Stem Cell Research : The Ethical Debate

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The Stem Cell Debate : Murder or Medicine
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Today I will speak about the stem-cell debate. Although the words are familiar to most, the problem that stimulates the debate is obscure. I will try to clarify it as best I can. First, what is a stem cell ? Each of us sits here today in a body made up of billions of cells, all hard at work keeping us alive and, I hope, awake. That vast collection, however, is not made up of identical little fluid filled bags depicted in high school biology texts. Our bodies are framed by some 200 different cell types, those that make the components of blood, those that make muscles of various types, hearts cells, liver cells, neuronal cells that constitute the brain and nervous system. Each of these cell types has its own quite different design and function ; they are alike only in that most of them have a minute central unit, called the nucleus containing the chromosomes that make us who and what we are. But for a brief moment in our existence, about five days after dad's sperm joined mom's egg, we were much simpler beings. We had the unflattering name of « blastocyst ,» a bundle of several hundred cells that have not yet become muscle, neuronal, skin or gut cells. Those bundles contain only two cell types, one that will evolve into the placenta in the womb and the other, only some 30 or 40 cells, will implant in the uterus, and differentiate into various components of our bodies. So, for some two or three days, the embryo, not yet implanted in the womb, contains this tiny complement of what are called « pluripotent » cells, that is, cells not yet shaped into the particular cell types. These are called Embryonic Stem Cells (ESC for short).

In 1998, Dr. James Thomson of the University of Wisconsin was able for the first time to isolate embryonic stem cells from the human blastocyst. The Journal Science ran an editorial accompanying Thomson's paper anticipating battle lines for the stem cell wars. It heralded the "(enormous) research and clinical potential for human ES cells... as a renewable source of cells for tissue transplantation, cell replacement, and gene therapies." It then noted "the isolation of human pluripotent

stem cells will no doubt catch the public eye, and there will be expression of concern, rekindling the debate on human embryo research. The debate will encompass the source of the cells, human cloning potential, and the possibilities of germ line modifications." [1] Now the moral battlelines were definite and clear: the promise of significant scientific and therapeutic benefits versus destruction of the human embryo.

The public and the political debates have been framed in terms of this stark moral dichotomy. The New York Times sums up the issue: "Advocates argue that embryonic stem cell research can help cure an array of diseases, including Parkinson's. But abortion opponents say the research destroys embryos and, therefore, violates human life." [2] Thus, the dilemma: choice of one course over the other leads either to violation of a moral injunction not to kill, or to the repudiation of a human good, to cure disease. We are faced with an Either/Or. Murder or Medicine.

Moral problems need NOT be Either/Or situations. While there are wrenching moments when persons are thrust into terrible "Sophie's Choices," many moral dilemmas can be relaxed by recognizing the complexity of the questions hidden in the dilemma. The use of stem cells can be seen, not as a stark contradiction, but as the convergence of five distinct questions. I call these fives questions, the physical question, the moral question, the ethical question, the evidence question and the political question. I will explain each of them later in this talk. But first, let us look at a genuine, even if fictionalized, moral dilemma about stem cell research.

Dr. Damien O' is a scientist with an international reputation for his study of "histocompatibility," that is, the genetic and biochemical process that enables the tissue of one organism to be transplanted into another organism without rejection. In recent years, he has explored a new direction to understand this process and to seek for ways to prevent the disaster of immune rejection of organs. That new direction takes him into the promising field of ESC research. It was immediately obvious to scientists such as Damien O' that stem cells held the promise of mastering the problem of immune rejection. It is theoretically possible to derive stem cells from the body cells, skin for example, of a person whose heart muscle had been destroyed by an infarct. Those stem cells could be cultured into a sheet of heart cells that could replace the damaged segment. To obtain stem cells, recipients of the transplant would be "cloned," that is, one cell of their body, taken from skin, would be inserted into a human ovum donated by a woman; the ovum, properly manipulated, would begin to develop as a fertilized egg in a laboratory dish. At about five days of growth, the 200 cell entity would be dissected, and the inner cell

