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An Ethical Discussion About Embryonic Stem Cell Research

In the late 1980's, America laughed at comedian Martin Short's humorous interpretations of the aging actress Katherine Hepburn, with her quivering voice and stunted jerky movements. The Western world understood-- Ms. Hepburn was afflicted with Parkinson's disease, and since Parkinson's disease was a disease of the elderly, the laughter, though irreverent, was somehow acceptable. A few years later, however, when a popular young actor, Michael J. Fox, revealed that he was a victim of the same devastating disease, no-one was laughing.

This is one of the many examples that makes stem cell research such a vital issue for the focus of scientists today. Aside from their established use in the treatment of certain types of cancer and leukemia, researchers have hypothesized that stem cells may become the foundation for treating such conditions as type I diabetes, Alzheimer's disease, heart disease, and some birth defects (Stem Cells: A Primer NIH). The discovery of a regenerative capacity in the adult central nervous system indicates that it may eventually be possible, through the use of stem cells, to repair damage from degenerative diseases, such as Parkinson's disease, and amyotrophic lateral sclerosis or ALS, commonly known as Lou Gehrig's disease. Research on stem cells in nervous system disorders is one of the few areas in which there is evidence that cell-replacement therapy can restore lost function, bringing new hope to victims of brain and spinal cord injuries. Other areas being explored by stem cell researchers include autoimmune diseases such as rheumatoid arthritis, and systemic lupus erythematosus, two conditions that result from the formation of antibodies that attack the cells or tissues of an individual's own body.

Stem cell research, with all its promise, potential and possibilities, is not without controversy, and has become the subject of some rather heated discussions in the scientific, political, religious, and philosophical communities. In order to examine these concerns, it is necessary to understand some of the essential facts and issues surrounding stem cells.

Stem cells have two important characteristics that distinguish them from other types of cells. First, they are unspecialized, or 'blank' cells that renew themselves for long periods of time, through cell division. The second important feature of stem cells is that, under certain physiologic or experimental conditions, they can be induced to become specialized cells, or cells with special functions such as the beating cells of the heart's muscle or the insulin-producing cells of the pancreas. There are primarily two kinds of stem cells, that are taken from animals and human beings: embryonic stem cells and adult stem cells. although some stem cells can also be harvested from umbilical cord blood (Stem Cells: A Primer- NIH).

In 1998, after working with mouse embryos for twenty years, scientists formulated the process of isolating stem cells, harvested from human embryos, and nurturing these cells to continue their growth in the laboratory. Originally, the embryos used in these studies, were created through the in-vitro fertilization process for the purpose of infertility treatment. When the embryos were no longer needed for that purpose, they were donated to research with the informed consent of the donor.

Unlike embryonic stem cells, which are defined by their origin, the origin of adult stem cells, in any mature tissue, is unknown. Scientist have speculated that stem cells are somehow set aside during fetal development and restrained from differentiating. A current list of adult tissues reported to contain stem cells includes bone marrow, peripheral blood, brain, spinal cord, dental pulp, blood vessels, skeletal muscle, adipose tissue, epithelia of the skin and digestive system,

cornea, retina, liver, and pancreas (Holtzer 44). But adult stem cells are rare. Their primary purpose is to maintain the steady state of functioning in the cell and, with some limitations, to replace cells that die because of injury or disease (Leblond 58).

In the case of stem cells derived from umbilical cord blood, while they are less likely to attack a recipient's tissue, a potentially life-threatening complication of a transplant, the number of blood cells collected from cords is usually insufficient for adult recipients. This fact, combined with the difficulties involved in matching recipients with donors, has prompted U.S. researchers to pursue methods of expanding the number of stem cells derived from umbilical cord blood. (Rostler, 2002)

Recent research into the regeneration mechanisms of the central nervous system, including the discovery of stem cells in the adult brain that can give rise to new neurons and neural support cells, has raised hopes that researchers can find ways to actually repair central nervous system damage. In many spinal injuries, the spinal cord is not actually severed so at least some of the signal-carrying neuronal axons are intact. Unfortunately, the surviving axons no longer carry messages, because other cells, called oligodendrocytes, which constitute the axons' insulating myelin sheath, are lost. Researchers have recently taken the first steps in learning to replace these lost myelin-producing cells (Raisman, 14). A successful outcome from this research would have an extraordinary impact on the lives of thousands of victims of brain and spinal cord injuries, and their families.

