

### I. The Basic Science and Current Context

Stem cells, or "master cells," are cells in the human body that have not yet differentiated into a particular type of tissue. As such, they seem to have the potential to become any type of tissue (though not a complete human organism). Each cell of an individual's body contains the same genetic information; that is, each cell (other than egg or sperm cells) has the complete DNA code required to become any type of cell in the body. However, through a complex and not-yet-understood mechanism, only certain parts of that genetic information are "switched on" or expressed in a given cell. This "switching" on or off of genes is what differentiates the cell into a certain kind of tissue. Stem cells are those in which the switching mechanism has not yet been initiated. Researchers hope to discover how to control this switching mechanism and reliably develop stem cells into various types of body tissue, which can then be used to repair damaged tissue and cure some kinds of disease and organic injuries. Stem cells, it is hoped, could be switched on to create the tissues in the heart, kidneys, spinal cord, brain, and other parts of the body. Thus there is speculation that Parkinson's disease, Alzheimer's disease, diabetes, heart damage, kidney failure, and other chronic and acute conditions may be treatable through stem cell injections. Researching stem cells may also lead to better understanding of human development and the causes of cancer, birth defects, and other abnormalities. There is also discussion of using stem cells in pharmaceutical testing. Realistically, most researchers and commentators agree, such discoveries and therapies are probably decades away.

Stem cells can be derived from a variety of tissues. Research has shown that placental tissue, umbilical cord blood, neural (nerve) tissue, bone marrow, skin cells, and body fat cells are among the sources of stem cells. These sources, and thus research using these sources, are not ethically objectionable, as long as other necessary moral requirements are met (for instance, the necessity for informed consent, demonstrated safety in research protocols, equal access to benefits, etc.).

However, the most controversial source of stem cells is the human embryo. Stem cells can be extracted from the embryo (termed at this stage a "blastocyst" and consisting of several hundred cells) late in the first week after fertilization. This extraction destroys the embryo and thus ends a human life. The stem cells are cultured in a Petri dish where they divide indefinitely. This is a very recent development in biomedical science, accomplished only in late 1998.

Some researchers claim that these embryonic stem cells are more flexible or "plastic" - that is, able to differentiate more easily in the various kinds of tissue desired. This claim has not been

substantiated. However, supporters insist that only by researching both adult and embryonic sources of stem cells can we be certain that adult sources are adequate. Supporters of adult sources, on the other hand, point out that adult stem cells can be derived directly from the very individual under treatment, and thus concerns about cellular rejection and incompatibility of tissue are avoided.

To date, no therapies have been successfully developed using embryonic stem cells. However, there are several successful therapies using adult stem cells, primarily hemopoietic cells (blood-producing cells found in bone marrow). These adult-stem-cell therapies use stem cells from a particular organ to treat that particular organ in turn; for instance, kidney stem cells can be extracted, cultured, and reintroduced into the kidney, where they will begin to repair the damaged kidney tissues. There is promising research, however, suggesting that adult stem cells can be reprogrammed into different types of tissue - for instance, body fat cells could be directed to act like nerve tissue. This research is ongoing and in quite early stages. Initially, embryonic stem cells were usually obtained from frozen embryos created in the process of *in vitro*

fertilization (IVF) but not implanted due to either previous success in achieving a desired pregnancy or the decision not to pursue IVF further. These so-called "spare" embryos are usually destroyed when they are not needed (directly, by thawing them and allowing them to die, or indirectly, by keeping them frozen indefinitely, during which time they die). Thus, some claim that using these embryos makes sense because they will die anyway; their use as sources of stem cells would allow their existence to make a positive contribution to the human community. This argument will be critiqued below. (More recent discussion has focused on the possibility of cloning embryos to create a source for stem cells; this is addressed in the accompanying fact sheet, "A Brief Ethical Primer on Cloning".)

As there are no successful therapies using embryonic stem cells, claims that prohibiting or limiting embryonic stem cell research will deprive those suffering from disease and disability of an opportunity for health, or "condemn them to an early death," are exaggerated and unsubstantiated. Such claims appeal to emotion rather than facts in attempting to sway public opinion and obtain research dollars.

## **II. President Bush's Decision on Stem Cell Research Funding and Current Law**

On August 9, 2001, President Bush announced his decision to allow federal funding for stem cell research only when the research uses existing stem cell lines. He desired to prevent tax dollars from paying for the further destruction of human life. In this, it was a laudable and arguably pro-life position. The decision received a broad range of reaction from religious and political leaders and pro-life organizations, from unalloyed praise to reserved caution to

disappointment to condemnation. Many advocates of embryonic stem cell research in Congress and in the scientific community were disappointed with the limits Bush placed on the research, pledging legislative action to broaden funding. They claim that the existing 64 stem cell lines in fact number only perhaps a dozen usable lines, which are insufficiently diverse genetically to allow research to progress. The President in turn pledged to veto any legislation contrary to his decision, even if there are significant breakthroughs with the existing lines or in private research. This matter was overshadowed by the terrorist attacks on the U.S. the following month.

