Stem Cells and the President's Council on Bioethics

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The word *nomos*, taken from the Greek, means an ordering system, a set of axioms by which an individual lives. Morality has to due with axioms relating to the distinction between right and wrong. Ethics is the system of behavior that conforms outwardly to the inward rules of right and wrong. One could say that perceived moral truth induces and directs ethical behavior.

There is no ethical set of rules or regulations that is universally acceptable. Further, no rule or set of rules is universally applicable. Ethical decisions are, at least at times, determined by the situation – they are not absolute. "Thou shalt not kill" is a near absolute of the Decalogue, but there are circumstances where killing may be a moral/ethical imperative; e.g., to prevent the murder of a child or adult by a criminal or terrorist or madman.

Societal ethics are more complicated than individual ethics because the pool of ruling axioms is broader, more complicated, and at times, conflictive. Nevertheless a societal ethical *nomos* is required. Anomie, the absence of a *nomos*, leads to societal chaos. One need look no further than Iraq to see anomie in action.

The language of individual ethics tends to be "private". This follows from the fact that good or right axioms are often based on the teachings of the great religions. However, religion-based axioms may not be understandable in the broader secular society.

Societal ethics normatively use "public" language based on reason and appeal to shared societal values and principles. It is sometimes called "common morality", social conventions about right and wrong human conduct that are so widely shared that they form a stable communal consensus. In the United States these shared principles were originally established in the founding documents, The Declaration of Independence and The Constitution (1). In fact, the earliest ethical *nomos* in North America is found in the Mayflower Compact of 1620 (2).

The Mayflower Compact, 1620

IN THE NAME OF GOD, AMEN. We, whose names are underwritten, the Loyal Subjects of our dread Sovereign Lord King *James*, by the Grace of God, of *Great Britain*, *France*, and *Ireland*, King, *Defender of the Faith*, &c. Having undertaken for the Glory of God, and Advancement of the Christian Faith, and the Honour of our King and Country, a Voyage to plant the first Colony in the northern parts of *Virginia*; Do by these Presents, solemnly and mutually, in the Presence of God and one another, covenant and combine ourselves together into a civil Body Politick, for our better Ordering and Preservation, and Furtherance of the Ends aforesaid: And by Virtue hereof do enact, constitute, and frame, such just and equal Laws, Ordinances, Acts, Constitutions, and Officers, from time to time, as shall be thought most meet and convenient for the general Good of the Colony; unto which we promise all due Submission and Obedience. **IN WITNESS** whereof we have hereunto subscribed our names at *Cape-Cod* the eleventh of November, in the Reign of our Sovereign Lord King *James*, of *England*, *France*, and *Ireland*, the eighteenth, and of *Scotland* the fifty-fourth, *Anno Domini*; 1620.

Note the key ethical requirement: just and equal laws, ordinances, acts, constitution and officers.[1]

The core "public" language in bioethics has been fairly fixed for a number of years, starting with the work of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research that culminated in the Belmont Report (4). The basic ethical principles in the report were three: respect for persons, beneficence, and justice. Subsequently, a four point system was widely used. One could summarize the four general ethical duties as follows:

1) There is a duty to preserve autonomy.
   This is the principle of respect for persons. All persons should be treated as ends, not means. In so far as their actions do not harm others, they are free. If autonomy is impaired then the person must be protected by both individuals and society.
2) There is a duty to perform no maleficence.
   This is the principle of not doing harm in physical, moral or spiritual terms. Harm can be either direct or indirect. I can do something that is harmful or I can withhold something from you that is harmful.
3) There is a duty to promote justice.
   This is the principle of treating persons fairly; to see that each receives what he or she deserves. It has dual elements: retributive justice, which has to do with punishment, and distributive justice, which has to do with rights and responsibilities. The punishments for crime should be equal and the rights and responsibilities of citizens should be equal.
4) There is a duty to practice beneficence.
   This means to perform acts of kindness or charity that go beyond strict obligation. The Latin word for this duty, *caritas*, and the Greek word, *agape*, mean disinterested or non-contingent love. One sees a need and meets it unbiased by personal interest or advantage or reward.

Very simply, then, ethical persons have a duty to respect persons, not to harm them, to see that they are treated justly and to respond to needs with kindness.

