STEM CELLS, CLONING, AND HUMAN EMBRYOS:

Understanding the Ethics and Opportunity of Scientific Research

FAMILY RESEARCH COUNCIL
Washington, DC

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President
Family Research Council

STEM CELLS, CLONING AND HUMAN EMBRYOS
BY DR. DAVID PRENTICE AND ROSA MACRITO

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Stem Cells, Cloning & Human Embryos:

Understanding the Ethics and Opportunity of Scientific Research

BY DAVID PRENTICE, PH.D. AND ROSA MACRITO

Stem Cells

Stem cells remain a mystery to most people, even though the debate over stem cell research, treatments, ethics, and funding has led to legal, legislative, scientific, religious, and policy debates. This publication offers a general overview of stem cells—their sources, practical uses and potential, and ethical problems. Stem cell research is a subject with which everyone should be familiar, because the path we choose for stem cells has profound implications for medical research, health care innovations, and public policy.

What is a stem cell?

A stem cell is an unspecialized cell capable of giving rise to a specialized cell of the body, such as a skin cell, a blood cell, a muscle cell, or a nerve cell. A stem cell is also capable of renewing itself, ensuring the pool of stem cells in the body is not depleted. Stem cells fall into three main categories that we will explore below:

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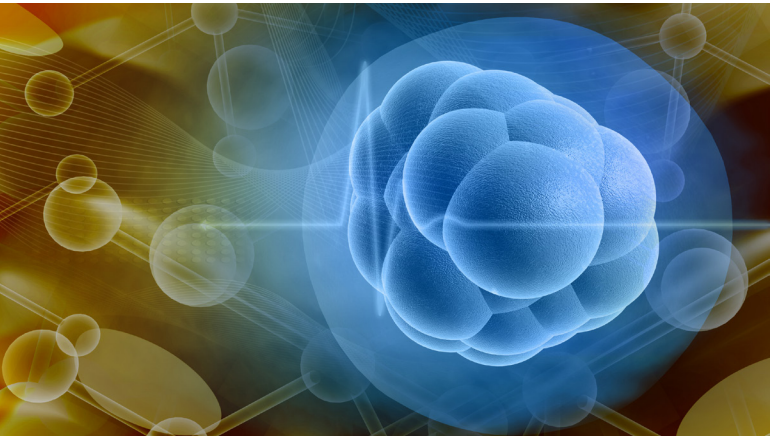
embryonic stem cells (ES cells), adult stem cells, and an innovative, ethical alternative to embryonic—induced pluripotent stem cells (iPS cells).

Why are stem cells important?

Stem cells are essential in replenishing tissue cells that wear out naturally, such as blood cells, skin cells, and the cells lining the gut. They also heal tissues and organs that have been damaged by disease or injury.



Where do embryonic-type stem cells come from?

- **Embryos—**Embryonic stem cells are obtained from the inner cell mass of the early embryo, usually from 5 to 7 days old. Deriving these cells requires the destruction of the young embryo.
- **Fetuses**—Embryonic germ cells, another type of embryonic cell, are obtained from aborted fetuses several weeks old; though similar to embryonic stem cells, they have not been used much by researchers.

Where do adult-type stem cells come from?

- **Umbilical cords, placentas, and amniotic fluid—** Adult-type stem cells can be derived from the blood of umbilical cords and the solid cord tissue, the amniotic fluid that surrounds the baby during pregnancy, and the placenta (rich sources of stem cells that are usually discarded after birth).
- **Body tissues—**Adult stem cells can be found within almost all body tissues, such as the bone marrow, liver, skin, retina, skeletal muscle, intestine, brain, dental pulp and nose. Fat obtained from liposuction has even been shown to contain a large amount of adult-type stem cells.
- **Cadavers**—Neural stem cells can be harvested from the brains of post-mortem humans as late as 20 hours following death. Another study has demonstrated that viable muscle adult stem cells can be harvested up to 17 days after death.

How do embryonic and adult stem cells compare?

Embryonic Stem Cell Advantages

1. Pluripotent—this quality means that ES cells have the potential to give rise to any type of cell in the body.
2. Immortal—ES cells can be grown in cell culture for an extended period of time, whereas most other cells age very quickly and, consequently, can only be grown for a short period of time.

Embryonic Stem Cell Disadvantages

1. Unethical: Harvesting ES cells requires the destruction of young unborn human life.
2. It is difficult to grow large numbers of a pure, single cell type, without also growing other cell types. For example, a researcher aiming to grow a culture of heart cells may find a smattering of liver cells among the heart cells, rendering the cell culture impure.
3. Immunogenic: ES cells are genetically different from the patient in need of therapy, rendering them likely to be rejected after transplantation.
4. Tumorigenic: Because of their characteristic of rapid and unlimited proliferation, ES cells tend to grow uncontrollably and cause tumor formation.