mass of some 40 stem cells removed. These would be cultured and then coaxed into one cell type, cardiomyocytes, that could be transplanted as new heart muscle. It would not be rejected because it was, in fact, the person's own tissue. Despite daunting technical problems, scientists like Damien see the vision of a totally new form of medicine. That vision quickly won the name, "regenerative medicine."
Damien was raised a Catholic in Ireland. As a youth, he joined the Jesuit order that sent him to Cambridge to take a degree in biochemistry. Although he left the order many years ago and does not consider himself a particularly devout Catholic, he retains respect for the faith of his youth and respects the religious beliefs of others. Until now, he never encountered a religious obstacle to his scientific explorations. His Church condemns ES research as immoral. A Jesuit friend sends Damien the "Declaration on the Production and the Scientific and Therapeutic Use of Human Embryonic Stem Cells," issued by the Vatican Academy of Life Sciences. That document states that it is "not morally licit to produce and/or use living human embryos for the preparation of ES cells" nor is it "morally licit to engage in so called 'therapeutic cloning' by producing cloned human embryos and then destroying them to produce ES cells." Damien's friend attaches a newspaper clipping quoting Pope John Paul II: "Experience is also showing how a **tragic coarsening** of consciences accompanies the assault on innocent human life in the womb... most recently, proposals for the creation for research purposes of human embryos, destined to destruction in the process."[3]

Dr. O' is now planning a major research project. He intends to explore the possibility of "silencing" the genes that turn on the immune response in cells. This immune response is mediated by the human leucocyte antigen system consisting of proteins on the surface of cell membranes that attack foreign tissue. These proteins come into being due to four genes on the human chromosomes. If they can be "silenced" without adverse effect, a "universal cell" that could be transplanted into any person could be created. Dr. O' has arranged to have a fertility clinic invite couples who do not need or want to use fertilized embryos that they have created to donate them to his research. Unused embryos are frozen at five days of growth. Those embryos will be thawed and the inner cells dissected: these cells are the embryonic stem cells. Dr. O' is thus engaging in "the use of a human embryo for the preparation of ES cells".

Ever since he began to work in this field, he has reflected on its moral implications. As a scientist, he is convinced that it is an extraordinarily promising field and, as a compassionate person, he sees it bringing in the era of regenerative medicine: the ultimate cure of many debilitating diseases. Now, as he is about to embark on the work, he wonders whether his conscience is, as the Pope said, "coarsening." So,

this experienced scientist plunges into the moral debate over the use of embryonic stem cells.

Dr. O' realizes this was not just a religious scruple. Legal and political problems abound. Fortunately for Damien, his laboratory is in the United Kingdom. At least, he need not worry about the legality of his work. Since 1990, the Human Fertilization and Embryology Authority (HFEA), established by act of Parliament, had effectively overseen the research and practice of assisted reproduction. In 2001, after study and deliberation, Parliament allowed HFEA to grant licenses for ES research, including the creation of embryos exclusively for research. Damien's laboratory had received such a license.

He knew that in the United States things were quite different. He had been associated with two major U.S. research universities. His former colleagues had kept him informed of the political wars that raged over ES research. Indeed, some of his current UK colleagues had migrated from the US to do their work in a more friendly climate. The language of debate now contained new terms: "reproductive cloning," the cloning of babies, was to be distinguished from "therapeutic cloning," cloning to develop treatments for disease. The verbal distinction and the prospect of a dramatically new form of medicine did not resolve the debate. Even the therapeutic value inherent in stem cells could not justify destruction of a human embryo, said the opponents. Also, advances in therapeutic cloning would open "the slippery slope" to reproductive cloning. President George Bush determined that a presidential decision was required.

On August 9, 2001, the President made his first formal media address to the American people, delivered from his home in Crawford, Texas. As much a moral sermon as a policy statement, he confessed his own beliefs, saying, "I believe that human life is a sacred gift from the Creator. I worry about a culture that devalues life and believe as your president that I have an important obligation to foster and encourage respect for life in America and throughout the world." He quoted a bioethicist as telling him, "make no mistake, that (five-day-old) cluster of cells is the same way you and I, and all the rest of us, started our lives. We are dealing with the seeds of the next generation." He then announced his decision to allow federal funds to support research only on existing stem-cell lines, this is, stem cells that had already been obtained and cultured from frozen embryos donated by couples using in vitro fertilization. The destruction of embryos that produced these cells, he reasoned, had already taken place![4] This was an extraordinary moment. One commentator noted that the President chose to appear before the nation for the first time in the role of a bioethicist !