In principle the cardinal rules, though semi-stereotyped, function well in personal ethics and some aspects of societal ethics, including the narrower field of bioethics.[2] They are clearly informative for bioethical questions in individual humans, such as end of life decisions, participation in research, or surrogate motherhood, to cite a few examples. In practice they are less applicable in major societal discussion where the problem is not a decision between good and evil, but two forms or issues of good that are in conflict. In the case of the cloning and stem cell debate, the first good was the necessity for society to have a high respect for human life, especially nascent human life. The second good was human relief of

[1] The Mayflower *nomos* was written before the colony or nation was founded. It was thus "exodic", a term in bioethics coined by the Jewish ethicist Laurie Zoloth to indicate ethical thought carried out before an activity is practiced, not after. She chose the term from the biblical book of Exodus, the story of the journey from bondage in Egypt under Moses, citing his words in Deuteronomy 11: 26-29 and 30: 19-20. (3): "See! I am setting before you today: blessing and curse. I call heaven and earth to witness against you this day: I have put before you life and death, blessing and curse. Choose life." Decide, people, before you go.

suffering and premature death by research cloning. As will be apparent, the fundamental question of the first good was: "What is the nature of the early human embryo? Is it deserving of the full respect due a human being? Since it is not possible to obtain human embryonic stem cells without destruction of either the natural or cloned blastocyst, the five day embryo, should stem cell research be forbidden to preserve good one or should it be allowed to preserve good two. The core ethical guidelines are of little help here. Many ethicists are concerned by implications of modern biotechnology for what it means to be human. They are concerned not so much about patient safety (although this is always important) but whether it can change humanity in a "brave new world" fashion. So, James Keenan asked: "Who are we and what do we become if we do this thing?" And Laurie Zoloth writes: "Who are we if we turn away and who are we if we proceed."

I thought it might be of interest to review briefly some of the activities in societal ethics that have occurred in the President's Council on Bioethics. I will cover the Cloning Report (5), the current status of federal law and stem cell research (6), and recent recommendations for legislative activities (7).

1. The Cloning Report

The President's Council on Bioethics came into being because of the promise of embryonic stem cell research and controversy regarding their origin. That controversy is based on the previously mentioned "status of the embryo" question, to which I will return.

On August 9, 2001, President Bush addressed the nation on his policy regarding stem cell research. At the end of the speech, the President disclosed his intent to "name a President's Council[3] to monitor stem cell research, to recommend appropriate guidelines and regulations, and to consider all the medical and ethical ramifications of biomedical innovation.....This council will keep us apprised of new developments and give our nation a forum to continue to discuss and evaluate these important issues." The Council was established by executive order on November 28, 2001 and had its first meeting in January 2002. The membership was originally 18 (see Appendix 1 for roster). One of the 18, Stephen L. Carter, The William Nelson Cromwell Professor of Law at Yale, resigned after the fourth meeting to pursue his writing career.

There were five MDs, and I was one of the four persons named as scientists. In addition to three non-scientist MDs there were distinguished professors of bioethics, law, government, sociology and political science. Charles Krauthammer, an MD, is now a syndicated columnist for the *Washington Post* and *Time Magazine*.

News reports at the time noted that from writings and previous statements the bulk of the Council could be classified as politically conservative. The assumption was widely held that when a vote on cloning for research came, it would be 13 to 4, the 4 being the scientists. This turned out to be wrong, as we will see.

At inception the Council sought a "deeper bioethics", an ethics that did not begin with judging whether deed X or Y was moral or immoral or whether technology P or Q should be funded or banned, but rather to undertake fundamental inquiry into the full human and moral significance of development in biomedical science. By "full" was meant consideration of the moral/ethical impact mentally, socially, culturally, politically and spiritually for individuals and society.

[3] A Council is the highest advisory body of the federal government. Its appointment requires the signature of both the President and the Secretary of State. All meetings must be public. Executive sessions are not allowed.

In his executive order the President stated that "the Council shall be guided by the need to articulate fully the complex and often competing moral positions on any given issue [and] they may therefore choose to proceed by offering a variety of views on a particular issue rather than attempt to reach a single consensus position." This in fact turned out to be the case.

One of the remarkable things about the Council's deliberations is that the dialogue has been entirely collegial. Although views were forcefully stated, expressed anger was not part of public discussion. *The New York Times*, in its first story, stated that attending a meeting was like attending a graduate seminar.

