

Study Results Suggest Adult Stem Cells May Help Repair Muscle Cells Damaged by Heart Attack

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(PhysOrg.com) -- Adult stem cells may help repair heart tissue damaged by heart attack according to the findings of a new study to be published in the December 8 issue of the *Journal of the American College of Cardiology*. Results from the Phase I study show stem cells from donor bone marrow appear to help heart attack patients recover better by growing new blood vessels to bring more oxygen to the heart.

Rush University Medical Center was the only Illinois site and one of 10 cardiac centers across the country that participated in the 53-patient, double-blind, placebo-controlled Phase I trial. Rush is now currently enrolling patients for the second phase of the study.

Researchers say it is the strongest evidence thus far indicating that adult stem cells can actually differentiate, or turn into [heart](#) cells to repair damage. Until now, it has been believed that only [embryonic stem cells](#) could differentiate into heart or other organ cells.

“The results point to a promising new treatment for heart attack patients that could reduce mortality and lessen the need for heart transplants,” said Dr. Gary Schaer, head of the Rush Cardiac Catheterization Laboratory and study principal investigator at Rush.

In phase I of the study, a group of 53 patients who had heart attacks in the previous ten days received adult mesenchymal stem cells and were

kept under close study for two years.

The mesenchymal stem cells (MSC) were harvested from the bone marrow of healthy adult donors. These cells have the potential to develop into mature heart cells and new blood vessels. Similar to Blood Type O, mesenchymal stem cells have the advantage that they can be taken from the bone marrow of an unrelated donor without needing to be matched by blood type.

After the stem cells were extracted, they were purified by drug manufacturer Osiris Therapeutics into a formulation for intravenous delivery called Prochymal. Patients were administered an infusion of either Prochymal or placebo as an injection into a vein in the arm or leg. To prevent bias, neither the patient nor the physician knew who received the stem cell treatment and who received the placebo.

In the study, patients who received the adult stem cells were compared to similar patients who received inert placebo injections. Both were followed by MRI and echocardiogram. After six months, patients who received the adult stem cells were four times as likely to have improved overall condition, were able to pump more blood with each heartbeat than untreated patients, had only one-quarter as many dangerous heart arrhythmias, and suffered no toxicity or other serious adverse side effects from the treatment.

“It is suspected that these stem cells may take part in the growth of new blood vessels to bring more oxygen to the heart and help reduce the scarring from a [heart attack](#),” said Schaer.

Echocardiograms showed patients had improved heart function, particularly in those patients with large amounts of cardiac damage. Patients also have improvements in lung function.

According to Schaer, one reason the study results are so promising is that these stem cells can be used without tissue typing and do not trigger an immune response, and are available for every patient.

A unique benefit of the stem cell product is that it is given to patients through a standard intravenous (IV) line which is simple and easy for the patient compared to other therapies that require delivery to the site of the disease through catheterization or open surgical procedures.

Adult stem cells are designed by nature to perform tissue repair in a mature adult. It is believed that these cells can be used in patients unrelated to the donor, without rejection, eliminating the need for donor matching and recipient immune suppression. Once transplanted, the cells promote healing of damaged or diseased tissues.

“It is possible that in the future, hospitals might be able to keep frozen adult stem cells on hand for speedy use in treating heart attacks,” said Schaer.

“This study suggests that adult [bone marrow](#) derived [stem cells](#) are more flexible than previously thought,” said Schaer. “If the benefits and safety are confirmed in the ongoing Phase II trial, we may soon have a remarkable new therapy for patients with a large heart.”

Provided by Rush University Medical Center ([news](#) : [web](#))

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