

Embryonic Stem Cells:

Do my thoughts reflect those of Christ and his Church?

ADULT STEM CELLS VERSUS EMBRYONIC STEM CELLS:

Classifications of stem cells include two types: those from embryo sources (embryonic stem cells, [ESCs]) and those from other sources (adult stem cells [ASCs] or somatic stem cells).

There are three basic properties of stem cells:

1. These cells can divide and renew themselves for long periods.
2. These cells are not differentiated into specialized cells.
3. These cells can become specialized cell types.¹

Adult stem cells are derived from non-embryonic origins. Origins include bone marrow, peripheral blood, cord blood, placental cells, and amniotic fluid. In fact, the Stem Cell Institute uses only adult stem cells (ASCs) derived from bone marrow from each patient because it is a good source of CD-34+ stem cell.² Adult stem cells are thought to be capable of facilitating all the body's natural repair processes. Since the production of adult stem cells does not require the destruction of an embryo, these cells are not associated with any ethical or political controversy. Readily obtainable, these cells have been used for many years for therapeutic purposes.²

Embryonic stem cells, however are taken from a clump of cells formed after fertilization, which is called the inner cell mass (ICM). A technician extracts cells from a five-day-old living human embryo using a procedure that kills the tiny body forming. If the cells of the ICM are harvested and grown in appropriate culture conditions, they will replicate indefinitely and, when suitably stimulated, will differentiate into three germ layers: ectoderm, mesoderm, and endoderm—representing any cell lineage of the body. This potential to differentiate is called plasticity or pluripotency:

Given their high degree of plasticity, however, embryonic stem cells not only have the capacity of becoming beneficial tissues; they can also differentiate into cancerous cells. While it has recently been reported that these cells can be derived from sources other than embryos, there is broad consensus that much more research is required before human therapies based on embryonic stem cells can be safely pursued.¹

There are currently no approved treatments or human trials using embryonic stem cells.¹

¹Rodgerson, Denis, PhD, Ron Rothenberg, MD, and Wayne Marasco, MD. "Adult Stem Cells." *LifeExtension.com*. N.p., Oct. 2007. Web. Oct. 2015.

²"Sources of Adult Stem Cells." *Stem Cell Institute*. N.p., Oct. 2015. Web. Oct. 2015. <<https://www.cellmedicine.com/>>.

ARE THERE ETHICAL ISSUES INVOLVING THESE TYPES OF STEM CELL THERAPY?

Adult stem cells are not encompassed by the controversy surrounding fetal and embryonic stem cells. The Catholic Church has issued papers that actually encourage research and the use of adult stem cells in the treatment of human disease, as an ethically acceptable alternative to the use of the fetal and embryonic stem cells.³

WHY NOT ONLY USE ADULT STEM CELLS INSTEAD?

A recent announcement in two scientific journals showed advancements in stem cell research. Professor Shinya Yamanaka from Japan and Dr. James Thomson of Wisconsin, both found a new method of obtaining embryonic stem cells. They were able to reprogram ordinary adult skin cells to create "induced pluripotent stem cells" which are the equivalent of embryonic stem cells. Dr. Thomson, who first discovered stem cells and pioneered subsequent research, stated that these cells "meet the defining criteria for pluripotent human embryonic stem cells." The method that both he and Professor Yamanaka developed is efficient and cost effective. The skin cells used are those of the patient himself, and therefore these new pluripotent cells, re-implanted in this original body will not be rejected – for they are the same DNA as the patient's. This eliminates the tissue rejection problem.

This also eliminates the moral question of killing five-day-old embryos to obtain these cells. An initial criticism was that the cells used to date have been fetal skin cells. This problem has been eliminated by currently using adult skin cells.⁴

WEBSITES FOR ADDITIONAL INFORMATION:

info@lifeissues.org

<http://www.the-stem-cell-institute.com>

³"Catholic Support for Ethically Acceptable Stem Cell Research." *Catholic Support for Ethically Acceptable Stem Cell Research*. N.p., n.d. Web. Oct. 2015. <<http://www.usccb.org/issues-and-action/human-life-and-dignity/stem-cell-research/catholic-support-for-ethically-acceptable-stem-cell-research.cfm>>.

