to do that, not at this point.*

It is my personal feeling its a very ethical decision to use this tissue [Embryonic Stem Cells] to end human suffering, to better human life, than to destroy it.{14}

Conclusion:

As Christians, we operate within an ethical framework dictated by Gods word. Although the Bible does not mention stem cells, it *does* make clear that we are made in Gods image (Genesis

1:26, 27), that God knew us and knit us together within our mothers womb (Psalm 139: 13-16), and how God called prophets before they were even born (Isaiah 49:1; Jeremiah 1:4-5). God values the life of the unborn. We do not always have the privilege of seeing ethical decisions vindicated in our lifetime, but we can be confident that God is sovereign over all things.

Notes:

1. Takahashi, Kazutoshi, et al, Cell 131, 861-872, November 30, 2007; Yu, Junying, et al Sciencexpress, www.sciencexpress.org, (fee/registration to access full article) November 20, 2007.
2. From teratocarcinomas to embryonic stem cells and beyond: a history of embryonic stem cell research Solter, *Davor Nature Reviews* 326, vol. 7, April 2006.
3. See list of references from Family Research Council, www.frc.org/get.cfm?i=IS06H01. See also www.stemcellresearch.org/facts/asc-refs.pdf for a sampling of peer reviewed research articles.
4. This case history [of ESC research] again reinforces the old truism that unfettered basic research driven only by scientific curiosity is usually the best way to discover things of enormous practical value Solter, *Davor Nature Reviews* 326, vol. 7, April 2006.
5. Two Major Studies Show: Human Pluripotent Stem Cells without Cloning or Destroying Embryo analysis by Maureen Condic, Ph.D. from www.stemcellresearch.org/statement/pptalkingpointsweb.pdf.
6. National Review Online NRO Symposium, nationalreview.com, Brave New Future.
7. Thompson, James A. et al, *Science* 282, 1998.
8. Standing in the Way of Stem Cell Research by Alan I. Leshner and James A. Thomson *Washington Post*, 12-0-07, pg. A17.
9. Man Who Helped Start the Stem Cell War May End It by Gina

Kolata, *New York Times,* Nov. 22, 2007.
10. Risk Taking Is in His Genes by Martin Fackler, *New York Times*, 12-11-07.
11. Vogel, Gretchen, and Holden, Constance , Field Leaps Forward with New Stem Cell Advances *Science* 318, 23 November 2007, p. 1224.
12. Dolly creator Prof Ian Wilmut shuns cloning by Roger Highfield, *Telegraph* 11/16/07, www.telegraph.co.uk.
13. 'Lead Into Gold:' Stem Cell Counter-Attack by Wesley Smith. Posting for November 27, 2007 www.bioethics.com.
14. Human embryonic stem-cell work must go on, says researcher by Carla McClain, *Arizona Daily Star*, 11-28-2007.

© 2007 Probe Ministries