There are some ongoing legal difficulties about ownership of the cell lines and degree of access that other research institutes would have to these lines. It was further pointed out that most or all of the existing lines may be subject to existing federal guidelines on xenotransplants (tissues used in human subjects that are derived from other species) since these lines were cultured using mouse embryos as "feeders" to release some unknown biochemical substances that foster the development of the human stem cells. This combination of species raises the threat of "retroviruses" - infections introduced into the human community through this mixing of cellular materials from other animal species.

Bush's decision also has some negative ethical implications, of course. Private sources can still fund the destruction of life; allowing some research to continue will likely foster the call for less restrictions and spur private laboratories to continue embryo destruction, especially in light of technical and legal difficulties related to the existing stem cell lines; and there is a question about the moral proximity to the deliberate destruction of life even in research that uses existing stem cell lines and does not directly destroy more embryos.

Research on stem cells in private labs remains legal at this time. Since 1996, Congress has prohibited federal funding of research that destroys an embryo. However, the Clinton administration interpreted this law to allow funding for studies on cells that had been extracted already in private clinics. Current legislation places no restrictions on funding for research on adult sources for stem cells; President Bush has pledged some \$250 million for this research.

Bush also appointed a new bioethics commission (succeeding the previous Clinton-era National Bioethics Advisory Commission) to continue to advise him on these and other bioethical issues. The chair of this new commission is Doctor Leon Kass, a Jewish physician and moral philosopher. Kass has long advocated against cloning, IVF, physician-assisted suicide, and the false promises of biomedical technology.

### **III. Catholic Moral Theology and Stem Cell Research**

The Catholic Church does not oppose stem cell research in general. Such research does hold promise for curing human maladies and improving the functioning and quality of life for many. However, while our faith would accept the use of adult-sourced stem cells, we do oppose the destruction of innocent life, as has occurred in procuring the existing stem cell lines. The moral issues involved with the use of stem cell lines that began with the death of embryos are discussed below.

### ***Donum Vitae* and the Destruction of Embryos**

On February 22, 1987, the Congregation for the Doctrine of the Faith published the most detailed Magisterial teaching on this area in *Donum vitae*, its "Instruction on Respect for Human Life in its Origin and on the Dignity of Procreation."

*Donum vitae*

covers many areas of artificial reproductive technologies and experimentation upon the human embryo. Several teachings in

*Donum vitae*

are relevant to the issue of stem cell research.

The document asserts that "the human being must be respected - as a person - from the very first instance of his existence." This is a nuanced statement. The Church continues to hold that a new and unique human life begins at fertilization; only time and the proper conditions are required for the innate, self-directed capacities of this human being to come to fulfillment. While the moment when human life begins continues to be popularly debated, it is clear that biological science supports the Church's claim: once fertilization has occurred, a new genetic identity comes into being and guides its own development, using materials in its environment. It is this very fact that underlies the possibilities of cloning, IVF, and in fact of stem cell research itself.

*Donum vitae* explicitly addresses the question of "personhood," especially relevant in the context of discussing the moral status and rights of the embryo. The Church relies upon an understanding of the human person (based both on Scripture and on reasoning about human experience) as a composite of body and soul. The body constitutes the material, physical aspect of the person; the soul constitutes the immaterial, non-physical, spiritual aspect of the person. Neither the body alone nor the soul alone is the human person; it is the composite of both that makes us human persons. The soul is the principle of life, that which "informs" (or provides the form for) the matter of the body.

Because the soul is not a physical entity, no observations - no matter how scientifically sophisticated - will ever directly reveal the presence of the soul. We know the soul's presence by its effects. And, the effects observed upon the moment of fertilization suggest to human reason that there is in fact a personal presence from that moment. *Donum vitae* states: "The Magisterium has not expressly committed itself to an affirmation of a philosophical nature." however, it goes on to reaffirm the teaching that the zygote, from the first moment of its existence, must be given the unconditional respect that is due to the human person. In other words, even if we could never be scientifically certain that an embryo is a person, we must act as though it is. At the same time, it should be noted that the Church's positions on abortion, freezing embryos, destroying embryos in research, etc., do not in fact depend on ascribing personhood to the embryo.