⁴Willke, John C. "The Stem Cell Argument Is Over." *Life Issues*. N.p., 25 Mar. 2015. Web. Oct. 2015. <<http://www.lifeissues.org/2008/04/stem-cell-argument/>>.

Embryonic Stem Cells:

Do my thoughts reflect those of Christ and his Church?

THE CHURCH TEACHING ON HUMAN EMBRYONIC STEM CELL (hESC):

- ❖ Embryonic life is human life.
- ❖ Human embryonic stem cell (hESC) research can never be justified because it involves intentional destruction of human embryos.
- ❖ It is never justifiable to use an evil means (killing human embryos) to achieve a good end (saving others' lives).

WHAT DOES THE CHURCH PROMOTE IN THIS LIFE ISSUE?

- ❖ The Church promotes respect for all human life from conception to natural death.

Catechism of the Catholic Church (CCC) Points of reference

2274, 2275, 2293, 2294, 2295

ETHICAL ISSUES AND CONCERNS:

1. Because ESC has been the subject of past research, some scientists justify its continued usage as a control factor for comparison with future research results. Is this comparison necessary?
2. Some scientists posit that ESC has the capacity to heal diseases such as diabetes and Parkinson's. To date, such claims have not been proven true.
3. Through IVF, there are storage facilities holding unclaimed, fertilized human eggs. Is it ethical to eliminate these lives in the interest of scientific research in order to further advance science?
4. If we have proven healing from the use of adult stem cells (ASC), why do we need to continue to investigate the healing capacities of ESC?
5. Should we ask who is human when we judge the moral status of the embryo from its age?

Research continues, and so does the clamor for the use of your tax monies to fund hESC. As a Catholic, are you bound to get involved and give a voice to these human beings by speaking on their behalf?

DID YOU KNOW?

- Stem cells are progenitor (parent) cells, capable of regeneration and differentiation into a wide range of specialized cell types. Once injected, stem cells follow inflammatory signals from damaged tissues and have multiple ways of repairing these damaged areas.¹
- Adult stem cells are generated into embryonic-like stem cells (induced pluripotent stem cells) with the same capacity for use as the human embryonic stem cells (hESC).
- To produce human embryonic stem cells, a technician must extract cells from a five-day-old living human embryo (blastocyst), a procedure that kills the tiny body forming.

DEFINITION OF TERMS:

ASC – adult stem cell

ESC – embryonic stem cell (same as hESC – human)

Induced pluripotent stem cells - (iPSC)– derived from skin or blood cells that have been reprogrammed back into an embryonic-like pluripotent state²

IVF - in-vitro fertilization

Mesenchymal (mesenchyme) – loosely organized, undifferentiated, mostly mesodermal cells that give rise to such structures as connective tissues, blood, lymphatics, bone, and cartilage³

Pluripotent- capable of differentiating into one of many cell types in the body³

Stem cells - a simple cell in the body that is able to develop into any one of various kinds of cells

Stem cell line - a group of identical stem cells that is grown and nurtured in a lab dish. A line originates with either a single induced pluripotent stem cell or from the cells of a five-day-old blastocyst—and all resulting cells in the line are replicates of the original cells.⁴

¹"FAQ." *Stemwell: Regenerative Medicine*. N.p., n.d. Web. Oct. 2015. <<http://stemwell.co/en/faq/>>.

²"Induced Pluripotent Stem Cells (iPS)." *UCLA Eli & Edythe Broad Center of Regenerative Medicine & Stemcell Research*. N.p., n.d. Web. Oct. 2015. <<https://stemcell.ucla.edu/induced-pluripotent-stem-cells/>>.

³"Dictionary: Search the Merriam-Webster Dictionary First. Here's Why..." *Merriam-Webster*. Merriam-Webster, n.d. Web. Oct. 2015. <<http://www.merriam-webster.com/dictionary/>>.

⁴"Stem Cell Line." *Wikipedia*. Wikimedia Foundation, n.d. Web. Oct. 2015. <https://en.wikipedia.org/wiki/Stem_cell_line>.