One question that comes to mind is "If we are finding so many uses for adult stem cells, then why bother with embryonic stem cells at all?" Would it not be logical to simply use adult stem cells, the harvest of which offends no-one, and avoid the controversy of embryonic stem cells? The fact is that embryonic stem cells are the precursor cells to all other cell types

in the human body. These stem cells arise early in development, when the embryos are only three to five days old, and exist in an undifferentiated state for a very short time before becoming other types of cells. Embryonic stem cells offer science its only window to the earliest stages of human development. The study of stem cells at this stage offers insight into the unknown cellular events that cause birth defects and contribute to the heartbreaking problem of infertility (Embryonic Stem Cells). It's not clear yet whether adult stem cells will prove as versatile as embryonic cells particularly in developing cures for Parkinson's disease and diabetes. It is also more difficult to produce large quantities of adult stem cells, and there is some fear that they may lose their potency over time.

It is not difficult to imagine the kind of moral questions and the debates that arise from the mention of stem cell research. How can the harvesting of embryonic stem cells be considered moral if the embryo must perish? When does life begin? Are we playing God? Can Science be trusted? Are corporate profits driving research agendas?

In response to the controversy, Louis M. Guenin, a professor of ethics at Harvard Medical School, says that for some human embryonic stem cells, it is not only justifiable to use them in research, but admirable. The stem cells he is referring to are those that come from embryos created through in-vitro fertilization procedures, that ended up not being selected for the process. The unused embryos were donated by their mothers, through informed consent, for the purpose of research within certain restrictions. Professor Guenin designated this group of embryos "epidosembryos," after the Greek word, epidosis, meaning 'a benefit for the common good'.

At the base of his reasoning is the claim that when a woman decides against intrauterine transfer of an embryo, the embryo never becomes enabled. At that point, "nothing can be gained

for an epidosembryos by arranging that it perish as waste rather than perish in aid of others." according to Professor Guenin. He also writes that "It is virtuous to eliminate suffering in actual lives when we may do so at no cost in potential lives. It seems difficult to deny that relieving widespread suffering is morally better than destroying embryos at no gain." Professor Guenin adds that, up to day 14, a fertilized egg can become twins, so no human identity exists before this time (Montminy, Neal, 2001).

Scott Klusendorf, in an article protesting the harvesting of the unborn, voices another side of the argument, "Funding research that deliberately destroys one human being so another may benefit is not only a serious moral wrong; it is unnecessary. There is no credible evidence that embryonic human beings must lose their lives in order to save ours"(1). Klusendorf cites the history of the United States involvement in embryonic stem cell research as proof of the immorality of the governments' attitude toward embryos. "In a bizarre twist of logic, the panel concluded that embryos are entitled to "profound respect", but this does not necessarily encompass the legal and moral rights attributed to persons." Put simply, we should profoundly respect human embryos, but we may kill them to benefit others.

The convoluted logic of the panel troubled many ethicists, including Daniel Callahan of the Hastings Institute who wrote "I have always felt a nagging uneasiness at trying to rationalize killing something for which I have profound respect"(6). Klusendorf declares that reasonable persons should applaud scientific research aimed at improving the health of the human community. Discovering treatments for diseases of all kinds is a good and noble pursuit. But good deeds do not atone for bad ones. By embracing fetal tissue research and destructive embryo research, political liberalism has violated the principle that once made it great: its basic commitment to assist the small, weak, and defenseless. It's regrettable that those espousing

tolerance and compassion would treat the most vulnerable members of the human community, human embryos, as disposable instruments to be used for someone else's benefit. This is not only a serious moral wrong, it is unnecessary (36).

