Exploring promise and problems in embryonic stem cell research

George B. Stoltzfus

In recent years, under the auspices of the Anabaptist Center for Healthcare Ethics,[1] I have met with people throughout the Mennonite Church in North America to talk about embryonic stem cell research. I believe that such conversation is most fruitful when it holds in tension disparate values, refusing to embrace one value at the expense of others or to set aside important values for the sake of agreement. In the spirit of such conversation, I offer readers some information about what embryonic stem cells are, and some reflections on the potential and problems of research using them.

Embryology for the non-embryologist

The embryonic stem cells used in research are cultured from human fetal tissue, from embryos that began their development either *in vivo* or *in vitro*. One way to illustrate the meaning of these Latin terms is to describe an experiment I did as a student in a physiology class. We placed a chick embryo on an agar plate, and then following the development of the baby chick through a series of steps including the formation of the circulatory system with a pulsating heart. The fertilization of the chick happened in vivo ("within a living organism"); the chick's early development was in vitro ("in glass").

Whether it happens in vivo (in a woman's body) or in vitro (in a fertility clinic or laboratory), the union of human sperm and egg leads to the formation of a clump of cells. This clump then begins the division and specialization process that eventually leads to the formation of an adult human. Soon after the union, the clump of cells shows microscopic changes that point to future function. The cells of the blastocyst are well along the way to differentiating to their final forms. One portion of the blastocyst will become the placenta, umbilical cord, and amniotic sac. These tissues support

pregnancy and the developing embryo, and are discarded when pregnancy ends. This portion of the blastocyst does not produce stem cells that are useful for research. Another group of cells is identified as the inner cell mass. It is from this group that pluripotent stem cells are taken, the embryonic stem cells that hold greatest promise for research.

Stem cell research holds promise

Research on these embryonic stem cells has the potential to increase knowledge of human development and improve treatment of a number of diseases and injuries. Almost weekly, news stories express boldly optimistic views of future possibilities for this technology. Areas of promise include improved drug testing, enhanced gene research, and new treatments for a variety of injuries and diseases.

Drug testing. Before drugs and other therapies are available to the public, they undergo a long process of study and testing. An estimated average of ten years passes before a drug can be introduced to the market. The factors that delay introduction are many and include concerns about toxicity and side effects. Much of the information necessary to assure safety can be gathered by testing drugs in animals, but eventually drugs must also be tested on human subjects. Animal testing is never a complete predictor of the way humans will metabolize and tolerate a particular drug.

Research using stem cells enables assessment from the outset of the new drug's impact on human cells. Furthermore, researchers can test the drug on the specific human tissue that it is intended to target. Stem cell testing will not eliminate human and animal testing, but it will make such testing much safer. Scientists can subject stem cells to situations and risks under controlled conditions and conduct tests that would be impossible or unethical if applied to animal or human subjects.

Gene research. When stem cells become skin or bone or hair, the process is essentially the result of turning on or turning off each of the 60,000 or so genes that make up the forty-six human chromosomes. At each step along the way from unspecialized to specialized tissue, the cells follow a preprogrammed process, or respond to changes in the environment. In the laboratory, researchers will be able to slow or stop this process and study it in

detail. They can observe the conditions under which changes take place, and acquire knowledge about how to arrest or alter the specialization. This study will lead to a vast expansion of knowledge about how genes function, and potentially of how they can be turned on or off. This information will help us understand how normal development occurs at the genetic level, and what happens when things go awry.

Treatment for diseases. Stem cells have the capacity to become any human tissue. When undifferentiated cells are added to an area of need, they may, under the influence of local agents, become differentiated into cells of the local type. Stem cells can be prompted to become bone marrow or nerve cells or heart muscle, to replace damaged or destroyed tissue. Stem cells may eventually be used to treat debilitating diseases such as diabetes and Parkinsonism.

We cannot predict when or how or whether these promises will come to fruition. My guess is that, given money and time, a vast array of future developments will show the vision I have described to be pale and constricted.

Questions we should ask

While there is much that we don't know about the future of stem cell research, what we do know is that it has the potential to dramatically alter our lives, our health, even our life span. These revolutionary possibilities challenge us to pose questions, because no technology is without risks. I offer the following questions not as a rejection of the technology but because only naïveté or arrogance would prompt us to move into this new frontier without contemplating the implications and possible impact of the new technology.

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Should stem cell research be a priority in our society? To spend money on one project is not to spend it elsewhere. Stem cell research will require significant investment. An inordinate amount of health care expenditure in the U.S. goes to treatment of exotic problems while basic infrastructure issues remain unaddressed. Growing numbers in the U.S. have no health

insurance, while others have access to highly specialized and expensive services. Some argue that we have already passed the point of spending more on "medical progress" than we should. Is stem cell research another example? How do we explain to those who lack the basics that spending money on this research is more important than providing primary health care services to everyone in our nation?

