CRG STEM CELL MYTHS
A Briefing Paper for the EGA Institute

HYPE CREATES MISCONCEPTIONS

Embryonic stem cell coverage by the popular media often has contained misleading and exaggerated information about the positive potential of these cells. Additionally, even though there are many concerns, the debate has frequently been reduced to a battle between the "religious right" and "researchers searching for cures to end human suffering." Media hype is a disservice to the public and has created myths that should be dispelled.

Myth: This is a pro-life vs. pro-choice debate.

A person can be pro-choice in terms of a woman choosing whether to continue with her pregnancy and be opposed to the production of embryos for research. There is a distinct moral difference between a woman deciding to bring a child into her life and controlling the fate of an embryo in a laboratory.

Myth: By questioning embryonic stem cell research we are allowing people to suffer and die every day.

People suffering from diseases have been very vocal in this debate, pleading to save them and others who share their afflictions by allowing this research to be funded and go ahead unhindered. These emotionally charged messages cloud the present reality of the situation. Prominent celebrities such as Michael J. Fox, Mary Tyler Moore, and Christopher Reeve are not likely to be cured as a result of embryonic stem cell research. Research on embryonic stem cells as possible therapeutic agents for Parkinson's disease, diabetes, and spinal cord injury are still in the early stages. The research is presently performed on animal models of human diseases. Animal models do not precisely mimic human diseases. It is too early to know the clinical benefits of embryonic stem cells for certain. While the only way to uncover these benefits is to keep researching and learning, the present situation should be kept in perspective, free from exaggerated claims and hype.

Myth: Embryonic stem cells are the only possible treatments for diseases like diabetes, Alzheimer's disease, and Parkinson's disease.

Stem cells are not the only avenue for future treatments for these diseases.

Scientists researching diabetes are looking into new drugs that would "sensitize" people with type 2 diabetes to the insulin that is in their blood. Other drug possibilities are in the works. Preventative treatments for Alzheimer's disease, such as estrogen replacement for women and anti-inflammatories, are showing early results. A lineup of drugs for Parkinson's disease is entering phase 2 clinical trials. While stem cells may offer treatments at a later date, we must not lose focus on other possibilities.

Myth: We can only get stem cells from embryos.

Amidst all the hype about embryonic stem cells, it is easy to come to this conclusion, and it is simply untrue. As mentioned in the Stem Cell Primer, there are many sources of stem cells in adult humans.

Myth : We can simply use adult stem cells as substitutes for destroying human embryos for science.

While adult stem cells may have medical promise, and may turn out to be more

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effective than embryonic stem cells in treating some diseases, adult stem cells cannot be mere substitutes for embryonic stem cells, and vice versa. Different types of stem cells are not equal. Each has distinct advantages and disadvantages. For instance, ESCs are grown more easily in vitro, but have a higher likelihood to form tumors than ASCs.

THE CONTINUING POLITICS OF HUMAN STEM CELL RESEARCH

In addition to allowing federal funding on 60 embryonic stem cell lines, President Bush has promised to create a new President's Council on Bioethics, chaired by University of Chicago professor Dr. Leon Kass, an expert in biomedical ethics. The sorely needed council will study such issues as embryo and stem cell research, assisted reproduction, cloning, genetic screening, gene therapy, euthanasia, psychoactive drugs, and brain implants.

Since President Bush's decision, researchers and politicians have debated whether there are truly 60 stem cell lines, whether these lines will be made available to public researchers, whether they have been maintained properly, and whether the alleged 60 lines will be enough for basic research.

The number of viable stem cell lines is still unconfirmed. Scientists are also unsure how many will be "needed" to pursue their research.

A COMPARISON OF HUMAN STEM CELL TYPES

	Adult Stem Cells (ASCs)	*Embryonic Stem Cells (ESCs)*	*Embryonic Germ Cells (EGCs)*
Possible Benefits	-may form more types of cells than was first speculated -some types can produce a whole different set of cells depending on their location	-form nearly all types of cells that make up an organism -proliferate for a long period of time in vitro	-do not form tumors as easily as ESCs -proliferate more rapidly than ASCs -can proliferate fairly well in vitro
Possible Drawbacks	-no known type of ASC can form as many types of cells as ESCs -rare and difficult to separate from progenitor cells -have not proliferated well in vitro	-divide rapidly and can form tumors -difficult to control the types of cells they produce	-while they proliferate in vitro, they have not divided for as many generations as ESCs
A Sample of Experimental Data	-A type of ASC, found in the bone marrow is the only type of stem cell currently used to treat human disease. These hematopoetic stem cells are used to treat cancers and blood disorders.	-ESCs have produced heart cells that pulse in vitro -Mouse pancreatic islet cells have been produced, but the experimental mice still retained the symptoms of diabetes.	-Researchers at John's Hopkins University used EGCs to restore motor function in rats whose neurons had been destroyed by a virus. it is not known why the treatment worked or if it could be applied to humans.

United States Patent 6, 200, 806, issued to Geron Corporation, makes claims to human embryonic stem cells. Geron has the intellectual property rights to the methods used to isolate human and other primate ESCs. Human embryonic stem cells are owned, and the rights to use them can be bought and sold.

Some people fear that because of Geron's patent, the cost of working with embryonic stem cell lines will be too high and research in the public sector will be very slow. With or without assistance from public researchers, private research will continue, and it will continue unregulated.

In January 2001, Great Britain became the first country to allow research on embryonic stem cells. It is also legal to clone embryos for research purposes. Since Great Britain has more lenient regulations, some U.S. scientists have threatened to pursue their research overseas.

Although the underlying message of the President's decision was to proceed with caution, the only way we can be completely cautious conducting research on human embryos is to enact regulations that reach worldwide and include private biotechnology and pharmaceutical companies. These companies have invested billions of dollars in biomedical research; should we allow bioethical boundaries to be determined and controlled by corporations?

TO LEARN MORE

This paper accompanies a briefing paper for the EGA Institute called "Stem Cell Primer," which explains many of the terms and concepts referred to here.

The briefing paper and this paper are excerpted from a booklet called *Brave New Biology: A Citizen's Guide to Stem Cells and other Bio-Controversies.* The booklet discusses stem cells, reproductive choice issues, embryo cloning, human cloning, and egg donation. It also contains a complete glossary, the Genetic Bill of Rights, and a section on "what you can do."

Brave New Biology is available from the Council for Responsible Genetics at the address below.

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