5. Limited Availability: Because a majority of embryos created by in vitro fertilization (IVF) are being preserved for future family building, only a small percentage of these eligible embryos are available for ES cell derivation.

Adult Stem Cell Advantages

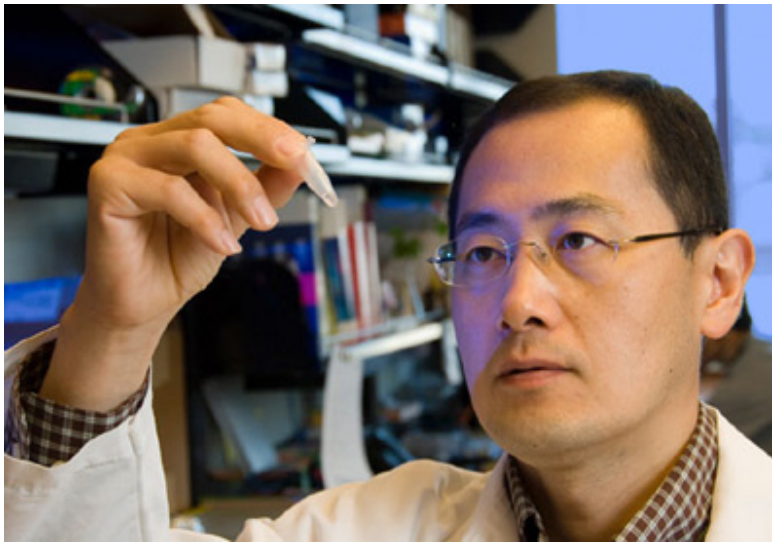
1. Ethical: The harvesting of adult stem cells does not require the destruction of the donor.
2. Some stem cells harvested from the bone marrow and umbilical cords have the potential to become many other types of body cells.
3. Because many adult stem cells are already somewhat specialized, it is easier to coax them to become different cell types.
4. Not Immunogenic: Because the stem cells are harvested from the patient's own body (and thus, genetically identical), there is no risk of immune rejection after transplantation, eliminating the need for immunosuppressant drugs.
5. Easily obtained: Adult stem cells are easy to harvest and require relatively non-invasive procedures to procure (skin, nasal, muscle, marrow, and fat cells). While brain stem cells are more difficult to procure, stem cells from the umbilical cord and placenta are also very easy to obtain.
6. Not Tumorigenic: Adult stem cells do not proliferate uncontrollably and, thus, do not cause tumor formation.
7. Homing: Adult stem cells tend to migrate to sites of tissue damage, targeting the repair.

Adult Stem Cell Disadvantages

1. Limited quantity: Most body tissues contain a small number of stem cells, and once harvested, most have a limited capacity for proliferation.
2. Finite: Adult stem cells cannot survive as long in cell culture as ES cells.
3. Limited pluripotency: It may be more difficult to differentiate into multiple cell types.

Induced pluripotent stem cells — an ethical alternative to embryonic stem cells

In 2006, Japanese scientist Shinya Yamanaka created the first Induced Pluripotent Stem Cells (iPS cells) from mouse cells, as an alternative to embryonic stem cells. A year later, Dr. Yamanaka, in addition to Dr. James Thomson (the scientist responsible for isolating the first stable human ES cell lines), independently created iPS cells using human cells. iPS cells are produced by reprogramming normal human body



Dr. Shinya Yamanaka

cells (e.g., skin cells) to express genes that are essential in maintaining the properties of embryonic stem cells, returning the specialized body cells to an embryonic stem cell-like state. Thus, an iPS cell behaves almost exactly like an embryonic stem cell. Since the creation of iPS cells, Dr. Thomson himself has even shifted the majority of his research away from embryonic stem cells and toward iPS cells. The process of obtaining iPS cells is easier and less expensive than obtaining ES cells, and provides an ethical alternative by

circumventing the destruction of a human embryo. In 2012, Dr. Yamanaka was awarded the Nobel Prize in Physiology or Medicine for his development of the iPS cell technique.

Why are adult stem cells preferable to embryonic stem cells?

Adult stem cells have been successful in healing human beings for many years, treating dozens of diseases and disorders, whereas ES cells have yet to show proven success in treating a single human being. Research with ES cells has nothing about which to boast, but instead has primarily triggered tumor formation and immune system reactions in animal studies. Adult stem cell research, in contrast, is quickly growing in documented successes with the rapid development of innovative therapies – therapies that come directly from the patient's own body. By utilizing the cells that exist within them, a patient's tissues are able to repair themselves naturally and effectively.