His decision came after months of public debate that had exposed the American people and its politicians to a large dose of bioethical language and argument. During his presidential campaign, candidate Bush promised to reverse the President Clinton's decision to permit some embryo research to be done with federal funding. His political support among Christian conservatives and among Roman Catholics strongly endorsed that position. In the early days of his presidency, the matter was muted and other political issues, such as tax policy, dominated the public scene. In the spring of 2001, hints that the president was considering action on his campaign promise began to appear and, with surprising rapidity, the anti-abortion constituency and the scientific community began to form sides. What might have been a rather silent administrative decision about an obscure topic took on huge dimensions and by fall, scholarly articles and media interviews with scientists, politicians, advocates, religious figures saturated public attention. The president, not known for his intellectual interests, actually immersed himself in the topic, studying documents and engaging experts in conversation.

In his address to the nation, President Bush announced that he would name a **Council to recommend policy about ES research**. Six months later a seventeen member Council was appointed with bioethicist **Leon Kass** as chair. Commentators generally agreed that the Council was stacked with conservative thinkers, likely to follow the declared lead of Dr. Kass, who had made his opposition to cloning and to stem cell research clear in many articles. Commentators were wrong. While the Council's Report Human Cloning and Human Dignity: An Ethical Inquiry, released in July 2002, did unanimously reject cloning for purposes of producing children, its members split on the contentious issue of research cloning for therapeutic purposes. Rather than an outright condemnation, the Council could only muster sufficient votes for a moratorium on ES research, and that only by a ten to seven vote. Regardless of the relatively soft conclusion on ES research, the climate has not been favorable for such work in the United States. Congressional efforts continue to ban it entirely; regulations surrounding funded research are so tightly drawn as to discourage researchers and their institutions from investing effort and money in it.

Dr. O' explores the extensive literature and finds that there are a number of questions, often confused but obviously related. Inspired by his early Jesuit training to clarify questions in logical fashion, he sorts the issues into the five types of questions that we mentioned above: physical, moral, ethical, evidence and political.

In the stem cell debate, the ”physical question” asks what exactly is the physical process whereby a new human entity comes into existence. During the nineteenth century, scientists described the development of the fertilized ovum into embryo and fetus. Today we know those steps in exquisite detail. Science has now revealed the pluripotent nature of the embryonic stem cell. In addition to being undifferentiated, stem cells are capable, under proper laboratory conditions, of “proliferating,” that is continuing to divide in their undifferentiated state. Also, and most important, they can be coaxed by biochemical means into becoming a certain cell type, for example, heart cells or nerve cells. These proliferated and differentiated cells can, in principle, be transplanted into living bodies, providing “regeneration” for organs and tissues that have been damaged by injury or disease. This physical question asks exactly what happens genetically, biochemically and physically, when gametes are joined and begin to move toward the production of the incredible complex of interacting tissue and chemistry that constitutes an organism of this or that species. Yet all of this science is silent about our second question, the moral question. Certainly, the chromosomes and genes involved in the making of this being pertain to the genetic species “human.” But the word “human” does not have only a genetic meaning. It has a moral meaning. It designates a kind of being that is to be valued and treated in certain ways. We must ask whether this human genetic being, the blastocyst, is also to be counted among the class of moral beings called human.

Where in the universe of living things, plants, animals and humans, does the embryo belong ? The question has been asked from antiquity. Orthodox Jews, relying on biblical texts of great antiquity, refer to the early embryo as “like water,” and impart to it no special moral meaning. Ancient biologists, such as Aristotle, believed that an embryo begins life as a vegetable, develops into an animal and then, when all organs are formed, a human being. The embryo certainly does not look very human: it starts life rather plantlike in cellular structure and, as it assumes shape, it looks as much like a mouse as a human. Only after 8 weeks of gestation, does it begin to look like a baby and gets its name changed to fetus.