More discussion surrounds corporate responsibility when engaging in stem cell research. Chris MacDonald's peer commentary on works by Zoloth, Maienschein, and Green, commends their (the authors) insightful glance into the 'not so obvious' aspects of the debate over stem cell research, but observes the clear recognition that a great deal of stem cell research, takes place in a corporate context. In the absence of public consensus or vision regarding the ethical issues in stem cell research, how should responsible biotech companies make decisions about what kinds of research to engage in? In formulating public policy, politicians have at their disposal democratic norms and institutions, supplemented by traditional ways of balancing the demands of competing interest groups. But in a domain in which unified public vision is lacking and in which scientific advancement is rapid, legislation will always lag. Thus, corporations will be left to make decisions-- decisions about what lines of research to pursue, about the value of an embryo, about when, in the human life-cycle, morally considerable beings come into existence without the guidance of either legislation or public consensus. It is entirely possible that for ethical questions related to biotechnology, the real action goes on in the corporate boardroom more than on the floor of the legislature (MacDonald 2002).

The political debate over whether the federal government should fund research of stem cells derived from human embryos, has been made to appear as a conflict between science and ethics. While the scientists speak imploringly in favor of funding embryonic stem cell research, for the cure of currently incurable diseases, the most vocal members of the ethical community

can be heard, arguing staunchly against it. One of the main points of the ethical protest is the belief that life begins at conception, whether that conception is done the natural way or accomplished in a Petri dish, within an IVF lab. Ethicists say that these leftover IVF embryos, frozen in labs all over the country could at any time be implanted into a woman's uterus and become a child. In spite of the fact that there is no shortage of frozen embryos, and a woman's opportunity to bring an embryo to term would never be compromised by the use of embryos for research, the opponents of research still insist that using even one embryo for research is one too many (Cohen 2001). Research opponents would prefer that the approximately 100,000 embryos currently residing in fertility clinic freezers be put up for adoption. The conservative Family Research Council says every embryo deserves "an opportunity to be born."

In the religious community, the Catholic Church has led the opposition to embryonic stem cell research on the basis of what it refers to as the "sanctity of life." Catholic doctrine holds that life begins at conception, so an embryo, even in its earliest stage of development, is regarded as a human life. Destroying an embryo, even for the purpose of curing disease is regarded as immoral (Friend 2001).

The perspective of the mainstream Jewish doctrine, however, is that life begins at a later stage of development. Traditionally in the Jewish faith, it is believed life begins at the moment of quickening, or the first time a mother feels the movement of the fetus. Jewish doctrine does not grant any legal status to an embryo (Friend 2001).

Mark Hanson, a faculty associate of the Practical Ethics Center at the University of Montana, and a Member of St Paul Lutheran Church in Missoula, Montana writes "The Lutheran church has not yet developed any strong, guiding statements about the issues of embryonic stem cell research. There's no straightforward correlation between being a Christian or a Lutheran and

how one should vote on this particular issue. All people must vote with their consciences, with the kind of humility required by our limited perspectives and the depth of the mysteries embedded in our thinking about the status of the embryo. Like abortion, the embryonic stem cell issue is a true moral dilemma, and it involves a trade-off of values (Jerde, 2001).

The ability to generate and propagate unlimited numbers of hematopoietic stem cells outside the body--whether from adult, umbilical cord blood, fetal, or embryonic sources--would have a major impact on the safety, cost, and availability of stem cells for transplantation.

Whether embryonic stem cells will provide advantages over stem cells derived from cord blood or adult bone marrow, hematopoietic stem cells remains to be determined. It is known that hematopoietic stem cells, whether from umbilical cord blood or bone marrow, have a more limited potential for self renewal than do pluripotent embryonic stem cells (Itskovitz-Eldor, J. 2000). In the spite of all we can learn and the medical advances that can be made as a result of stem cell research, the debates continue, without either side gaining any ground.

In order to find a barometer of how random private citizens consider this ethical issue, interviews were conducted on subjects with opposing points of view, focused on the area of the most controversy, embryonic stem cells. The subjects, two Caucasian, upper-middle class, middle aged women, of similar backgrounds, and both of Roman Catholic faith were interviewed under similar circumstances, asked similar questions, and with no prior knowledge of what the subject matter would be.

The first subject is a homemaker, wife and mother of two, with a son in college and a daughter in her senior year of high school. The subject struggled with infertility for several years, but was finally able to conceive in the conventional fashion. Her father died of cancer several years ago, and she has a niece who is afflicted with Downs syndrome. The subject attended

college and worked as a paralegal before having children. She attends St. Joseph's Catholic church on a regular basis, and is a concerned mother.