Treatments from Adult Stem Cells

Multiple Sclerosis

Barry Goudy was diagnosed with multiple sclerosis, a disease characterized by deteriorating vision and loss of muscle control. As the disease progressed, Barry endured days and weeks of extreme fatigue, leg numbness, and blurry vision. Then Barry and his wife discovered a new adult stem cell transplant procedure, part of a clinical trial approved by the FDA and conducted at Northwestern University by Dr. Richard Burt. The trial involved replacing or "re-booting" Barry's diseased immune system with a transplant of healthy adult stem cells harvested from his own body. Less than a week after the transplant, he returned home with a fresh immune system. "You know, I've been (MS) symptom-free now for 8 and a half years," Barry says. "I do nothing, except live my life."

Cerebral Palsy

Months after birth, Chloe Levine was diagnosed with cerebral palsy (CP). CP is caused by damage to one or more specific areas of the brain and typically occurs before, during, or shortly after a baby's birth. After consulting with doctors, Chloe's mom, Jenny, says, "They told us that she would always be weak. She would walk at some point, but they didn't know when." Soon after, Chloe's parents heard of a treatment for CP involving an adult stem cell reinfusion. Her parents had "banked" Chloe's placenta and umbilical cord blood cells at birth – the same stem cells needed for a reinfusion. The Levines contacted Duke University Medical Center, where doctors reinfused Chloe's own cord blood stem cells into her bloodstream. Within a few days, the two-year-old girl was speaking her nickname—"Coco"—for the very first time. Strength appeared throughout her body and she started walking, riding her bicycle, and doing other physical activities for the first time in her life. "Just recently she started playing soccer," says Chloe's father. "I don't know what's next…she'll find something else to do and she'll amaze us."

Spinal Cord Injury

As a result of a car accident in 2001, Laura Dominguez broke her neck and was paralyzed from the chest down. She was treated with a mix of adult stem cells and other cells obtained from olfactory tissue inside her nose. The cells were transplanted across the injury site in her damaged spinal cord, and several months after the surgery, she was able to move her foot. She can now walk with braces. Her remarkable progress is continuing, and several other spinal cord injury patients like her are also showing benefits from the transplant surgery. Dr. Carlos Lima, who published

the results, performed the surgery in Portugal, but neurologists in the US are seeking FDA approval to begin offering Dr. Lima's therapy in the United States.

Sickle-Cell Anemia

Not long after birth, Joe Davis, Jr. was diagnosed with sickle-cell anemia, a disorder in which the red blood cells of the body are abnormally shaped, blocking blood flow within the blood vessels. The disorder can cause intense pain and organ damage, usually proving itself fatal within ten years. Doctors confided to Joe Jr.'s parents, Darlene and Joseph Sr., that their son may not live to see his teen years. But a doctor they knew informed them of a transplant using adult stem cells from umbilical cord blood taken from a donor at birth. However, they needed a good match from the donor, and the number of cord blood donations from the African-American community was low. A surprise came to the Davis family when Darlene became pregnant. As the pregnancy progressed, the tissue type of the second Davis baby was revealed to be a perfect match for the transplant. Joe Jr., just two years old at the time of the transplant, was given a dose of chemotherapy, ridding his system of the diseased blood cells, and received an injection of adult stem cells taken from his younger brother's umbilical cord blood. Joe Jr. was cured, with not a hint of sickle cell anemia since the transplant.

For more examples of successful adult stem cell applications, see stemcellresearchfacts.org.

Is stem cell research ethical?

Most of the stem cell research in the scientific world is acceptable, ethical, and laudable. The only area of stem cell research that is unacceptable is the field requiring harm or destruction of human life, especially ES cell research.

Embryonic Stem Cells: Because obtaining ES cells requires the death of the human embryo, research involving these stem cells is unethical and unacceptable. Every human life at every stage of life has intrinsic dignity, and should be treasured and not sacrificed for science.

Embryonic Germ Cells: When the embryonic germ cells are derived from fetuses by abortion, this research is unethical and unacceptable, because the procedure requires the deliberate destruction of an innocent human life.

Induced Pluripotent Stem Cells: Because the creation of iPS cells requires only human body cells (e.g. skin cells) and bypasses the need for an embryo or egg cell, iPS cell research is ethical.

Umbilical Cord Stem Cells: The umbilical cord is no longer needed after birth, and thus, can be utilized as an ethical source of stem cells.