However, we now know that the developing appearance is driven by a genetic program originating in the DNA that joined at fertilization. Thus, one plausible answer to the moral question could be that, from the instant when two human genetic packages join into one, a human person is generated; the full responsibilities that obtain between human persons are also generated. This is the position taken by the Roman Catholic Church. “From the moment of conception,” says the official document Gift of Life, “the life of every human being is to be respected in an absolute way... Human life is sacred because from its beginning it

involves the 'creative action of God...' no one can, in any circumstance, claim for himself the right to destroy directly an innocent human being." [5]

Many other religious faiths take this position. Even some who are not religiously affiliated, consider it a plausible position: after all, we all begin life as a fertilized ovum and the genetic program that forms us is human from the beginning.

Another response to the moral question relies, not on the genetic origins of the embryo, but on its staged progress from zygote to baby. There are many milestones in that progress. It makes sense, say those who hold this position, to attribute moral personhood to the fetus only as it reaches certain of those milestones. Implantation and, above all, the formation of the primitive streak, at about 14 days, which sets the fertilized ovum on the way to individuality and initiates the nervous system, seems to many a significant marker of human personhood. Moral obligations can be ascribed only when individuation has taken place, for only then can it be said that the developing entity is at the start of being a person. One might even maintain that only when the fetus has a firm enough hold on existence that it can live independently of its mother do moral duties of significance appear. In this view, viability, the time at which organ systems, particularly the lungs, can function, even with artificial support, is the most suitable milestone to attribute moral personhood.

The third question, the "ethical" one, asks how we should act toward the entities that are described in the physical and moral questions. Ethical arguments go beyond the designation of moral standing. They ask what might be done to, with, or for, entities of this sort. Thus, while admitting that a convicted murderer is a human being, we may still ask whether it is ethical to execute him. So, we can ask, does this fetus, admittedly a moral human, have "rights" from its origin, or does it accrue rights as it develops. What might these "incremental rights" be? Here we must debate whether cells from embryos that will be otherwise destroyed can be used for research. Here we debate whether the social good of research justifies destruction of life. At the heart of the stem cell debate dwell arguments of this sort.

A term, "Respect for the embryo or the fetus" has come into the debate. It is hard to decipher what it means. Certainly for those who take the "first moment" position, respect means that the embryo at conception deserves full protection for its life and full promotion of its flourishing. Those who espouse the "developmental" position also use the term. They use it to describe an attitude of reluctance to destroy embryonic or fetal life unless the destruction is justified by some greater good. Even then, other means of achieving that good should be

preferred to using the fetus, if at all possible; if impossible, the least destructive course should be followed.

The ethical questions go beyond the balancing of the good of producing knowledge and therapy and the evil of destroying a developing human organism. The processes for obtaining ES also open the way toward many troubling activities. Stem cells might be genetically manipulated in ways that not only eliminate disease but change human characteristics for eugenic purposes. Further, techniques to obtain ES require the utilization of human ova and raise concerns over exploitation of women to obtain ova and over commodification or commercialization of human parts. Regenerative medicine might be so expensive that it would be available only to the well placed and wealthy, thus introducing another inequity into an already inequitable health care system. Also, regenerative medicine may set society off on an ultimately futile quest for a world totally free of pain, disability and disease. These are the ethical questions circling around the science of ES.

The fourth question, "the evidence question," asks "With what degree of confidence can answers to the physical and moral questions be accepted? What sort of evidence supports that confidence?" The physical questions are answered by experimental science. The confidence owed to well performed physical experimentation is usually high but, since the result of any experiment can be tested by further experiment, confidence is rarely absolute. Still, results that stand the test of time and other tests, and fit into an explanatory schema, deserve significant, if not absolute, confidence.

Moral questions are answered by more obscure means, such as moral intuition, rational argument or religious faith. Moral intuition is difficult to describe and even more difficult to defend. It takes the form, "I just know, or I have the strong feeling, that this is right." Individuals may have utter confidence in their moral intuitions, but no other person need heed them, unless they can be explained by rational argument.

Rational argument must explain the grounds for its affirmations. Thus, the claim that moral status should be accorded the human embryo only after individuation is supported by the argument that moral obligations pertain only to persons but an embryo cannot be considered a person until it is clear that its physical form is unable to split into two or more persons. Even though rational arguments display their grounds, they can be disputed and challenged by other rational arguments. Still, confidence grows as arguments appear more reasonable, logical and plausible. It is rare, in moral discourse, that a single argument will settle an issue definitively.