As is well known, the cloning report, entitled Human Cloning and Human Dignity. The Report of The President's Council on Bioethics, was very detailed, 350 pages in length. There was no disagreement on a ban against cloning to produce children. Arguments from safety, based on animal cloning, and moral arguments were thought to be overwhelmingly persuasive despite awareness that some arguments for reproductive cloning might be acceptable in rare circumstances. The Council's unanimous vote for a ban on cloning to produce children was entirely in accord with the National Academy of Sciences Report, Scientific and Medical Aspects of Human Reproductive Cloning, released in 2002. (8)

The issue of cloning for biomedical research resulted in a closely divided Council, a surprise for those who thought the vote would be one-sided for a ban against all cloning.

The fundamental argument in the debate was about the nature of the embryo from point of conception by natural human intercourse or in vitro fertilization or by somatic cell nuclear transfer (cloning). A significant number of the Council holds that from the very beginning the embryo should be considered "one of us", a full equivalent of the human being. The prime argument is that if everything goes well there is no discontinuity between the zygote and the newborn child; i.e., it is human at conception and human at birth. It is, therefore, inviolable even for special good that might come from stem cells isolated from the blastocyst.

Those who ended up voting for the minority view felt that a five day embryo, absent neurons, brain, or any other organ, nonsentient, is potentially human but from a biologic standpoint pre-human. They were and are willing to shift to full protection at some early point in development. A popular line would be the appearance of the primitive streak at about 14 days. This is the time chosen by the United Kingdom for its embryo research. The Council minority was willing to set the limit at 5 days, the blastocyst stage. An excellent and balanced discussion of the moral standing of the human embryo is found in reference 6, pages 74-93.

After six months of intense and detailed discussion, a final vote was taken. The following table is published on page 228 of the report. It gives an informative look at how the Council stood.

	Permit now (with regulation)	Moratorium	Ban
To produce children	0	0	17
For biomedical research	7	3	7

The three members voting for a moratorium did not hold to the argument that the embryo was fully human as did the seven voting for a ban on cloning for research because the process destroys the embryo. They wanted time to think about regulations and to see if adult stem cells might do what embryonic stem cells can do.[4] Worries were also expressed about a "slippery slope". It was thought that routine destruction of blastocysts in unregulated fashion might make it subsequently easier to destroy embryos at later development even up to the time of the fetus at two months. Or that advancing skills in cloning might make it easier for rogue scientists or physicians to clone children.

The table indicates the original votes. When the "ban" seven realized that they could not carry the Council, they joined the three for moratorium to bring it to ten. Their decision was based on the fact that this would at least delay stem cell research to give them further time to develop their position of total ban. This transformed the final vote from 7-3-7 to 7-10.

The report was submitted to the President on July 10, 2002 but he has never publicly responded to it.

2. Where Are We Now With Stem Cells? Review of Federal Law and Policy

In 1995, before any funding proposal had been approved by the NIH, Congress attached language to the 1996 Departments of Labor, Health and Human Services and Education and Related Agencies Appropriations Act (the budget bill that funds DHHS and the NIH) prohibiting the use of any federal funds for research that destroys or seriously endangers human embryos. This provision is known as the "Dickey Amendment" after its author, former Representative Jay Dickey of Arkansas. It has been attached to the Health and Human Services appropriations bill each year since 1996.

Sections 510.(a) and (b) read as follows:

(a) None of the funds made available in this Act may be used for --
(1) the creation of a human embryo or embryos for research purposes; or
(2) research in which a human embryo or embryos are destroyed, discarded, or knowingly subjected to risk of injury or death greater than that allowed for research on fetuses in utero under 45 CFR46.208(a)(2) and section 498(b) of the Public Health Service Act (42 U.S.C.289g(b)).
(b) for purposes of this section, the term 'human embryo or embryos' includes any organism, not protected as a human subject under 45 CFR 46 as of the date of the enactment of this Act, that is derived by fertilization, parthenogenesis, cloning, or any other means from one or more human gametes or human diploid cells.

This law effectively prohibits the use of federal funds to support any research that destroys human embryos or puts them at serious risk of destruction. It does not, however, prohibit the conduct of such research using private funding. Thus, it addresses itself not to what may or may not be lawfully done, but only to what may or may not be supported by taxpayer dollars.

