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## Human stem cells heal the hearts of rats

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WASHINGTON - A nutritious cocktail helped human embryonic stem cells thrive and repair the damaged hearts of rats, U.S. researchers reported on Sunday.

The experiment provides the best evidence yet that the powerful but controversial stem cells might be used to repair the ravages of heart attacks and heart failure, the researchers said.

Biotechnology company Geron Corp said it would try to develop the cells into a product. "We're developing our cardiomyocyte product, GRNCM1, to address the large unmet need in heart failure," said Dr. Thomas Okarma, president and chief executive officer of Geron.

Stem cells are the body's master cell, acting as a source for the various cells and tissues in the body. Those taken from days-old embryos, called embryonic stem cells, are the most malleable and can produce all of the cell types.

Their use is controversial because some people oppose the destruction of a human embryo. U.S. President George W. Bush has kept strict limits on federal funding of human embryonic stem cell research. There are no restrictions on privately funded researchers.

Okarma said embryonic stem cells were the only human stem cells that had been shown to form cardiomyocytes -- heart muscle cells.

Because embryonic stem cells are so immature, it is very difficult to control what kinds of cells they produce, and the fear is that a tooth could grow inside a heart, for instance.

"We got stem cells to differentiate into mostly cardiac muscle cells, and then got those cardiac cells to survive and thrive in the damaged rat heart," said Dr. Chuck Murry of the University of Washington's Institute for Stem Cell and Regenerative Medicine, who worked on the study.

But the cells died when they injected them into the hearts of the rats, the researchers reported in the journal *Nature Biotechnology*.

### COMMON PROBLEM

"This problem is not unique to our system. Death of transplanted cells is slowing research progress in cell therapy for diabetes, Parkinson's disease and muscular dystrophy, among other diseases," they wrote.

So the team developed what they dubbed a "survival cocktail" that included various proteins and other compounds to stop the cells from dying.

It worked. When they caused heart attacks in the rats and then injected the new heart muscle cells, every graft survived and integrated into the hearts of the rats.

They beat in rhythm and improved the heart function of the rats, they reported.

"This is one of the most successful attempts so far using cells to repair solid tissues -- every one of the treated hearts had a well-developed tissue graft," Murry said.

This is key to treating someone after a heart attack, known medically as a myocardial infarction, said Dr. Michael Laflamme, who also worked on the study.

"This sort of treatment could help the heart rebound from an infarction and retain more of its function afterwards," Laflamme said in a statement.

An estimated 865,000 people have heart attacks in the United States every year and more than a third eventually develop heart failure, a chronic condition in which the heart fails to pump blood properly. A third of heart failure patients die within two years.