and manipulation of human embryos on the part of those producing or supplying them. [7]

Embryonic stem cell research on existing stem cell lines is also immoral because the embryos never consented to the research. Even if the parents consented to the research, such consent would be gravely immoral because the research does not benefit the child but, on the contrary, kills the child. The Catechism teaches:

Experimentation on human beings is not morally legitimate if it exposes the subject's life or physical and psychological integrity to disproportionate or avoidable risks. Experimentation on human beings does not conform to the dignity of the person if it takes place without the informed consent of the subject or those who legitimately speak for him (no. 2295).

Parents who consent to embryonic stem cell research on their children do not legitimately speak for their children because such consent kills the child. While parents under ordinary circumstances legitimately speak for their children, they fail to do so when they consent to homicide.

Moreover, embryonic stem cell research on existing stem cell lines is immoral because it is contrary to the dignity owed to the bodies of the deceased:

The bodies of the dead must be treated with respect and charity, in faith and hope of the Resurrection. The burial of the dead is a corporal work of mercy; it honors the children of God, who are temples of the Holy Spirit (Catechism, no. 2300).

And further: The corpses of human embryos and fetuses, whether they have been deliberately aborted or not, must be respected just as the remains of other human beings. . . . Furthermore, the moral requirements must be safeguarded that there be no complicity in deliberate abortion and that the risk of scandal be avoided. Also, in the case of dead fetuses, as for the corpses of adult persons, all commercial trafficking must be considered illicit and should be prohibited. [8]

### By Their Fruits You Will Know Them

Embryonic stem cell research is a poisonous fruit of in vitro fertilization. The Church teaches that in vitro fertilization, even when the donors of the sperm and the egg are married, "is in itself illicit and in opposition to the dignity of procreation and of the conjugal union, even when everything is done to avoid the death of the human embryo." [9]

In vitro fertilization is gravely immoral because it destroys "the inseparable connection, willed by God and unable to be broken by man on his own initiative, between the two meanings of the conjugal act: the unitive meaning and the procreative meaning." [10] Contraception is always immoral because it excludes the conjugal act's procreative intention. In vitro fertilization is always immoral because it excludes the conjugal act's conjugal relation.

In vitro fertilization, moreover, is ordinarily attended by the grave moral evil of masturbation.

In conclusion, embryonic stem cell research is gravely immoral because it necessarily involves the killing of an innocent human being. Adult stem cell research is already helping patients who suffer from nearly two dozen conditions. The former should be shunned and the latter pursued, to the glory of God.



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# The Church's Teaching on Embryonic Stem Cell Research

**ISSUE: What are stem cells? What does the Church teach about embryonic stem cell research?**

RESPONSE: Stem cells are the building blocks of human tissues. The Church teaches that the intentional destruction of human embryos, which is necessary for embryonic stem cell research, is gravely immoral (cf. Catechism, no. 2274-75).

DISCUSSION: Stem cells have two characteristics that make them stem cells. First, they can reproduce without becoming differentiated (specialized). Examples of differentiated cells are nerve, muscle, and blood cells. Second, stem cells can produce other cells, called progenitor cells, which can eventually spawn highly differentiated cells. In other words, a stem cell can produce a cell that can become the "ancestor" of a lineage of cells that produce muscle or blood cells. The progenitor cells and the lineages of cells they produce are together called stem cell lines.

Stem cells can be extracted from living human embryos or from the tissues of those who have been born, including the tissues of a mother's placenta. The former type of extraction for the purposes of research is called embryonic stem cell research; the latter, adult stem cell research.

Embryonic stem cell research involves several stages:

- First, embryos are obtained for experimentation, either by being deliberately brought to life for this purpose or by using already living embryos. In either case, these embryos have been brought to life through in vitro fertilization—the fertilization of an egg by a sperm outside the human body — and may have been frozen for some time.

- Second, the fertilized eggs divide and develop from one cell to blastocysts of at least 32 cells. Ordinarily, the development of a human being from his or her first stage of life (as a fertilized egg) to the blastocyst stage occurs during the first four or five days of life.
- Third, the embryoblast, or inner cell mass, of the blastocyst is removed by the researcher. This removal of the embryoblast kills the embryo.
- Fourth, the embryoblast is placed on irradiated mouse cells; here the human cells are cultured and multiply.
- Fifth, human cell lines are harvested; these cell lines eventually differentiate into nerve, blood, and other cell lines.