The Dickey Amendment was originally enacted before the first isolation of human embryonic stem cells by Thomson *et al* in 1998 at the University of Wisconsin.(13) This work was supported only by private funds (largely from the Geron Corporation and the University of

[4] There is increasing doubt that adult stem cells have plasticity, the ability to transdifferentiate into cells of different tissues. (References 9-12)

Wisconsin Alumni Research Foundation.) Embryonic germ cells, obtained from aborted fetuses, were identified in John Gearhart's laboratory at Johns Hopkins University School of Medicine, also in 1998.(14) The discovery of both types of cells and their unique and promising properties aroused great excitement both within and beyond the scientific community.

On its face the Dickey Amendment would seem to close the question of federal funding of human embryonic stem cell research, since obtaining stem cells for such research relies upon the destruction of human embryos. But in 1999 a legal interpretation by the General Counsel of the Department of Health and Human Services argued that the wording of the law might allow for an approach through which human embryonic stem cell research could be federally funded. If embryos were first destroyed by researchers supported by private funding, then subsequent research employing the derived embryonic stem cells, now propagated in tissue culture, might be considered eligible for federal funding. The Clinton Administration developed a policy to follow this legal opinion, but it was not completed in time to go into effect before the Bush Administration entered office. In conducting its own review, the Bush Administration sought a way to allow some potentially valuable research to proceed within the limits of the Dickey Amendment. At the time of The President's speech on August 9, 2001, a number of embryonic stem cell lines had already been derived and were in various stages of development. The embryos from which they were derived had therefore already been destroyed – the life and death decision had been irreversibly made. The Administration's policy made taxpayer funding available to research conducted on these pre-existing lines, but it refused in advance to support research on any lines created after the time of the announcement: 9:00 pm, August 9, 2001. In addition, to be eligible for funding, researchers could use only those preexisting lines that had been derived from excess embryos created solely for reproductive purposes (as opposed to aborted fetuses). Informed consent of the donors was required and no financial inducements could be offered. (For details, see chapter 2 of reference 6.)

The NIH lists the number of cell lines eligible for funding as 78. However, as of June 11, 2004, only 19 of the eligible lines have become available to federally funded researchers, with 41 more undergoing testing. On March 3, 2004 it was revealed in the *Washington Post* that 16 of the 78 eligible lines had deteriorated or died. Presumably this means that the eligible pool is down to 62.

The debate about stem cell research is far from over. Patient advocacy groups are intent on overthrowing the congressional restrictions. Scientists believe that the current number of cell lines is too few to develop meaningful therapeutic options. Essentially all the lines are from Caucasians. The number of spare embryos frozen is extremely large, with estimates as high as 400,000. The scientists argue that they will all eventually be destroyed or will degenerate through natural decomposition. Since death is inevitable under any circumstance, they think it better to have a useful and meaningful death. With deliberate destruction or with death from entropy, no benefit to humankind can possibly flow.

On the other hand, persons who feel strongly that from the moment of conception the embryo has the full status of a human being consider that destruction of embryos is not acceptable, even for the great good of potential treatment of unsolved human disease. The President, in his August 2001 speech, opted for this view:

> "Stem cell research is still at an early, uncertain stage, but the hope it offers is amazing: infinitely adaptable human cells to replace damaged or defective tissue and treat a wide variety of diseases. Yet the ethics of medicine are not infinitely adaptable. There is at least one bright line: We do not end some lives for the medical benefit of others. For me, this is a matter of conviction:

a belief that life, including early life, is biologically human, genetically distinct and valuable."[5]

On July 31, 2001, the House of Representatives passed the Weldon-Stupak bill which banned all human cloning by a vote of 265 to 162. The Senate has never acted on cloning legislation.

How much work is being done privately? This is uncertain. As of June, 2002 (reported in 2003) there were more than 30 biotechnology start-up firms in 11 countries pursuing commercial development of stem cell technology and therapeutic cloning.(15) They numbered about 1,000 scientists and support staff and spend just under $200 million a year on research and development. There were 10 companies in the United States spending about $70 million a year by best estimates, about twice what the NIH has spent on the approved funded research. The NIH assigned $180 million for adult stem cell research in fiscal 2003.