Individuals, honestly and seriously studying the contrasting arguments, must judge which among them seems most consistent and cogent.

Religious faith is something like moral intuition (which may, in many religious systems be considered the result of divine inspiration or grace). However, it exists within a "faith community," that is, a religious institution with a tradition, teaching, and authorities. Unlike personal intuition, and somewhat like rational argument, religious faith displays the grounds of its assertions. Those grounds may be the words of a scripture believed to be the inspired word of God, or they may be the words of an authority believed to have some divinely appointed mission to teach the faith community. Persons who profess that faith may, and usually but not always, do have great confidence in assertions of that sort. Thus, a recent Vatican document asserts that the Roman Catholic doctrine regarding personhood at the time of conception derives, not from scientific evidence, but from faith. Indeed, that faith itself derives not from the words of Sacred Scripture but from a faith-based acceptance of the authority of the hierarchy of the Church. Those who do not share the faith that gives rise to certain assertions have no obligation to attend to its claims, other that the broad moral duty to respect the right of others to hold their beliefs.

Thus, the evidence question endeavors to describe the sort of knowledge and the strength of evidence appropriate to that form of knowledge. In the stem cell debate, the answers to the moral and ethical questions rest **both** on rational argument and on faith assertions. The rational arguments must be assessed for their consistency and use of evidence; the faith arguments on the moral authority of their sources. Dr. O' realizes that, in his own Roman Catholic tradition, faith assertions are also supported by rational argument. He discovers that a minority of Catholic theologians support rational arguments in favor of the developmental position on moral status. He himself finds this view reasonable.

The fifth question for the stem cell debate is the political question. Many scientific, moral, ethical and religious questions never enter the political world. When they do, the most general political question should be about the impact on the good of society, that is, the welfare of a society and on the peace of the community. In liberal societies, moral positions are generally not considered legitimate objects of legislation, unless practices based on those moral positions threaten harm to the community. Another political question concerns the civil propriety of allowing a moral belief based on religious faith to dictate public policy, particularly when the adherents of that religious faith may constitute only a segment of the society. Another political question concerns the effect of espousing or repudiating a moral

or religious belief on the fortunes of the politicians who might be affected. Thus, legislators might worry about loosing a conservative constituency if they vote in favor of a policy of funding aid programs that propagate birth control or abortion.

The stem cell dilemma looks quite different depending on the answers that are given to these five questions. A rational response to the stem-cell dilemma proceeds from confidences in the claims of the physical realm through rational arguments in the moral and ethical realm to a policy formulation that looks primarily to the social good and harms associated with a political decision. That response must recognize the distinct confidences that can be placed in the evidence or arguments available to answer each of the questions. It must recognize that the confidence of persons in their own moral intuitions and in their religious faith, though powerfully strong, ought not to serve as the basis for public policy. The appropriate political decision must be based on the confidence that can be put in scientific evidence and on the rational persuasiveness generated by sound moral and ethical argument. When honest diversity of opinion remains, after the fullest debate on these issues, freedom should prevail. If policy **must** be made, government should formulate policy that respects that freedom and the promotion of public welfare. The debate can be drawn away from the two poles of **you must and you must not** by a thoughtful review of the questions and answers posed above. Dr. Damien O' does this review and, in the end, he decides that his conscience can approve of this research. Would that others, and our society as a whole, were so conscientious.

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[1] John Gearhart, "New Potential for Human Embryonic Stem Cells," Science 1998; 282 (5391): 1061-2.
James Thomson, J. Itskovitz-Eldor, Sander Shapiro et. Al. "Embryonic Stem Cell Lines Derived from Human Blastocysts." Science 1998; 282; 1145-1147

[2] New York Times, 7/21/01, A9

[3] Pontifical Academy of Life Sciences, Vatican City, August 25, 2000, pp. 6, 7.
http://www.cin.org/docs/stem-cell-research.html. "Remarks by John Paul," The New York Times, July 24, 2001, A8.

[4] NYT. 8/10/01, A17.

[5] Donum Vitae, Sacred Congregation for the Doctrine of the Faith, U.S. Conference of Bishops: Washington, D.C., 1987.