Stem cells can be classified as totipotent, pluripotent, or multipotent stem cells. Totipotent stem cells can differentiate into all of the various stem cell lines. Pluripotent stem cells have the capacity to differentiate into most human tissues. Embryonic stem cells obtained from embryoblasts are pluripotent. Multipotent stem cells can differentiate into more specialized stem cell lines. Adult blood stem cells, for example, can become red or white blood cells, or platelets. Recently, pluripotent adult stem cells have been discovered in the brain, bone marrow, umbilical cord blood, and in other organs. The distinction among the types of stem cells is important because multipotent cells are the least versatile of the three and can potentially treat the fewest number of diseases.

## The Promise of Stem Cell Research

Stem cells, according to scientific consensus, hold promise for restoring the tissues of people who suffer from Alzheimer's or Parkinson's disease, diabetes, and other debilitating illnesses. For example, insulin-producing cells developed from stem cells could cure some forms of diabetes. Nerve cells developed from stem cells could mitigate the effects of paralysis from spinal injuries.

Currently, a majority (but not a consensus) of scientists believes that embryonic stem cells hold more promise than adult stem cells for the treatment of such conditions. Embryonic stem cells exist in greater quantities and multiply more rapidly than adult stem cells.

However, the much-touted promise of embryonic stem cell research is not yet a reality—embryonic stem cells have yet to help a single human patient. "There is no evidence of therapeutic benefit from embryonic stem cells," according to Marcus Grompe, M.D., Ph.D., of the department of molecular and medical genetics of Oregon Health Sciences University. [1] Dr. Bert Vogelstein, professor of oncology and pathology at Johns Hopkins University, states that the promise of embryonic stem cell research is "conjectural." [2]

Adult stem cells, in contrast, are currently being used to help patients who suffer from the following conditions: (1) cancer, including brain tumors, retinoblastoma, ovarian cancer, solid tumors, testicular cancer, multiple myeloma and leukemias, breast cancer, neuroblastoma, non-Hodgkin's lymphoma, and renal cell carcinoma; (2) autoimmune diseases, including multiple sclerosis, systemic lupus erythematosis, juvenile rheumatoid arthritis, and rheumatoid arthritis; (3) stroke; (4) immunodeficiencies; (5) anemias; (6) cartilage and bone diseases; (7) corneal scarring; (8) blood and liver disease; (9) gene therapy; and (10) heart damage. [3]

Advances in biology have proven that a new human being exists with his or her own well-defined genetic identity at the moment of fertilization. From that point forward, the individual will develop gradually and continuously into a mature human being.

At the moment the human person begins to exist, he has a right to life (Catechism, no. 2270). Every medical intervention on a human embryo that does not seek to benefit that particular human being is morally illicit. [4]

For these reasons, the Church teaches that the removal of the inner cell mass of the blastocyst, which kills a human being in his embryonic stage, is a gravely immoral act, whether the embryo was brought to life for this specific purpose or whether the embryo already exists. [5]

No intention, however good, can justify the killing of an innocent human being. Even if human embryonic stem cell research could one day provide relief for those who suffer from debilitating illnesses, the killing of one human embryo for this purpose could never be justified. [6]

Suppose, however, a researcher were not directly involved in the killing of the embryos. Could his participation in embryonic stem cell research be justified?

If his cooperation were formal, the answer is clearly no. Formal cooperation is the willing or intentional cooperation in an act committed by the principal agent (doer) of the act. Formal cooperation in an evil, like embryonic stem cell research, is always immoral—much as the accomplice in a bank robbery who does not rob the bank but drives the getaway car commits an immoral act.

If a researcher does not approve of the gravely immoral acts by which embryonic stem cells are produced, and intends to conduct research on already existing embryonic stem cell lines for the benefit of humanity, would his cooperation be morally permissible?

The bishops of the United States and the Pontifical Academy for Life say no. The Pontifical Academy believes such acts constitute proximate material cooperation in the evils of in vitro fertilization and the killing of embryos:

Is it morally licit to use ES [embryonic stem] cells, and the differentiated cells obtained from them, which are supplied by other researchers or are commercially obtainable? The answer is negative, since prescinding from the participation—formal or otherwise — in the morally illicit intention of the principal agent, the case in question entails a proximate material cooperation in the production