Subsequent to this published report, major increases in private funding have been announced in the press. New Jersey has committed $20 million for stem cell research and hopes to increase it to $100 million. Harvard will raise $100 million while UCSF has raised $11 million, and Stanford $12 million for stem cell research. The California Stem Cell Research and Cures Act proposes a $3 billion bond measure that will likely be on the November 2004 ballot.

There is no doubt that private funding will continue to increase. But the number of investigators able to get private funding is small relative to the number of investigators who would like to work with stem cells. There is also concern that private research may escape the ethical scrutiny of research demanded by the NIH. However, a number of companies have taken care to demand responsible ethical oversight of their operations. An outstanding example in stem cell work is the Geron Ethics Advisory Board (16).

3. Regulatory Proposals for Stem Cell Research from the Bioethics Council

On March 31, 2004, the Council delivered to the President its suggestions for legislative action in the report entitled, "Reproduction and Responsibility. The Regulation of New Biotechnologies." (7) It was quite remarkable that in contrast to the cloning report, the vote was unanimous. Leon Kass, in his personal statement in the Appendix to the report, notes the rather remarkable unanimity in the following comment:

> "Although its recommendations may be helpful in making progress on some familiar and contested policy questions, the report's major contribution is to show how a heterogeneous group of individuals, whose opinions range almost as widely as the American people, has agreed on the need to set limits on some uses of some biotechnologies, in order to protect common values."

[5] Thus far courts have not agreed with the President. I'm grateful here to Bruce F. Howell for a lecture given to the medical law class at UT Southwestern on November 13, 2003. There are five appellate court cases in none of which were embryos judged equivalent to humans. Perhaps the two most important decisions came from Kass vs. Kass (in New York's highest court) and Davis vs. Davis (Tennessee Supreme Court). In the Kass case the argument was about ultimate disposition of disputed embryos in a divorce. The court rejected the trial court's argument that a status "greater than property" was involved in cryopreserved zygotes. Instead, a legal instrument executed at the time the couple visited the fertility clinic was to be controlling. In effect this was a property decision about embryos. In Davis, the Tennessee Supreme Court concluded that "preembryos are not, strictly speaking, either 'single persons' or 'property', but occupy an interim category that entitles them to special respect because of their potential for human life." Nevertheless, the court said that the parents did have an "interest in the nature of ownership" which entitled them to dispose the preembryos pursuant to any mutual agreement. Both decisions basically create a property right in the pre-implantation embryos.

The recommendations represent modest safeguards in future stem cell research. There are also recommendations for additional regulation of assisted reproduction technologies (ART), but I will not comment on those here. I do note that all the major professional societies for assisted reproduction approved the recommendations. The Council did not propose a major regulatory structure for stem cell research like the Recombinant DNA Advisory Committee (RAC) because it believed much more thought was required and many more questions needed to be answered.

The eight recommendations are:

1) **Prohibit the transfer, for any purpose, of any human embryo into the body of any member of a non-human species.**

2) **Prohibit the production of a hybrid human-animal embryo by fertilization of human egg by animal sperm or of animal egg by human sperm.**

The purpose here is to preserve reasonable boundaries between humans and non-humans in procreation. Explanatory comments about the first two items are taken from the text:

"The 'mixing' of human and animal tissues and materials is not, in the Council's view, by itself objectionable. In the context of *therapy and preventive medicine* we accept the transplantation of animal organs or their parts to replace defective human ones; and we welcome the use of vaccines and drugs produced from animals. Looking to the future we do not see any overriding objection to the insertion of animal-derived genes or cells into a human body – or even into human fetuses – where the aim would be to treat or prevent a dread disease in the patient or the developing child (although issues would remain about indirect genetic modification of egg and sperm that would adversely affect future generations.) Likewise in the context of *biomedical research* we now see nothing objectionable in the practice of inserting human stem cells into animals – though we admit that this a scientifically and morally complicated matter. But in the context of *procreation* – of actually mixing human and non-human gametes or blastomeres at the very earliest stages of biological development – we believe that the ethical concerns raised by violating that boundary are especially acute and at the same time that the prospects of drawing clear lines limiting permissible research are especially favorable. One bright line should be drawn at the creation of animal-human hybrid embryos, produced ex vivo by fertilization of human egg by animal, (for example, chimpanzee) sperm (or the reverse): we do not wish to have to judge the humanity or moral worth of such an ambiguous hybrid entity (for example, a humanzee, the analogue of the mule); we do not want a possibly human being to have other than human progenitors. A second bright line would be at the insertion of ex vivo human embryos into the bodies of animals; an ex vivo human embryo entering a uterus belongs *only* in a *human* uterus. If these lines should be crossed, it should only be after clear public deliberation and assent, not by the private decision of some adventurous or renegade researchers."

