

Embryonic Stem Cell Research

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Abstract

Stem cell treatment is a proven treatment for cancer, disease, and catastrophic injury. Scientists are discovering new techniques to harvest stem cells from embryo's and adult donors. The reality of each individual is based on their own perception of the world. Therefore each individual opinion is unique and based solely on their experiences. Embryonic stem cells provide life saving cures for many illnesses and injuries that currently are untreatable. Embryo's can be saved from in vitro procedures and used to give life versus being destroyed. Allowing this technology to continue is an ethical and moral dilemma society must face. This decision should not be based on the individual's reality but the needs of everyone.

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Douglas Adams once said that, “Everything you see or hear or experience in any way at all is specific to you. You create a universe by perceiving it, so everything in the universe you perceive is specific to you”.

Your reality is solely based on your own perception. Albert Einstein discussed the illusion of reality. Our schools and universities teach us to understand this very simple rule. What you perceive determines your own reality.

Too often we forget this when deciding if the actions of others are ethical or moral. We base our decisions on our own reality. Like everyone, our reality changes when we marry and have children. Our perceptions shift as our parents grow old, and pass away from known disease and illness. Some of us are faced with crippling injury to ourselves or our children. Each evolution of life brings on a new perception and a new reality.

Scientists and doctors have unleashed the miracle that is stem cell technology. The political environment has been blindsided by backlash from both sides of the debate. Embryonic stem cells are derived from human embryos. To harvest these stem cells, the scientist is required to destroy the embryo. This destruction saves lives. Neither side argues this fact. But ethically and morally the debate continues.

Embryonic stem cell research is neither right nor wrong. The reality is that only the individual can determine this. Only a mother, faced with the paralysis of her five year old child can determine if treating the injury with embryonic stem cells is moral and ethical. A mother who has healthy happy children should not force her own perception on the mother of the injured child. Her perception is uniquely different. Her reality has not evolved.

To understand stem cells we need to remember that research is critical to success. Understanding the process and the potential of these miracle cells is critical to understanding our own reality. When the decision to allow research is hinged solely on our own moral compass, we must stop ourselves from judging others and ask an important question. What if that happened to me?

Stem cells are unspecialized cells within the body that are used to replenish other cells. These cells have no distinguishable traits. Stem cells divide when necessary, and the second cell becomes the replacement cell for use throughout different regions within the body.

“Stem cells have the remarkable potential to develop into many different cell types in the body during early life and growth. In addition, in many tissues they serve as a sort of internal repair system, dividing essentially without limit to replenish other cells as long as the person or animal is still alive. When a stem cell divides, each new cell has the potential either to remain a stem cell or become another type of cell with a more specialized function, such as a muscle cell, a red blood cell, or a brain cell” (National Institutes of Health, 2010)

The study of stem cells began over 30 years ago. It wasn't until 1998 that the study of embryonic stem cells first began. These cells were developed using in vitro fertilization. This technique requires the fertilization of a human egg. At different stages of development, the embryo is destroyed to harvest the required stem cells.

Embryonic stem cells are the purist form of stem cells. They have no clear link to a human body. Like blood, stem cells require an exact match with the patient for use within their body. If the body does not match the stem cells, the body will treat the cells as foreign and attack and kill them with the bodies immune system. Embryonic stem cells have no clear link to

any human body. Therefore the patients body recognizes the cells and will use them versus destroy them.

Although the embryo is destroyed during the harvesting of stem cells, the act of creation is irrelevant to scientists. Hundreds of thousands of embryos can be cultured and harvested providing for significant life saving treatments to many patients. This act of saving a life offsets the argument that creating then destroying an embryo for medicinal use is unethical.

Geron, the leading embryonic stem cell manufacturer utilizes surplus embryo's from in vitro procedures. These embryo's will already be destroyed. Geron takes these surplus embryo's and utilizes their life energy to create treatments for saving lives or improving the lives of injured patients.

Stem cells have no souls. They are the beginning of life. They are a group of cells with no recognizable features. What the embryo holds inside is nothing short of a miracle. These cells hold the ability to give life, heal significant injuries, and cure diseases that waste away ourselves and our families.

In 2005 my cousin Teresa Corwin was diagnosed with Acute Myelogenous Leukemia. The treatment for such a life threatening cancer was to use chemotherapy to destroy the Leukemia. This treatment involves toxic doses of radiation. The side effects of chemotherapy is the total loss of the bodies immune system. Teresa found a stem cell donor in her sister Diann Blitsch.