Does stem cell research conform to our convictions about international justice in health care? Every measure we take to extend the frontiers of technology widens the massive gap between the health care middle-class Canadians and Americans receive and the care available to our Anabaptist sisters and brothers and other people elsewhere in the world. At Mennonite World Conference World Assembly this August, how will we explain to our friends in Zimbabwe that we cannot help them address the AIDS epidemic in their country,[2] as we spend more and more on our health care?

If we are critical of abortion and the fertility industry, can we condone research on stem cells harvested from these sources? The stem cells used in research are cultured principally from tissues harvested from two sources: fetuses aborted at between five and nine weeks' gestation, and "extra" embryos left over from the in vitro fertilization that is part of artificial reproductive technology used in fertility clinics. Coexisting with a rate of about 300 abortions per 1,000 live births, the U.S. has developed an industry whose sole function is to enable infertile couples to produce biological offspring. At the same time that many embryos conceived in vivo are aborted, many other embryos are produced as a result of in vitro fertilization (IVF) in the context of fertility treatment. IVF, in practice, results in unused developing embryos, which may be stored for years under controlled conditions. Eventually, the "parents," the sperm and egg donors, may release these embryos.

The Mennonite Church's confession of faith notes that the practice of abortion does not conform to our understanding of God's will.[3] Mennonite writers also question some of the values and practices of the fertility industry, including the absolute value it seems to attach to biological procreation. Ann Krabill Hershberger has observed, "The Bible message is that the family is to be held in great esteem with God's blessing. . . . An even

stronger message from the Bible . . . is that the family is not the only or even the most important dimension of human life."[4] If we question abortion and advocate limits on use of artificial reproductive technologies, must Mennonites not also be willing to question the ends that follow from these practices? Should we not express doubts about research on stem cells cultured from tissues harvested from aborted fetuses and abandoned embryos?

If stem cell research enables genetic engineering, where do we draw the line? Recently I read about a geneticist who carries a gene for early onset Alzheimer's disease. For her second pregnancy she chose to use IVF, not because of infertility, but because doing so enabled her to screen and discard embryos carrying the early onset Alzheimer's gene: she ensured that her child would be free of this defect. Is her achievement laudable? If so, at what point in the screening process should we stop? Should all embryos be checked for a host of genetic diseases? Why not do prenatal/pre-implantation screening on all pregnancies and in the process avoid the ones that will yield "defective" babies?

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As I have met in small groups with Mennonites across the church, I have often conversed with folks who care for people with developmental and other disabilities. What I have heard is a call to care for the disadvantaged, for those who are marginalized and weak. I have heard a call to recognize how much our own growth is enhanced when we "normal" people participate in care of those we consider abnormal. Caregivers call us to recognize how much our own expression of humanity is bound to the care we offer those who need us. If we pick only the "best" embryos, we are unlikely to choose children with Down syndrome or a clotting disorder or carrying a hundred other known genetic diseases. How do those choices reflect the kind of community we are? What effect will those choices have on the kind of community we become?

How do we respond to those for whom stem cell research offers the hope of healing? What do we say to those whose lives could be enhanced by new technologies? Sisters and brothers in the church

offer a variety of responses. Some emphasize the need for caution, and some are enthusiastic about the possibilities stem cell technology offers for their healing. Lutheran pastor Russell Saltzman, a diabetic, tells the story about the man who died in a flood:

> *A Red Cross boat had come by earlier when the water was above the window sills, but the fellow refused rescue saying, "The Lord will save me." A second boat came when the water was to the eaves and the man was hanging from the gutters. But again he refused rescue. "The Lord will save me," he declared. Scrambling onto his roof ahead of the ever-rising waters the man spied a helicopter heading his way. A rope was lowered from the copter, but the obstinate guy batted it away and shouted over the din of the rotors, "The Lord will save me." Of course he drowned. He arrived at Heaven's throne perplexed, hurt, angry, and dripping wet. "Why," he shouted at God, "didn't you save me?" "Give me a break," sighed the Lord God Almighty. "I sent two boats and a helicopter."*[5]

Saltzman goes on to describe the losses his diabetic friends have sustained, losses of limbs and mobility, among others. He articulates the dilemma for those who suffer from diseases stem cell therapy might some day be able to cure:

> *There is something supposedly just over the horizon that sounds for all the world like two boats and a helicopter, and if I don't grab it, maybe I'm the fool? The promise is fetal stem cell therapy. . . . When this research is perfected and receives FDA approval, all I have to do to benefit from it is give up my opposition to abortion and most forms of embryonic research, swallow a little pride, take a shot or two, whatever's called for, and pretty soon I'll be eating like a regular guy, all my body parts intact. Why, after all, should we let a perfectly good embryo, one that is not a candidate for implantation in a vacant womb, go to waste?*[6]

Saltzman graphically portrays the struggle between the immense promise of embryonic stem cell research and the ethical issues created by its use of aborted fetuses and discarded embyros. Saltzman concludes that he cannot support most forms of stem cell research because of his convictions about the moral status of embryonic and fetal life. The dilemma that he highlights constrains me from taking such a definite position. I prefer to remain in the uncomfortable middle ground where the answers are not always clear and the questions only seem to multiply. I don't know how to explain rejecting such research to those whose lives could be enhanced by its results. I do know I need to continue to ask the questions on their behalf and in behalf of the church.