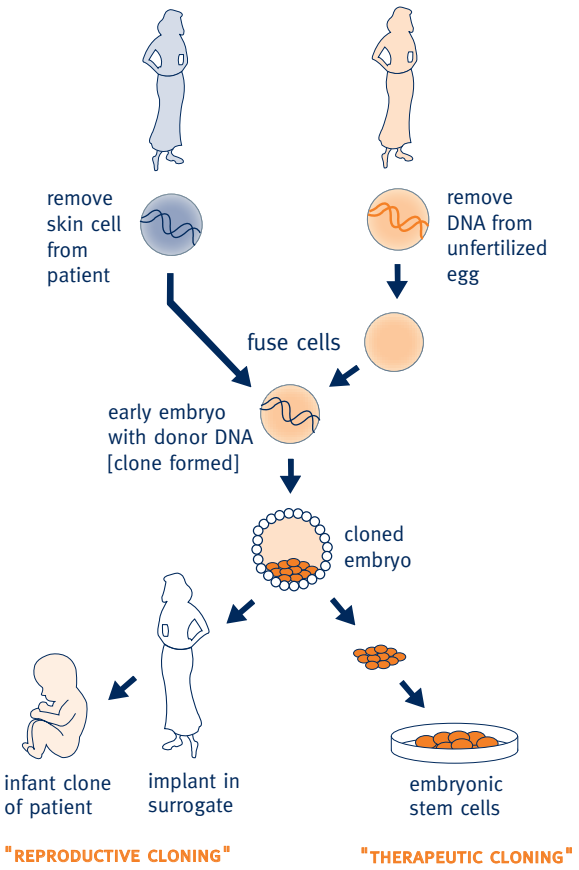
Placentally-Derived Stem Cells: Like the umbilical cord, the placenta is not needed after birth, rendering its stem cells acceptable for research purposes.

Adult Stem Cells: Because their harvest does not require destruction of the donor, adult stem cells are ethically acceptable for research and treatments, provided the donor gives informed consent.

Cloning

What is "cloning" and what are its uses?

Cloning is the process of creating an embryo asexually. While it's not the only way to clone, the most common technique is "somatic cell nuclear transfer" (SCNT). SCNT occurs outside of the woman's body and does



not involve the fusion of egg and sperm. Cloning is used with two primary ends in mind. The first and most well-known is "reproductive cloning" or cloning to produce children. The second is so-called "therapeutic cloning" or cloning for biomedical research.

What is reproductive cloning (cloning to produce children)?

Reproductive cloning involves removing the nucleus of a somatic cell (a body cell such as a skin cell). The nucleus is then transferred into an egg cell (oocyte) which has already had its nucleus removed or inactivated. In other words, the nucleus of an egg cell is replaced with the nucleus of a body cell. An electrical or chemical stimulus initiates cell division and the beginning of embryonic development. This is followed by implantation of the embryo into a uterus in order to gestate the young clone to birth. Because the nucleus stores the genetic material, this cloned embryo is genetically identical to the person who donated the somatic cell nucleus. Reproductive cloning essentially creates a virtually identical twin of the nucleus donor.

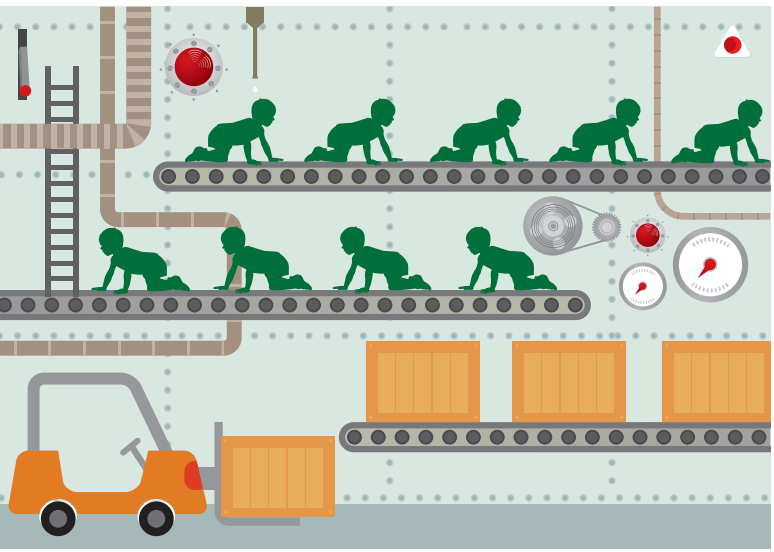
What is therapeutic cloning (cloning for research)?