*Donum vitae* also teaches that the only interventions upon the human embryo that are morally acceptable are those which are undertaken for directly therapeutic purposes: that is, to benefit this particular embryo without undue risk of harm. Even more relevant to the issue of stem cell research are the following statements (from *Donum vitae* I, 4):

- Medical research must refrain from operations on live embryos, unless there is a moral certainty of not causing harm to the life or integrity of the unborn child and the mother, and on condition that the parents have given their free and informed consent to the procedure.
- If the embryos are living, whether viable or not, they must be respected just like any other human person; experimentation on embryos which is not directly therapeutic is illicit.
- No objective, even though noble in itself, such as a foreseeable advantage to science, to other human beings, or to society, can in any way justify experimentation on living human embryos or fetuses, whether viable or not, either inside or outside the mother's womb.
- The practice of keeping alive human embryos *in vivo* or *in vitro* for experimental or commercial purposes is totally opposed to human dignity.

The next section of *Donum vitae* explores the question of using embryos obtained by IVF in research. First, the document notes that it is immoral to produce human embryos simply as disposable biological material. However, it also addresses the precise issue in current stem cell research:

- It is a duty to condemn the particular gravity of the voluntary destruction of human embryos obtained *in vitro* for the sole purpose of research É It is not in conformity with the moral law deliberately to expose to death human embryos obtained *in vitro*.
- . In consequence of the fact that they have been produced *in vitro*

, those embryos which are not transferred into the body of the mother and are called "spare" are exposed to an absurd fate, with no possibility of their being offered safe means of survival.

The substance of this teaching is repeated in Pope John Paul II's encyclical letter *Evangelium vitae* (March 25, 1995; n. 14). Thus it is clear that for the Catholic tradition, the destruction of embryos for whatever purpose is never morally justified. Even if the prospects for such research to benefit others were certain, it would still be wrong to directly destroy innocent life, for the end does not justify the means; we may not do evil that good may come of it (see Romans 3:8). It is this necessary destruction of human life to obtain embryonic stem cells that grounds the Church's objection to the research.

### **Secondary Related Issues**

Bush's decision does not reach into the private sector, where the destruction of human lives continues. Further legislative action would be necessary to prevent this destruction, making it criminal. The logic behind this move would threaten existing laws permitting abortion, making it unlikely to occur in the current political climate.

The decision also does not touch the issue of fertility clinics, at present a vastly profitable, unregulated, and rapidly growing industry in the U.S. and elsewhere. The Church opposes IVF in main part because of its violation of the integrity and meaning of human sexuality, but also in part because of the cavalier and regular destruction of human embryonic life as part of its process. The very existence of "spare embryos" is a sign of moral crisis.

### **May One Use Therapies Derived from Embryonic Stem Cells?**

Perhaps the most thorny issue that arises from Bush's decision is that of moral complicity in evil, as Bishop Joseph Fiorenza (chair of the USCCB) stated after Bush's press conference. Even though no more embryos would be destroyed under this policy, the research that will be conducted on existing stem cell lines will use cells derived from embryos destroyed precisely for this purpose. Is this morally licit?

As apparent analogy might be drawn (as President Bush has done) between using these stem cells and the use of vaccines that were originally derived from aborted fetuses. In both situations, the destruction of life has already taken place; the use of the tissue does not cause

the loss of a life. However, there seems to be a fundamental difference: with the vaccine, the death of the child was caused for some other reason (the mother's reason to choose abortion), not specifically to obtain tissue to develop the vaccine. However, in the use of stem cells, the death of the child was caused precisely to obtain these cells. Thus there is a degree of cooperation in evil that seems unacceptable, as explained below.

For one opposed to the destruction of innocent life, accepting a therapy using stem cells derived from the death of an embryo would not be *formal* cooperation, since one does not approve of the evil. It would not be *mediate material* cooperation, since the recipient of the therapy is not directly involved in the destruction of the embryo; he or she does not provide actual assistance, funding, expertise, or other necessary elements to bring about the evil action. Thus accepting such a therapy would be *mediate material* cooperation. However, the justification of mediate material cooperation depends on two factors: the gravity of the need for cooperation, and the proximity of causality. To accept such a therapy would demand a serious and legitimate medical need that could not be met in some alternative, morally acceptable way. Further, the causal distance between the destruction of life and the use of the therapy may not be sufficient, since the reason for the embryo's death was precisely to create the therapy. No matter how much time has passed or how many cellular divisions have taken place, the cell culture is ethically "tainted" by its origins in the deliberate destruction of life to harvest those cells. *im*

The Church's teachings on this specific matter will no doubt continue to develop, as will theological reflection. This fact sheet is not intended to represent the final word on these complex issues, but to foster further reflection and discussion.