3) **Prohibit the transfer of a human embryo (produced ex vivo) to a woman's uterus for any purpose other than to attempt to produce a live-born child.**

An explanatory excerpt from the document expands this thought:

"A number of animal experiments using assisted reproductive technologies have shown the value of initiating pregnancy solely for the purpose of research on embryonic and fetal development or for the purpose of securing tissues or organs for transplantation. We generally do not object to such procedures being performed on other animals, but we do not believe they should, under any circumstances, be undertaken with humans, or that human pregnancy should be initiated using assisted reproductive technologies for any purposes other than to seek the birth of a child. A woman and her uterus should not be regarded or used as a piece of laboratory

equipment, as an 'incubator' for growing research materials, or as a field for growing and harvesting body parts."

This recommendation involves respect for women in human pregnancy, and for preventing certain exploitative and degrading practices in women.

4) **Prohibit attempts to conceive a child by any means other than the union of egg and sperm.**

5) **Prohibit attempts to conceive a child by using gametes obtained from a human fetus or derived from human embryonic stem cells.**

6) **Prohibit attempts to conceive a child by fusing blastomeres from two or more embryos.**

Recommendation four would allow separation of the question for cloning to produce a child from cloning for research. It would simply be an affirmation of all the bodies that have commented on this issue before, namely that cloning for reproduction should not be allowed. Items five and six have to do with maintenance of respect for children conceived by other technologies. The Council said:

> "But as we have seen, certain applications of embryo manipulation and assisted reproductive techniques could deny to children born with their aid a full and equal share in our common human origins, for instance by denying them the direct biological connection to *two* genetic parents or by giving them a fetal or embryonic progenitor. We believe that such departures and inequities in human origins should not be inflicted on any child."

7) **Prohibit the use of human embryos in research beyond a designated stage in their development (between 10 and 14 days after fertilization).**

The Council wrote:

> "What degree of respect is owed to early human embryos will almost certainly continue to arouse great controversy as it does among members of this Council. But, we all agree that human embryos deserve, as we have said, '(at least) special respect.' Accordingly we believe some measures setting upper age limits on the use of embryos and research...may be agreeable to all parties to the ongoing dispute over the moral status of human embryos."

8) **Prohibit the buying and selling of human embryos.**

The Council states:

> "Concerns about commerce in the domain of human reproduction suggest to us the need for legislation instructing the United States Patent and Trademark Office **not to issue patents on claims directed to or encompassing human embryos or fetuses at any stage of development**; and amending Title 35, United States Code, section 271(g) (which extends patent protection to products resulting from a patented process) **to exclude those items from patentability.**"

By way of explanation of the patenting problem, the U.S. Patent Office was founded in 1793 under Jefferson. In 1889, the U.S. Commissioner of Patents ruled that no product in nature, even if newly discovered, was patentable. In the famous United States Supreme Court case of Diamond vs. Chakrabarty (1980) everything changed. A scientist working for General Electric had modified a *pseudomonas* bacterium (now called Burkholderia cepacia) to make it an oil eater. GE applied

for a patent which was rejected on the grounds that this fell under the nature restriction. The Supreme Court, on appeal, then ruled that things in nature that had been modified by humans were patentable. A subsequent ruling in 1987, Ex Parte Allen allowed patenting of organisms, including animals. However, the Board of Patent Appeals and Interferences ruled that one could not patent a human being based on the 13th amendment which overturned the Dred Scott case from the 1850s that said one could hold a property right in a human being.

The race to obtain patents for therapies developed from adult stem cell research is likely to be as rapid as the race to patent genes. David Reznik suggests that the next stage of the stem cell debate will involve a battle over commercial rights related to stem cells.(17) He said:

> "I will not try to defend it here, but my own view is that the problem is not just that stem cells and their products may be commodified, but that market-rhetoric may come to dominate the discussion (and practice) of regenerative medicine in a way that is dehumanizing."

