Embryo-destroying Stem Cell Research Fact Sheet

Summary: The question of whether the federal government should fund human embryo research is the same as the question of whether we should use federal funds to pay for abortions. Both issues concern the use of taxpayer funds to destroy human lives.

Status: The Bush Administration is reviewing the Clinton administration's National Institutes of Health (NIH) guidelines allowing federal funding of embryonic stem cell research. Three embryo-destroying research grant applications were submitted by the March 15 deadline to the Department of Health and Human Services. The next round of grant requests are due June 15.

NIH Guidelines

The National Institutes of Health (NIH) has issued guidelines under which, for the first time in history, our federal government will officially approve and regulate the destruction of innocent human life for research purposes. The guidelines instruct researchers in how to harvest versatile "stem cells" from living one-week-old human embryos, a procedure which kills the embryos. They also establish standards for harvesting similar cells from dead unborn children following induced abortions -- a practice that has its own increasingly visible moral problems (trafficking in fetal body parts), but is in accord with a federal law enacted in 1993. The new moral and legal frontier broached by these guidelines is the destruction of live embryos specifically for federally sponsored research -- on the pretext that no one will care anyway, because these are "spare" embryos from fertility clinics that are "in excess of clinical need."

Objections to Embryonic Stem Cell Research

I. The NIH Guidelines Destroy and Demean Human Life

- These guidelines are not designed to implement current laws and regulations protecting the human embryo from harmful experiments -- they are designed to undermine that protection.

- Live human embryos are dismissed as mere "tissue" to be destroyed for useful cells.

- NIH justifies this destruction by, among other things, the prospect that use of the resulting cells may reduce the need to use "laboratory animals" for drug testing. The human embryo ranks lower in status than a laboratory rat.

- Since 1975, embryos in the womb at this same stage of development (about a week old) have been seen by the federal government as "human subjects" to be protected from harmful research (see 45 CFR §46.201 et seq.). Yet the NIH now decides that the same embryo outside the womb can be exploited and killed as mere "tissue." Even the NIH's own Human Embryo Research Panel in 1994, and President Clinton's National Bioethics Advisory Commission in 1999, admitted that this embryo is a developing form of human life that deserves respect.

II. Evading the Law

- Since January 1996, federal law has banned federal funding of "*research in which* a human embryo or human embryos are destroyed, discarded, or knowingly subjected to risk of injury or death greater than that allowed for fetuses in utero" under federal human subjects regulations. The NIH guidelines allowing federal funding of embryo-destroying research are clearly outside the intent of federal law.

Arguments used by proponents of embryo-destroying research

I. This research might generate a cure for diseases like Parkinson's, diabetes or spinal cord injuries.

ANSWER: Adult stem cells also have the same potential, and research on adult stem cells does not require the destruction of a human embryo.

II. These embryos will be destroyed eventually anyway, so we might as well use them.

ANSWER: This is hardly a justification to use human life as a scientific test subject. We don't condone experiments on death row prisoners or the terminally ill. IVF embryos can be adopted (Snowflake Adoption Agency) by the many families looking for a way to have children.

III. Since it is already happening in the private sector, we need to make sure the government is doing it also so the benefits of the research will be available to anyone.

ANSWER: Just like with abortion, federal funding should not be used to condone something that many taxpayers feel is morally wrong. Diverting federal money from promising adult stem cell research to embryo research only invests taxpayer dollars in the controversial instead of the promising.

Alternatives

Recent scientific breakthroughs show that adult stem cell research has as much, or more, potential than embryo-destroying research.

I. Embryo research has problems:

ÿ Douglas Melton of Harvard University has said recently: "Human embryonic stem cells are trickier than mouse. **They're more tedious to grow**."[1]

ÿ Molecular biologist Michael Shamblott, Ph.D. sums up some of the concerns with embryonic stem cell research. "We thought from the first that problems would arise using hPSCs [human pluripotent stem cells] to make replacement tissues. The early-stage stem cells are both difficult and slow to grow. More important, there's a risk of tumors. If you're not very careful when coaxing these early cells to differentiate — to form nerve cells and the like -- **you**

[1] G. Vogel; "Stem cells: New excitement, persistent questions"; Science 290, 1672-1674; Dec 1 2000.

risk contaminating the newly differentiated cells with the stem cells. Injected into the body, stem cells can produce tumors."[2]

Adult Stem Cell Alternatives Promising:

- ÿ On April 11, 2001, a New York Times article reported that a New Jersey company can Derive Stem Cells from the Placenta. This provides a substantial supply of ethically obtained stem cells for treatment and research.
- **ÿ** Human fat can provide stem cells that can turn into bone, cartilege, bone marrow, and muscle tissue. On April 10, 2001, the Washington Post, New York Times, CNN, Wired, CNS News, Reuters, AP, Los Angeles Times, and Boston Globe all reported on this story. The Washington Post article said, **"Those discoveries have begun to shatter a long-held belief that embryos and fetuses are the only significant source of stem cells."**
- ÿ On March 30, 2001, *MSNBC* and *NBC Nightly News* reported that Dr. Donald Orlic of the National Human Genome Research Institute in Bethesda, said adult stem cells can rebuild all the parts of the damaged heart. He was quoted as saying, "We are currently finding that these adult stem cells can function as well, **perhaps even better than**, embryonic stem cells."[3]
- ÿ Scientists have found that cultures of adult stem cells from the spinal cord can be grown from single cells, and can differentiate into neural cells when injected into the spinal cord or brain of rats. The researchers noted that the adult stem cells generate region-specific neurons in the body when exposed to the appropriate environment.[4]
- ÿ Research at the University of California-Irvine College of Medicine shows that simply adding the proper growth signal to injured brains may be sufficient to stimulate the neural stem cells already in the brain, rescuing brain cells. The researchers note that this "points as a means of treating the cholinergic component of neuronal loss in Alzheimer's disease."[5]
- ÿ Two research groups have shown that adult bone marrow stem cells can be injected into the bloodstream and migrate to the brain, where they become incorporated into brain tissue and differentiate into neurons. One group noted that **generation of brain cells from adult bone marrow "demonstrates a remarkable plasticity of adult tissues with potential clinical applications."** The other research team said: **"These findings raise the possibility that bone marrow-derived cells may provide an alternative source of**

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[2] Johns Hopkins Medical Institutions Office of Communications and Public Affairs; "New Lab-Made Stem Cells May Be Key To Transplants"; Dec. 25 2000.

[3] Robert Bazell: "Approach May Repair Heart Damage"; MSNBC.com; April 2001.

[4] S. Shihabuddin et al.; "Adult spinal cord stem cells generate neurons after transplantation in the adult dentate gyrus"; J Neuroscience 20, 8727-8735; December 2000.

[5] M.H. Tuszynski; "Intraparenchymal NGF infusions rescue degenerating cholinergic neurons"; Cell Transplant 9; 629-636; Sept-Oct 2000

neurons in patients with neurodegenerative diseases or central nervous system injury."[6]

ÿ Researchers in the UK have shown that brain cells called "oligodendrocytes" can be "reprogrammed", forming complete adult neural stem cells which can generate multiple brain cell types. The scientists found that different combinations of growth signals could cause the cells to revert to a multipotential adult stem cell, and note that **"these precursor cells have greater developmental potential than previously thought."[7]**

ÿ Another report from the University of California-Irvine showed that infusion of a single factor named transforming growth factor alpha into rats with brain damage similar to Parkinson's induced rapid proliferation of neural stem cells, followed by their migration and differentiation into neurons. Treated rats had decreased symptoms. The scientists note: "This finding has significant implications with respect to the development of treatments for both acute neural trauma and neurodegenerative diseases," and: "The data predict an alternative strategy to the current cell transplant methodologies for the treatment of neurodegenerative diseases."[8]

Definitions

Stem cells are cells capable of developing into a variety of cell types. Stem cells are found in the adult body (bone marrow, fat, and even hair) and in embryos. Stem cells are totipotent, pluripotent and multipotent. Totipotent cells contain genetic coding capable of forming a complete organism. For example, a fertilized human egg is a totipotent cell. These totipotent cells, after several days of cell division, form a hollow sphere called a blastocyst. The outer layer of cells of the blastocyst forms the placenta while the inner layer of cells can form almost any type of tissue. This inner layer consists of pluripotent stem cells. As the embryo continues to grow, the stem cells develop into multipotent stem cells, which give rise to specific cells. Totipotent and pluripotent cells are also called embryonic stem cells while multipotent cells are known as adult stem cells. Embryonic stem cells are taken from the Blastocyst of an embryo over 8 days old. The Blastocyst is the outer layer of the embryo, so in taking the stem cells, the embryo is killed. At this time stem cells can only be taken from an embryo by destroying the embryo.

Here We Go Again

We are hearing the same thing about embryonic stem cells that we once heard about fetal tissue derived from aborted unborn babies. Nearly a decade later, fetal tissue research has not lead to any of the miracle cures that were touted by its supporters at the time. Worse still, a recent article in the *New York Times* documented that a comprehensive analysis of fetal tissue

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[6] T.R. Brazelton et al.; "From marrow to brain: expression of neuronal phenotypes in adult mice"; Science 290, 1775-1779; Dec 1, 2000.

E. Mezey E et al.; "Turning blood into brain: Cells bearing neuronal antigens generated in vivo from bone marrow"; Science 290, 1779-1782; Dec 1, 2000.

[7] T. Kondo, and M. Raff; "Oligodendrocyte precursor cells reprogrammed to become multipotent CNS stem cells"; Science 289, 1754-1757; Sept. 8, 2000.

[8] J. Fallon et al.; "In vivo induction of massive proliferation, directed migration, and differentiation of neural cells in the adult mammalian brain"; Proc. Natl. Acad. Sci. USA 97, 14686-14691; December 19, 2000

transplantation research uncovered horrifying accounts of Parkinson's disease patients who have been irrevocably harmed by the fetal tissue transplants. Now the same arguments are being used to promote embryo-destroying stem cell research, which has proven to be tricky and may not be as easy to work with as adult stem cell research. Fetal tissue research promised cures that were not realized; it is unlikely that embryonic-stem cell research will fare much better. What will be the next ethical barrier that must be breached in the name of finding a cure? Research on human clones?