The process of harvesting stem cells from a donor is painful and expensive. The donor is either given general anesthesia or regional anesthesia to numb the person from the waste down. A needle is then inserted into the pelvic bone to draw out bone marrow. This bone marrow is then used to extract stem cells for use in the cancer patient.

Nikki Corwin, Teresa's daughter is a registered nurse. Nikki explained the purpose of using stem cells in her mother's treatment. "They wipe out her immune system. They take stem cells from the donor by apheresis. Which is like a filtering process. Filtering out the stem cells. Then they give that unit of stem cells to the recipient so that the stem cells create into new cells that don't have cancer" (N. Corwin, personal communication, November 25, 2010).

Diann was an exact match for Teresa. This is often uncommon between siblings due to the differences in body chemistry based on variances from both parents. Teresa was fortunate to find a donor that could provide her with life saving stem cells.

Teresa's prognosis was death without a donor. The treatment for this form of leukemia requires the use of stem cells to recreate her body's immune system. Without this treatment, survival is impossible and life expectancy is months not years.

During the interview, Nikki confirmed that embryonic stem cells would in fact be a suitable treatment for a leukemia patient that does not have a donor. Patients without a donor at this time have no form of treatment and are faced with their own mortality. This evolution in life creates a new perception. This perception develops into a new reality. The reality may be that embryonic stem cell technology would be acceptable for a patient facing their own death.

Our discussion continued into the ethical and moral aspects of embryonic stem cell research. Nikki said, "I don't agree with people telling people to get pregnant and then we'll store it and use it for embryonic research" (N. Corwin, personal communication, November 25, 2010). She added throughout our conversation that left over stem cells from in vitro, scheduled to be destroyed, will be a suitable place to find donor stem cells.

When asked how she felt when the doctor's discovered they had located a suitable donor, Nikki said she felt, "Relieved! Thankful! Thankful they found a match in such a short time.

Some people, even with the millions of donors, still can't do it. Nobody matches!" (N. Corwin, personal communication, November 25, 2010). Nikki explained that the process of locating a donor requires research of the family history. In one case, a woman could not locate a donor because her research showed that one of her ancestors as African American.

The blood from Asian's, African's, Mexican's, and other ethnicities is different from Caucasian blood. Intermixing of these types often eliminates the ability to locate a suitable donor. Nikki explained, "There are not a whole lot of African's or Asian's that donate. That lady couldn't find a donor. So she died!" (N. Corwin, personal communication, November 25, 2010).

Nikki shared her feelings about the use of embryonic stem cells. She explained that using in vitro technology requires the creation of many embryos. Upon completion of the process, the embryos are destroyed. Donating these embryos for stem cell use is ethical in her opinion. She felt strongly that becoming pregnant or having a child just to harvest stem cells is in her opinion wrong. Nikki referenced the movie "My Sisters Keeper" when discussing this topic.

The movie is a heart breaking story of the tragedy faced by families whose child is suffering from Acute Myelogenous Leukemia. The parents, after learning their child has this form of leukemia, decide to have another child to harvest stem cells from the umbilical cord. This treatment worked, but later Kate relapses and further treatment is required.

When Anna was eleven, she files a lawsuit against her parents for medical emancipation. Kate now requires a kidney transplant, and the procedure would be life threatening for both children. Anna wins her case and does not have to donate her kidney to her sister.

Anna, the second child, is used as a donor for Kate throughout her life. The movie often flashes back in time to show a very young Anna being sedated or restrained during a procedure.

Documents are read during the court room scenes stating the dozens of procedures that have been required to continue treatment for Kate.

There are significant twists within the story that tell a remarkable tale of a family struggling with the loss of a child. Anna filed the lawsuit at the request of Kate. Kate believed she would die anyway and did not want to risk Anna's life.

Kate, who seemed incredibly mature for her age, kept a photo album of her life. Often, she would look at this book and remember the better times in her life. Her first kiss, and a formal dance she attended with another Leukemia patient. Unfortunately, the bad memories outnumbered the good memories.

The brilliance of this story underlines the fact that a families own evolution in reality is significantly effected by events that occur throughout life. Their own opinion of stem cell research would change dramatically based on these events. The simple act of deciding to create another life to cure an existing child is evidence of this change of heart.

The heartbreaking reality of this movie is the absolute torture these people endured in the effort to save a remarkable child. This remarkable story would not have existed if embryonic stem cell research was used to treat the illness. Research that would evolve and grow and provide new ways to treat diseases that are too common in todays medical world.