Commodification is a term used by ethicists to describe the consideration of humans or their organs, tissues or genes as products (commodities) to be bought and sold like any manufactured item. One sees this already in the underground payment for kidneys to be transplanted. The Council does not want embryos commodified.

A number of private statements by Council members regarding these proposals are contained in the Appendices to *Reproduction and Responsibility, The Regulation of New Biotechnologies*.(7) They explain why Council members voted unanimously for the report although underlying philosophies, especially on the status of the embryo, differ rather widely. Five of the seven members who voted for research cloning in the original cloning report (5) hoped that this report could be used as a basis to break the deadlock on cloning in the Senate. Recognizing that it would not be possible to get agreement for research cloning, the hope was that the number of high quality stem cell lines derived from frozen blastocysts available for support by NIH could be expanded. For example, the 17 well categorized lines from the Melton laboratory(18) would be extremely valuable. Here is the statement of the minority: [6]

Personal Statement of Dr. Foster, Dr. Gazzaniga, Dr. Rowley, Professor Sandel, and Professor Wilson

We endorse the legislative recommendations contained in this report, on the following grounds: First, the limitations these regulations impose on the treatment of embryos in assisted reproduction and research give proper expression to the moral significance of human embryos. Although we do not regard embryos as the moral equivalent of fully developed human beings, we believe that they are more than mere things, and should not be used wantonly or treated with moral indifference. The proposed regulations offer a way to prevent such wanton or casual treatment, and so accord human embryos the respect they are due.

Our second reason for supporting these regulations is that they point to a possible solution to the vexed issues of cloning and stem cell research that could overcome the current impasse in the U.S. Senate. Despite widespread opposition to reproductive cloning, the Senate has been unable to ban it because of disagreement about cloning for biomedical research. The obvious

[6] Two of the original minority group, Drs. Elizabeth H. Blackburn and William F. May were not reappointed to a second term on the Council.

solution is to detach the two questions, but until now, it has proven difficult to do so. One way of banning reproductive cloning alone would be simply to prohibit the transfer of a cloned embryo into a woman's uterus, as Britain has done. Some object, however, that such a law would effectively make it a crime not to destroy a cloned embryo.

The formulation proposed in this report offers a way of banning reproductive cloning that avoids that difficulty. It proposes that Congress "prohibit attempts to conceive a child by any means other than the union of egg and sperm." We believe that this language provides a way for Congress to ban reproductive cloning while agreeing to disagree on the question of cloning for biomedical research; such a solution would prevent attempts to created cloned children while allowing debate to continue about cloning for stem call research and regenerative medicine.

The proposed regulations, taken together, also point toward a possible compromise on federal funding of stem cell research. Some object to embryonic stem cell research on the grounds that embryos are persons and therefore inviolable. But others object on different grounds. They worry that, in the absence of clear limits, embryo research could lead down a slippery slope of exploitation and abuse: if today we derive stem cells from blastocysts, tomorrow some might seek to transfer embryos into a woman's uterus, or even a pig's uterus, to grow organs for transplant, creating the nightmare prospect of embryo farms, fetuses exploited for spare parts, and the commercialization of human life.

One great merit of the regulations contained in this report is that, if implemented, they would address the slippery slope argument against embryonic stem cell research by assuring that such research is done responsibly, within carefully prescribed limits. No embryos used for research could be used or preserved beyond a 10-14 day limit, or transferred into a woman's uterus or an animal's body to grow organs for harvest; nor could embryos be bought and sold. Regulations such as these will not fully satisfy the objections of those who oppose stem cell research on the grounds that blastocysts are morally equivalent to babies. But by assuring that stem cell research is conducted within carefully prescribed limits, these regulations effectively address the concern that stem cell research today will lead us down a path to exploitation and abuse tomorrow. The proposed regulations could, therefore, point the way toward a compromise on federal funding along the lines that Senator Bill Frist proposed in July 2001:

> After grappling with the issue scientifically, ethically and morally, I conclude that both embryonic and adult stem cell research should be federally funded within a carefully regulated, fully transparent framework. This framework must ensure the highest level of respect for the moral significance of the human embryo. Because of the unique interaction between this potentially powerful new research and the moral considerations of life, we must ensure a strong, comprehensive, publicly accountable oversight structure that is responsible on an ongoing basis to moral, ethical and scientific considerations.