So-called therapeutic cloning involves the same series of steps as the reproductive cloning technique described above. The only difference is what happens to the embryo. Rather than implanting the embryo into a uterus and gestating to birth, scientists destroy the embryo to harvest its stem cells. Therapeutic cloning is, therefore, a "create and destroy" method—one where the embryo is created in order to be destroyed. The purpose of creating the embryo is to harvest embryonic stem cells that are genetically identical to the nucleus donor in question, theoretically eliminating the risk of immune rejection after transplantation.

What's wrong with human reproductive cloning?

The act of cloning in order to produce human beings replaces *procreation* with *production*. Human beings are treated as manufactured products rather than created persons. In animal cloning experiments, only 2 to 3 percent of all reproductive cloning attempts have been successful at producing born clones. The clones that are successfully birthed are often born with major disabilities or deformities, or experience problems after birth. For example, cloned mice have been

shown to be extremely obese. Cloned cows usually experience lung and heart problems. Dolly the sheep – the first mammal ever to be cloned from an adult cell nucleus – experienced early onset arthritis and had a lung disease. Due to these complications, she was put down only six years after birth. Thus, the few cloned children that might manage to be born would be subjected to disabilities, deformities, and abnormally short lives, all because of the imprudent curiosity of some researchers. Reproductive cloning would allow a woman to clone herself using her own egg, her own



somatic cell, and her own womb. Not only would a man be superfluous to the process of creating a child, but a woman would be giving birth to an individual who is both her identical twin sister and her child.

Cloning could even allow us to pick and choose desired physical and mental traits for our children. Characteristics such as height and intelligence could be manipulated according to someone else's likes and dislikes. By purposely choosing desirable characteristics and avoiding undesirable ones for our future generations, scientists employ a method of eugenics.

When contemplating the future of cloning, it is especially telling to hear Ian Wilmut, the creator of Dolly the sheep, describe *human* reproductive cloning as "criminally irresponsible."

What's wrong with human therapeutic cloning?

Plainly put, therapeutic cloning is the purposeful creation of human life with the deliberate intention of destroying that life. This technique is graced with the adjective "therapeutic" because a human life is used as an object for someone else's supposed benefit. Essentially, this creates a disposable caste of people – a new class of human beings to be discriminated against as objects. Human life is thus degraded, seen as something dispensable, rather than something valuable.

Therapeutic cloning opens the doorway to "fetal farming." That is, it creates a situation in which newly-created embryos can be gestated to the fetal stage within a woman's womb. The fetus would then be aborted and harvested for its organs instead of simply its stem cells. Unfortunately, the concept of "fetal farming" is more than mere speculation. In reference to women considering abortion, *Huffington Post* writer Jacob Appel, says, "If only a small percentage of those women could be persuaded to carry their fetuses to the necessary point of development for transplantation, society might realize significant public health benefits."[1] If embryos can be grown to the point where their stem cells can be harvested, what will prevent scientists from growing them to the point where *whole organs* can be harvested? As a result, women would be treated as incubators, no more than a piece of machinery by which products (i.e., organs and tissues) are manufactured.

Whether the technique goal is reproductive or therapeutic cloning, human eggs are the necessary raw materials. Obtaining human eggs, of course, requires soliciting women from whom to harvest those eggs. Besides the possibility of using women as incubators,

women will begin to be viewed as natural resources from which to obtain the necessary raw materials of scientific research. In other words, women will be utilized as a means to an end—the end being the procurement of an egg.

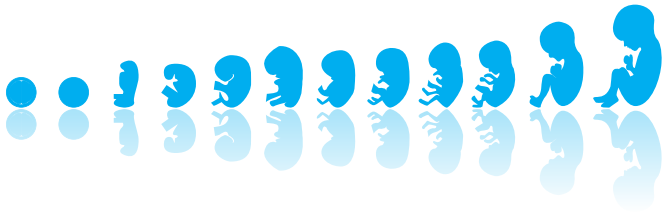
The health risks to women who donate eggs is also of great concern, and many egg donors are not given adequate informed consent regarding the dangers. A significant number (anywhere from 5% up to 20%) of women who undergo ovarian stimulation to procure eggs experience severe ovarian hyperstimulation syndrome, which can cause pain, and can lead to various side effects, including ovarian torsion, blood clots, kidney disease, premature menopause, ovarian cysts, chronic pelvic pain, stroke, reproductive cancers, and in some cases, death.[2]

Reproductive cloning treats human beings as products to be manufactured, while therapeutic cloning discriminates against the youngest forms of life by viewing them as nothing more than a means to an end.

Human Embryos

Are embryos human? Are they really one of us?

