




Is Stem Cell Research Necessary?

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IN CONTROVERSY

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Stem Cell Research: The Moral Debate

Michael J. Fox shot to stardom playing the role of Marty McFly in the movie *Back to the Future*, which tells the story of a teenager who travels back in time to make sure his parents meet at a high school dance. After starring in the film and its sequels, Fox went on to a career in TV and the movies that established him as one of the most popular actors in Hollywood.

But Fox takes few roles today. In 1991, at the age of 30, he was diagnosed with Parkinson's disease, a debilitating neurological disorder that manifests itself in slowed and slurred speech, muscle tremors, and rigid muscles. The disorder is caused by a lack of nerve cells, or neurons, in the brain that produce dopamine, a chemical that carries messages from cell to cell. Research has shown that the brain contains many more neurons than it actually needs—it is nature's way of preserving cognitive abilities as people grow older and lose brain cells during the normal process of aging. In Parkinson's disease, the cells die much more quickly, which means less dopamine is produced by the brain, leaving relatively young people fewer neurons than they need to maintain normal cognitive abilities. At first Fox was able to continue working because his symptoms were minor. But over the years his

> "Embryonic stem cell research is so promising that it's hard to understand the hesitation people have with studying them."[4]
>
> — Michael J. Fox, actor and Parkinson's disease patient.

symptoms have progressed, and now whenever Fox makes a public appearance, the physical tremors that make him tremble and slur his speech are evident.

A controversial process that involves the use of what are known as stem cells may hold a lot of promise for Parkinson's patients and others who suffer from cell-related diseases. During the past few years, Fox has emerged as a major proponent of stem cell research and has even established a foundation to raise money for the research. He has also called on the federal government to make billions of dollars a year available for stem cell research. Says Fox, "I really believe in the promise of stem cell research."[1]

Destroying Embryos

Stem cells can be injected into a patient, where they are believed capable of growing into normal and healthy tissue, replacing cells that are diseased or destroyed. Proponents of stem cell research

Actor Michael J. Fox, speaking at a conference in 2008, was diagnosed with Parkinson's disease at the age of 30. He believes that stem cell research offers promise for a cure for Parkinson's.

advantages, and we learn a tremendous amount by comparing the two cells."[51]

The Safest Option

Like embryonic stem cells, adult stem cells are undifferentiated. They are found among other cells in the body, and their purpose is to replace cells that become damaged either through disease or injury. There are places in the various tissues, organs, and fluids of the body known as stem cell niches, which is where the adult stem cells reside, often for many years. Adult stem cells remain dormant until they are needed.

A form of adult stem cell is also found in the blood of the umbilical cord, the tube of tissue with which a mother supplies nutrients to her fetus, as well as the placenta, the bag of thin tissue that surrounds the fetus in the womb. Typically, cord blood is withdrawn from the placentas and cords donated by mothers after

Stem cells can be harvested from blood found in the umbilical cord and placenta (pictured). After a woman gives birth, blood from both can be frozen until it is needed for stem cell harvest.

they give birth. The blood is then frozen until it is needed for stem cell harvest. These stem cells are often called cord blood cells.

As with embryonic stem cells, adult stem cells are pluripotent. While stem cells found in the brain, for example, do a very good job of differentiating into brain cells when they are needed due to a head injury, research has also found that undifferentiated adult stem cells drawn from brain matter can evolve into cells that can be used to repair other organs. Says Wolfgang Lillge, a physician and science journalist:

> It has been known for about 30 years that stem cells are present in the tissue of the adult, but it was assumed that they could only form cells of a particular tissue. That is, reprogramming them was considered impossible. In recent years, however, pluripotent stem cells were discovered in various human tissues—in the spinal cord, in the brain, in the . . . various organs, and in the blood of the umbilical cord. These pluripotent stem cells are capable of forming several cell types—principally blood, muscle, and nerve cells. It has been possible to recognize, select, and develop them to the point that they form mature cell types.[52]

"The greatest advantage of adult stem cells is that it's usually possible to use a person's own stem cells, which is the safest stem cell option for people."[53]

— Jean Peduzzi-Nelson, professor of anatomy and cell biology at Wayne State University School of Medicine in Michigan.

Another advantage of adult stem cells is that in many cases the patient can be his or her own donor, meaning that there is virtually no chance the body's immune system will reject the cells. "The greatest advantage of adult stem cells is that it's usually possible to use a person's own stem cells, which is the safest stem cell option for people," says Jean Peduzzi-Nelson, professor of anatomy and cell biology at Wayne State University School of Medicine in Michigan. "This avoids the problems of rejection, disease transmission, chromosomal abnormalities and uncontrolled growth,"[53] which can lead to tumors.

While adult stem cells may have some distinct advantages over embryonic stem cells, many scientists believe there are also

Related Organizations

American Life League

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phone: (540) 659-4171
fax: (540) 659-2586
e-mail: info@all.org
Web site: www.all.org

The American Life League opposes abortion rights. By following the "Bioethics" link on the organization's Web site, students can read essays by officials of the league who oppose cloning and embryonic stem cell research.

Beijing Tiantan Puhua Hospital

Tiantan Puhua Stem Cell Treatment Center
12 Tiantan Nanli
Beijing, 100050
People's Republic of China
phone: 86-10-67035566
fax: 86-10-67061799
Web site: www.stemcellspuhua.com

Many Americans undergo stem cell therapies at the Beijing hospital. Visitors to the hospital's Web site can read about the treatments and recoveries of patients who suffer from Parkinson's disease, cerebral palsy, brain trauma, Batten's disease, stroke, and other diseases and debilitations.

California Institute for Regenerative Medicine

210 King St.
San Francisco, CA 94107

For Further Research

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Lisa Yount, *Biotechnology and Genetic Engineering: Library in a Book.* New York: Facts On File, 2008.

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