Although embryonic stem cells are a known source to treat patients, research is underway in locating alternative sources. Scientists are using new techniques to locate and extract stem cells from patients themselves to use in their own treatment. These are called human stem cells.

“Hundreds of clinical trials using stem cells aim to find cures for conditions ranging from cancer to arthritis and genetic disorders to multiple sclerosis. Government and private industry are investing billions of dollars in pursuit of medical breakthroughs. While embryonic stem cells

seem to attract the most media attention, the truth is there's only a single human embryonic stem cell clinical trial recently approved by the Food and Drug Administration (FDA). That's why the soonest breakthroughs won't come from embryonic stem cells, but rather advances in adult stem cell technology" (Geehr, 2010).

Dr. Geehr writes, "Embryonic stem cells are derived from human embryos. However, adult stem cells can be obtained from many tissues, including bone marrow, circulating blood, fat tissue, lining of the nose, and umbilical cord. Recent reports describe the conversion of skin cells to an embryonic-like stem cell state through genetic reprogramming, suggesting the potential for an almost unlimited source of embryonic-like cells in the future".

Adult stem cell research began with bone marrow transplants. This research has led to innovations in the locating and development of human stem cells. But in most cases, the host patient is undergoing some form of treatment that does not allow them to use their own cells. In the story of Diann and Teresa, only a perfect match could be used to extract stem cells. Teresa was unable to provide the cells from her own body.

When an exact match is unavailable, embryonic stem cells become the logical choice for treatment. The body will not reject these cells and every patient is able to receive the same life saving treatment regardless of their ability to use a donor.

Equally important is the time frame involved with harvesting and converting adult stem cells. A patient with a disease that allows time to develop a treatment may benefit from adult stem cells. A patient with a spinal injury requires immediate attention and cannot wait for stem cells to be derived from their own tissues.

Testing of stem cells in a spinal patient has recently been approved on a human patient. Researchers injected thousands of embryonic stem cells into a recently injured patient in hopes to

heal the injured spinal column. These tests have been performed on lab animals with positive results. “In preclinical studies, GRNOPC1, when injected into the injury site of spinal cord-injured animals, migrate throughout the lesion site and mature into functional oligodendrocytes that remyelinate axons and produce neurotrophic factors (*Stem Cells and Development*, Vol. 15, 2006), resulting in improved locomotion in the treated animals” (Geron, 2010).

For Geron, “The ultimate goal for the use of GRNOPC1 in man is to achieve spinal cord repair by injecting these cells directly into the spinal cord lesion”. This treatment is the first proactive treatment that repairs the damage caused from injuries to the spine. Thousands of patients a year suffer from spinal injuries that are irreversible using today’s medical treatments.

Spinal repair is just one area that benefits from embryonic stem cell treatment. But embryonic stem cells are not the only solution. There are proven techniques that can limit the need for mass creation of embryos to treat patients. One such technique begins at child birth.

Umbilical cord cells are currently being banked by private and public systems. These cords have large amounts of stem cells, and storing these cords for further testing may be a future source for providing treatment against dozens of illnesses.

Other stem cell researchers have found that a person’s own skin can be turned into blood. “Researchers say their new method can create enough blood for a transfusion from a four by three centimeter (1.6 by 1.2 inch) patch of adult human skin” (Breitbart, 2010). Patients who receive chemotherapy will benefit from this treatment by generating genetically matched blood for transfusion. This allows them to withstand longer treatment periods.

A key area affected by this treatment is leukemia patients. If a patient is capable of generating their own cells for bone marrow transplant, an exact match donor is not necessary. This is a major breakthrough in treatment that benefits the patient and families.

Unfortunately, the research is not complete and many patients must face death. Clinical trials for using a patients skin to create stem cells is years away. Embryonic stem cells are available now. Researching both techniques can move the process forward and begin to save lives today. The reality is that we have the technology that will save lives. Embryos that exist and are destroyed upon completion of the in vitro process are available. Funding and support must gain momentum. This requires a change in the moral opinion of the public and government.

Regardless of the approach, stem cells save lives. This fact is important in determining the ethical decision to allow stem cell research to continue. The research takes years to complete and we as individuals must realize the benefit of stem cell research now. If we do not allow the research to continue, we eliminate our own treatment in the future.

Research is an on-going process of learning new ways to treat existing illnesses and injuries. Embryonic stem cell research is the just the beginning. One day scientists may develop more robust techniques for harvesting stem cells that do not require embryos. But learning what these cells can do today will lead to new breakthroughs for tomorrow and for years to come.

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