Just as an infant, a child, and an adolescent are potential adults, so is an embryo. An embryo is not a "potential life." It is, rather, "life with potential." Any embryo has

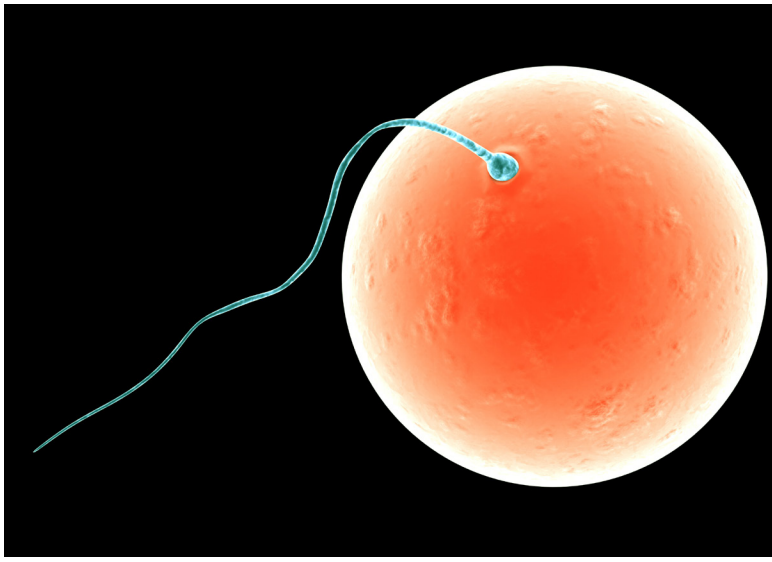


the potential to become a fetus, an infant, a child, an adolescent, and eventually, an adult.

A human being retains his or her status as a human being no matter how young or old. A human embryo is simply a human being in his or her earliest stage of development. Who among us was never an embryo? Despite their unfamiliar appearance, embryos are what young humans are supposed to look like.

Religious belief or biology?

The moment at which a human life begins is not a matter of religious belief, but a matter of basic biology. A quick glance through standard embryology and developmental biology textbooks tells us the beginning of human life is at conception. When the sperm and egg unite to form a zygote—a single-cell embryo—a new, genetically distinct human life has begun. The definitions found in these textbooks are not written



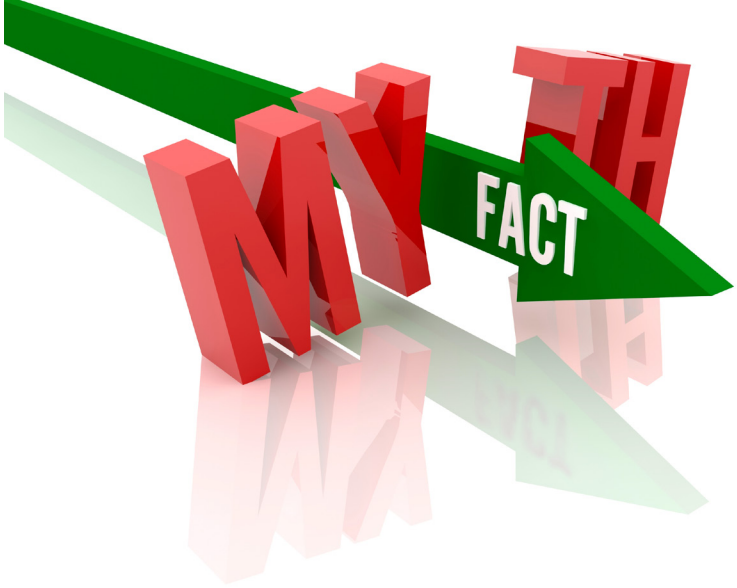
by pastors, priests, or theologians. They are written by embryologists and developmental biologists—those who specialize in the study of the embryo and the development and maturation of human beings.

It is those who wish to exploit the human embryo—whether for financial gain, scientific curiosity , or even for well-intended medical advancement—who

deny this clarity. But any scientific advancement that requires the denial of scientific fact must be viewed as it is: hollow and unethical.

Why is the destruction of human embryos wrong?

Because a human embryo is a human being in his or her earliest stage of development, destroying an embryo is morally equivalent to destroying any other human being. Some will balk at this line of reasoning. But it is valuable to ask—when *would* it be morally acceptable to end the life of another human being? We know that the human embryo is a human being because it is a self-directed organism. As long as it is given an appropriate, nurturing environment (i.e., the womb of the mother), it actively develops to maturity. Proponents of embryo research may argue that because an embryo cannot develop in isolation when placed in a petri dish, it does not possess an internal code for self-actualization and is therefore not a human being. To this, we respond that no organism (including adult human beings) can develop without a hospitable environment. If you or I were placed on Mars with no food or drink, we would undoubtedly die. The planet Mars is not an environment conducive to our growth and development. This is no different when it comes to a human embryo. All organisms are dependent on their environment for growth and survival.



