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Scientists hope a method used to coax monkey stem cells to form neurons will work with human stem cells. (PhotoDisc)

Making Brain Cells
Scientists Create Monkey Neurons; Work Could Boost Parkinson's Cure

By Amanda Onion
abcNEWS.com

Jan. 29 — In an important step that could lead to an effective treatment against Parkinson's disease, researchers have coaxed monkeys' embryonic stem cells to form brain cells.

Scientists have long sought ways to grow human neurons that could replace the millions of cells that die in the brains of Parkinson's disease patients. This work is significant since the cells of monkeys and humans share many similarities — and a success in one suggests it's possible in the other.

"If human embryonic stem cells show similar patterns of differentiation, then cells derived in this fashion might be appropriate for human transplant in the next five years," said Curt Freed, director of the Neurotransplant Program for Parkinson's Disease at the University of Colorado School of Medicine.

New Brain Cell Source Needed

Parkinson's is a slow, progressive disorder that inhibits movement, muscle control and balance due to a loss of cells in the brain that produce the neurotransmitter called dopamine. It's most common among the elderly, but the disease can also affect younger people and has afflicted many high-profile figures, including actor Michael J. Fox, former Attorney General Janet Reno and former boxer Muhammad Ali.

Recent research in Sweden has shown that replacing brain cells with cells taken from fetuses discarded following abortions might be an effective treatment for the disease.

But the method is still unreliable, and depending on fetal cells for transplants can be controversial

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and problematic. Lorenz Studer, head researcher of stem cell and tumor biology at the Sloan Kettering Institute in New York City, said aborted fetuses are very difficult to acquire and are often prepared by inconsistent methods.

"Often you need tissue from four entire fetuses to manage a single transplant for one side of the brain — it's just not efficient," he said. "But with stem cells, one cell line could produce transplants for thousands of people."

Stem cells are known as the body's "tool box" since they are highly flexible and can develop into nearly any of the more than 200 types of cells and tissue that make up the human body.

Since embryonic stem cells are derived from discarded embryos from abortion or fertility clinics, the research also remains contentious in the United States. The Bush administration ruled last September that federally funded researchers could only have access to 64 already existing stem cell lines, and barred any federal funding for work that uses any newly created lines.

Finding the Right Trigger

A major stumbling block for scientists has been in learning how to guide embryonic stem cells to develop into particular blood or tissues. Scientists have successfully triggered human embryonic cells to form human neurons but these cells haven't secreted the crucial signaling chemical, dopamine.

To trigger the monkey embryonic stem cells to grow into neurons, scientists from Kyoto University's School of Medicine in Japan exposed the cells to another cell line known as PA6. Past experiments with mice showed that this cell line somehow leaked signals that caused the young cells to form neurons.

The team, including lead researcher Hiroshi Kawasaki, proved that PA6 could be an effective trigger since nearly 40 percent of the cells formed neurons in three weeks. Kawasaki published the findings in this week's issue of the *Proceedings of the National Academy of Sciences*.

Despite the success, others point out that much needs to be done before the method can be attempted in clinical trials.

First, neurons created by the method need to be tested in primates to make sure they function normally in the brain. And then scientists will need to see if the method actually works as expected using human embryonic cells.

"There is a very big safety concern," said Studer. "If some of the transplanted cells are not fully transformed into normal neurons, it can cause tumors."

The Japanese scientists may face more work ahead, but this study revealed the research could yield unexpected bonuses. Some of the monkey embryonic stem cells they manipulated changed into pigment cells that play a critical role in vision. The new discovery might prove vital in finding new treatments for diseases of the eye.

"This just shows that there are many exciting surprises to be uncovered as work on embryonic stem cells continue," said Freed. ■

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