In response to questioning the first subject stated that she was in favor of embryonic stem cell research because she felt that anything that can be done to relieve suffering in the world should be done. She indicated that science should be allowed to pursue research at any cost in order to cure devastating illnesses. On the question of the Catholic church's position against embryonic research the subject stated "I have to disagree with the church on this one. Too many lives are at stake. If that makes me a bad catholic, than maybe I am, but I don't really think that's true. I feel that we should do everything we can to help these people, and I probably think that way because, as a catholic, I was taught to help others. So if helping others is what the church teaches, how can the church say embryonic research is wrong?" The fact that embryonic research meant the destruction of the embryos was responded to with the statement "They're going to be destroyed anyway. They may as well be put to good use. I don't think of them as being alive at that point, I think that happens later, weeks later when they start to look like babies."

The first subjects position and reasoning indicates that she subscribes to a utilitarian philosophy (Eichhoefer, 212), although the influence of the Divine Command theory was evident. She does care about being a good catholic, but will not follow all of the doctrines of the Roman Catholic church blindly. She is able to avoid the issue of 'killing' the embryos because in her mind, they are not yet truly alive. According to the first subject, the greatest good for the greatest number is the guiding philosophy where embryonic research is concerned.

The second subject is a Certified Registered Nurse Anesthetist, wife and mother of three children. One of her children is in college, and the other two are in high school. The subject obtained her masters degree from Georgetown University in Washington D.C. and is employed

by the University of Chicago, a research hospital. She attends St. Joseph's Catholic church on a regular basis, is an active member of her community and volunteers her time to organizations her children are involved in. The subject lost her mother at an early age to cancer.

In response to questioning, the second subject indicated that while she was in favor of stem cell research, she was not in favor of embryonic stem cell research. She explained that in her capacity as a CRNA, she had been present during the process of in-vitro fertilization, and found it to be extremely cold and clinical. She said that she would not wish to participate in this method, even if it had been the only way she could conceive. The subject indicated that she had been present during occasions when informed consent for research was obtained in the pre-op area, after sedation had been administered. Her concern is that should embryonic stem cell research be allowed, it would bring science one step closer to creating embryos for the express purpose of research. The second subject subscribes to the belief that life begins at the moment of conception, therefore the destruction of the embryo, no matter what the reason, is murder. In response to the possibility of preventing birth defects with embryonic stem cells, the second subject made the following statement. "That is an area that is in God's hand, and we simply shouldn't be getting involved with it. It would be like playing God. Some things happen for a reason, and trying to change the outcome before the baby is born could do more harm than good. Too many other things could go wrong. An amniocentesis can cause a miscarriage; a chorionic villiae sampling can cause a child to be born missing a limb; what kind of horrible outcomes are we flirting with by invading the womb to change the future with stem cells? I'm sorry, but I just don't think this is something we should be messing with."

The second subject appears to subscribe to the philosophy of Divine Command. She is willing to place her trust in God's hands and accept the outcome. (Eichhoefer, 151) She does seem to express a good deal of concern about consequences, but the guiding force behind her viewpoint seems to be a strong belief in basic Christian values. It is an interesting position for a woman of science, although the subject did reveal that her contract with the research hospital does allow her to refuse to participate in cases that conflict with her beliefs, or cause her to feel uncomfortable.

Embryonic stem cell research presents humankind with the opportunity to relieve an incredible amount of suffering in the world, as well as increasing the quality of an immeasurable number of lives. While it is true that the embryos must be destroyed to harvest the stem cells, it is inconceivable, under any scenario, that every frozen embryo, in every laboratory around the world would be adopted, and spared from certain death. It would be wasteful, as well as illogical, to assume that sparing the excess frozen embryos from being used for research would be somehow noble. They cannot exist indefinitely in their frozen limbo, and must eventually be declared nonviable before being destroyed. The fact that humans possess the intelligence necessary to formulate solutions to the problems that plague our species, indicates that we have a responsibility to exercise our potential, and strive for excellence. An increase in adult life spans and a decrease in the rate of infant mortality are both indicators that our scientific efforts have been beneficial and effective. Therefore stem cell research, and in particular, embryonic stem cell research can be considered both a case of the greatest good for the greatest number, as well as God helping those who help themselves.

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