Senator Frist proposed a number of regulations, similar in spirit to the ones proposed in this report, that would permit federal funding of embryonic stem cell research, at least on cell lines derived from blastocysts from IVF clinics that would otherwise be discarded. Although we would not restrict stem cell research to blastocysts left over from IVF clinics, we realize that this remains a controversial question. The compromise toward which the regulations in this report points might leave aside the question of funding for stem cell research on cloned embryos, and move forward

on areas of potential agreement.

Recent scientific developments illustrate the need to adjust federal funding policy along the lines Senator Frist proposed in 2001. Only 17 cell lines are currently on the NIH Registry and available for federally funded research, and many of those are subject to stringent licensing requirements. In March, Harvard biologist Douglas Melton announced the creation of 17 new embryonic stem cell lines that he is making available free of charge to scientists for noncommercial research purposes. The Harvard stem cell lines meet all the criteria proposed by Senator Frist: They were derived, using private funds, from blastocysts left over from IVF clinics that would otherwise be discarded, with the consent of the donors. And yet, under current federal policy, research on these cell lines is ineligible for federal funding. The reason: unlike the 17 stem cell lines currently available for federal funding, the new Harvard cell lines were derived after 9:00 p.m. on August 9, 2001, the deadline announced by President Bush in his address to the nation on stem cell research.

Whatever one's view of the moral status of the embryo, it is difficult to understand the moral distinction between research on stem cell lines created before 9:00 p.m. on August 9, 2001, and research on stem cell lines created since. We endorse the regulations proposed in this report in the hopes that these regulations can point the way to a national compromise on cloning and stem cell research that will enable this country to promote the promise of stem cell research while upholding the highest ethical standards.

4. Final Comments

There are serious ethical questions involved in the new biotechnologies beyond the central issue of the nature of the embryo in stem cell research. Scientists tend to focus on safety and things like informed consent and not on larger ethical questions. Even on the safety issues, there are recent examples of physician scientists pushing or crossing the boundaries of patient safety with resultant patient death. (A classic example is the death of Jesse Gelsinger at the University of Pennsylvania after gene therapy for a mild ornithine transcarbamylase deficiency.) There is no doubt that serious regulatory oversight will be needed in stem cell research. The ethicist Cynthia Cohen has proposed a National Stem Cell and Associated Technologies Advisory Board to carry out this function. (19) However, there are deeper issues that have been discussed by the Council. They are usually encompassed by fears that the very nature of humans may be put at risk. While questions such as: "What does it mean to be human?" have evoked ridicule by many in the scientific community (largely because persons who ask such questions tend to also be against embryo destruction to obtain stem cells), in my view, such questions are legitimate and important. In terms of "enhancement" of human performance by drugs or gene therapy there is always the question of justice. The persons who need enhancement the most, the poor and undereducated or mentally less gifted, are not likely to get it since the costs are very great. But the questions are larger than just justice. Do we want a humanity where competition is not based on natural gifts, for example? Will pre-implantation genetic testing go beyond choice of embryos to prevent transmitted disease and be applied to sex selection focusing on boys over girls? (For a full discussion, see the Council's report entitled Beyond Therapy. Biotechnology and the Pursuit of Happiness.)(20)

So, I think there are unanswered ethical questions and even dangers. The analogy might be what happened to the nuclear physicists more than a half a century ago. C.P. Snow in his book The New Men, discussed the angst of those who built the nuclear bomb as they faced up to the fact that nuclear power had potential benefit and also great risk. The geneticist James Neel, commenting on this, said:

> "The molecular geneticist bids to replace the physicist in the intellectual hot seat. No person can foresee the ultimate power of the methodology of modern genetics, but to fail to use the power wisely with respect to ourselves would be the ultimate in the many desecrations humankind have already inflicted on the Earth and its various inhabitants."(21)

This is the status of the Council's work on stem cells as of July 2004. It's now working on ethical issues in other arenas. I would like to add three references from the July 15 issue of the *New England Journal of Medicine* which is out today (22-24). The first two are by Council members Paul R. McHugh and Michael J. Sandel. Dr. McHugh voted with the majority in Human Cloning and Human Dignity. Dr. Sandel voted with the minority. Dr. Debora Spar, not a member of the Council, addresses commercialization issues.

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