TEN MYTHS
in the Stem Cell Debates

The scientific research can be exciting, but the moral and ethical stakes are high. As you engage scientists, patients, and policy-makers, you may come across the following myths.

Myth 1: **Embryonic stem cells are the only kind of stem cell.**

Adult stem cells can be harvested from umbilical cords, the placenta, amniotic fluid, tissues and organs such as bone marrow, muscles, the eye and nose, and even from cadavers after death, and have been used in patient treatments for years. Induced pluripotent stem cells – stem cells that behave almost exactly like embryonic stem cells – are another type of stem cell used in research.

Myth 2: **Christians oppose stem cell research.**

Stem cells can be classified into three general categories: embryonic stem cells, adult stem cells, and induced pluripotent stem cells. As long as stem cells are not derived from embryos or fetuses that have been intentionally destroyed, Christians are morally opposed only to one category: embryonic stem cells, because deriving embryonic stem cells relies on destruction of a young human embryo.

Myth 3: Human ES cells are necessary for iPS cell research.

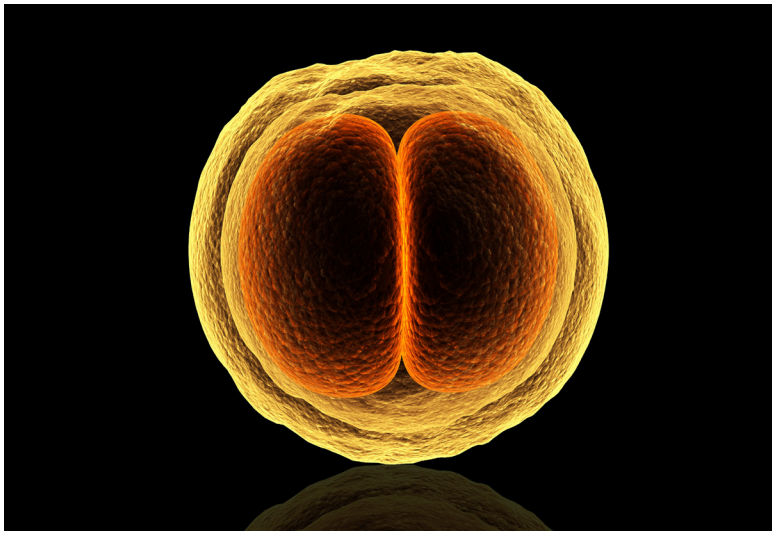
Japan's Shinya Yamanaka is one of the two scientists credited with the iPS cell breakthrough (the other being James Thomson of the University of Wisconsin). Both scientists worked independently and published their results in November 2007. Contrary to the claims made that ES cell research is essential to iPS cell research, Yamanaka himself has said that human ES cells were not crucial to his work. Before his breakthrough in reprogramming human somatic cells to a pluripotent state, Shinya Yamanaka's work in reprogramming utilized *mouse*, not human, ES cells, and he used the same method for human iPS cell production. In fact, Yamanaka himself has said, "Neither eggs nor embryos are necessary. I've never worked with either." Moreover, it was precisely Yamanaka's ethical concerns to avoid lethal experiments with human embryos that led to his breakthrough. Recalling looking at a human embryo through a microscope several years earlier, Yamanaka said: "When I saw the embryo, I suddenly realized there was such a small difference between it and my daughters…I thought, we can't keep destroying embryos for our research. There must be another way."

Myth 4: **Embryonic stem cell research holds the greatest promise.**

ES cells have yet to provide a proven treatment or cure for a single human being. In 2010, the biotechnology company Geron began conducting the first human clinical trials using ES cells to treat spinal cord injuries, but in 2011 decided to abandon not only the trial, but the entire field of ES cell research altogether. The field of *adult* stem cell research, on the other hand, is flourishing. Adult stem cells have already cured and treated hundreds of thousands of people. For example, stem cells from olfactory tissue inside the nose have shown great success in treating spinal cord injuries, and adult stem cells harvested from an area of the eye have even restored sight to patients with corneal blindness.

Myth 5: **Embryonic stem cell research is illegal.**

The 1996 Dickey-Wicker amendment (implemented during Bill Clinton's presidency) prohibited research involving the destruction of human embryos. President Bush then issued an executive order banning the use of federal funds to support research on ES



cell lines created after August 2001. ES cell lines created before August 2001 were still allowed to be funded by the federal government. Bush's executive order actually *relaxed* the restrictions called for by the Dickey-Wicker amendment. It should be highlighted that Bush's policy never declared the research illegal. President Obama, upon assuming the presidency in 2009, replaced Bush's policy with his own executive order, permitting increased incentives for embryo destruction and federal funding of the research.

