

Using a child's own stem cells to repair their heart looks promising

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Visionaries in the field of cardiac therapeutics have long looked to the future when a damaged heart could be rebuilt or repaired by using one's own heart cells. A study published in the February issue of *Circulation*, a scientific journal of the American Heart Association, shows that heart stem cells from children with congenital heart disease were able to rebuild the damaged heart in an animal model.

Sunjay Kaushal, MD, PhD, surgeon in the Division of Cardiovascular Thoracic Surgery at Children's Memorial Hospital and assistant professor of surgery at Northwestern University Feinberg School of Medicine, who headed the study, believes these results show great promise for the growing number of children with congenital heart problems. With this potential therapy option they could avoid the need for a heart transplant.

"Because of the advances in surgical and medical therapies, many children born with cardiomyopathy and other [heart defects](#) are living longer but may eventually succumb to heart failure," said Kaushal. "This project has generated important pre-clinical laboratory data showing that we may be able to use their own heart stem cells to rebuild their hearts, allowing these children to live longer and have more productive lives."

Cells were obtained from patients with ages ranging a few days after birth to 13 years who were undergoing routine congenital cardiac surgery. Findings show that the number of heart stem cells, or human cardiac [progenitor cells](#) (hCPCs), was greatest in neonates and then

rapidly decreased with age, and that the highest numbers of these [stem cells](#) are located in the upper right chamber of the heart, or the right atrium. The study also showed that the hCPCs are functional and have the potential for use in repairing the damaged heart.

Up until now, heart stem cell studies have addressed the adult diseased heart, but this is the first systematic study to focus on children.

"Heart disease in children is different than heart disease in adults," said Kaushal. "Whereas adults might suffer heart failure from a stroke, [heart failure](#) in children occurs mostly because they are born with cardiomyopathy or other conditions in which the vessels of the heart chambers are small or in the wrong position causing pumping problems. The potential of cardiac stem cell therapy for children is truly exciting." said Kaushal.

Pending FDA approval, Kaushal hopes to begin clinical trials with children in the fall. The study was funded by grants from the National Institutes of Health, the Thoracic Surgical Foundation for Research and Education, the Children's Heart Foundation and the North Suburban Medical Research Junior Board.

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