Sometimes the act of posing a question has the effect of pointing to a preferred answer. My intent has not been to ask questions about stem cell research in a way that takes a position either in favor of or against using embryonic stem cells. It is not evident to me what position we should take. I am convinced, though, that if we as Christian health care practitioners and pastors either take dogmatic positions or fail to ask honest questions, we have failed in our leadership roles.

Note that I have not addressed the question of when human life begins. I have not addressed the question of the personhood of the blastocyst because I consider it to be unanswerable from a theological or a scientific point of view.[7] We may disagree about the personhood or the soul of the clump of cells called a blastocyst, but we should be able to agree that it is not just any clump of cells.

Attributes for living in the gray area

Living without definite answers to the questions highlighted above is difficult. A willingness to live with some ambiguity may also allow space for innovation and creativity. It may open the way to outcomes we may otherwise not imagine. It also may lead us to foster new expressions of some important attributes.

When we are prepared to live in the gray area, we have freedom to be honest in ways that are not possible when we insist on quick resolution. We can struggle authentically with those who suffer the devastation of diseases such as Parkinson's and diabetes. We can weigh possibilities for good in the treatment of suffering

against the possibility that in reaching for this good we may be giving up God's best.

Admitting that I live in the ambiguous middle is profoundly humbling. At the same time I experience the release that comes in acknowledging the vast frontiers of my unknowing. For all that we know and for all that we want to believe we know, we do well to recognize that being "fearfully and wonderfully made" suggests complexities that will frustrate even the most adroit scientists in their desire for knowledge and control.

Having spoken of humility, I now offer words of confession. When I consider the vastness of the problems of access to care in my country, and the even larger needs for health care on a global scale, it is hard for me to become exercised about embryonic stem cell research. Ethicist Laurie Zoloth points to the danger of asking questions about the exotic when what we most need are things close at hand: "We tend to think about bioethics, even health care justice and access, as a problem of the highest tech medicine, the access to the scarcest commodity, rather than the access to what we could have much of: human touch, conversation, responsibility for attention, a relationship of simple, practical nursing."[8]

I affirm the value of deliberation about the morality of stem cell research. Its value should not, however, be placed on the same scale of importance as the value of providing basic health care to all members of society. Nor should deliberation about stem cell research distract us from the task of bridging the chasm that lies between our technological privilege as middle-class Canadians and Americans and the dearth of technology that is a fact of life for many millions in the world.

By concluding between the extremes of certitude, I end where I began, but with even more questions. The fact that these questions remain requires that I proceed with caution, counsel with grace, and refuse to pass judgment on those with whom I disagree.

Notes

[1] For the full text of the vision and mission statements of ACHE, see www.mennmed.org/ache2.htm.

[2] Doris Dube, "What Should the Church Do about HIV/AIDS? The Brethren in Christ of Zimbabwe Face the Problem," *Courier,* 17, no. 1 (2001), 3–5.

[3] *Confession of Faith in a Mennonite Perspective* (Scottdale, Waterloo: Herald Pr., 1995), 82. A draft of a new Mennonite Church USA statement on abortion can be found at www.MennoniteUSA.org.
[4] See Anne Krabill Hershberger, "Procreation: Extraordinary Means," in *Medical Ethics, Human Choices: A Christian Perspective,* ed. John Rogers (Scottdale, Kitchener: Herald Pr., 1988), 100. See also Dan Epp-Tiessen, "Does God Care That We Make Babies?" in this issue, pages 6–15.
[5] Russell E. Saltzman, "Two Boats, a Helicopter & Stem Cells," *First Things: A Monthly Journal of Religion and Public Life* 96 (October 1999): 13.
[6] Ibid., 14.
[7] See Richard B. Hayes, *The Moral Vision of the New Testament: A Contemporary Introduction to New Testament Ethics* (San Francisco: Harper San Francisco, 1996), 455.
[8] "Heroic Measures: Just Bioethics in an Unjust World," *Hastings Center Report* 31, no. 6 (November-December 2001): 35.

About the author

George Stoltzfus recently completed his assignment as staff consultant for the Anabaptist Center for Healthcare Ethics. He now serves as chief executive of Friendship Community in Lititz, Pennsylvania, a church-related organization devoted to the care of developmentally disabled adults. He anticipates that this setting will offer new opportunities to pursue his interests in health care ethics.