Myth 6: **Therapeutic cloning and reproductive cloning are fundamentally different techniques.**

Both cloning techniques use the exact same series of technical steps to create a new, cloned embryo. The only difference is the fate of the newly-created embryo. The embryo will either be implanted into

a woman's uterus in an attempt to gestate to birth (reproductive cloning) or be destroyed for its stem cells (therapeutic cloning).

Myth 7: **Somatic cell nuclear transfer (SCNT) is different from cloning.**

"Somatic cell nuclear transfer" is simply a scientific term for the most popular method of cloning an organism.

Myth 8: **Somatic cell nuclear transfer can produce tissues or organs without having to create an embryo.**

Scientists are currently unable to bypass the creation of an embryo.

Myth 9: **Because cloning employs the use of a somatic (body) cell in order to create an embryo, all of our body cells have the potential to become human beings; thus, every somatic cell is a human life.**

Some bioethicists such as Julian Savulescu argue: "If all our cells could be persons, then we cannot appeal

to the fact that an embryo could be a person to justify the special treatment of it." The problem with this argument is that NO somatic cell can develop into an

embryo on its own. The ability to become an embryo does not come from *within* the somatic cell. The cell must be acted upon. In other words, the process of creating an embryo from a somatic cell requires deliberate human intervention. Without any degree of human tinkering, a somatic cell (such as a skin cell) will only give rise to more somatic cells (more skin cells). An embryo, on the other hand, is a self-directed entity, actively developing and maturing itself, eventually giving rise to an entire adult organism. Consequently, somatic cells are not analogous to embryos.

Myth 10: **Since frozen embryos will eventually be discarded, we may as well destroy them for their stem cells and get some good use out of them.**

The moral analysis of what we may permissibly do with an embryo doesn't depend on its otherwise "going to waste," nor on the incidental fact that those embryos are "trapped" in liquid nitrogen. Consider a radical case in which a group of children are permanently trapped in a schoolhouse through no fault of their own; that would not make it morally acceptable to send in a remote control robotic device which would harvest organs from those children and cause their demise.

Conclusion

In defense of vulnerable human life, knowledge is important. This publication has given you the basic information about stem cell science and ethics. But for sound policy that protects human life, and that funds responsible scientific research, every voice must be heard. Responsible policy protects human life and furthers worthy research. We encourage you to speak up in the defense of life, to your legislators, to your community leaders, to your news organizations, to your friends and family. Please speak up for those who have no voice.

ENDNOTES

1 Jacob M. Appel, "Are We Ready for a Market in Fetal Organs?", Huffington Post, March 17, 2009; www.huffingtonpost.com jacob-m-appel/are-we-ready-for-a-market_b_175900.html

2 Linda Giudice, Eileen Santa, and Robert Pool, eds., Assessing the Medical Risks of Human Oocyte Donation for Stem Cell Research (Washington, D.C.: National Academy of Sciences, 2007), 11. http://www.nap.edu/openbook.php?record_id=11832&page=11

FAMILY RESEARCH COUNCIL

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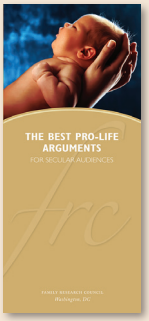
ADDITIONAL RESOURCES FROM FAMILY RESEARCH COUNCIL

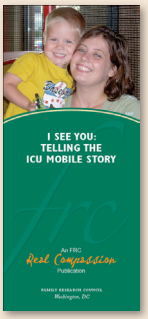


The Best Pro-Life Arguments for Secular Audiences

by Cathy Cleaver Ruse, Esq. and Rob Schwarzwalder

BC11E01

Abortion is unlike any other issue debated today. Millions of American women have aborted a child and the pain and emotional need to justify what was done is strong and deep which places an invisible thumb on the scale so that even the best logic will fail to persuade. Consequently, the most convincing case needs to be made in the language of the post-modern secularist.



I See You: Telling the ICU Mobile Story

by Robert G. Morrison **BC11H02**

Image Clear Ultrasound (ICU) is a wonderful pun: I See You. Thanks to the wonders of modern technology, expectant mothers often form that indissoluble bond with their child even before he or she is born. The ICU Mobile ministry travel into the heart of America's inner cities, even across the street from abortion facilities, extending the compassionate hands of pregnancy care centers. When a young woman is making life-changing decisions, she needs those helping hands.

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