New heart cells increase by 30 percent after stem cell infusion

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Healthy, new heart cells have been generated by animals with chronic ischemic heart disease after receiving stem cells derived from cardiac biopsies or "cardiospheres," according to research conducted at the University at Buffalo School of Medicine and Biomedical Sciences.

The research is being presented today (Nov. 15) at the Scientific Sessions of the American Heart Association in Orlando.

The UB research demonstrated a 30 percent increase in healthy heart muscle cells within a month after receiving cardiosphere-derived cells (or CDCs). This finding is contrary to conventional wisdom which has held that heart cells are terminally differentiated and thus, are unable to divide.

Ischemic heart disease from coronary artery narrowing and prior heart attacks is the most common cause of heart failure, the UB researchers explain. While other investigators have largely focused on regenerating muscle in scarred tissue, the UB group has shown that cardiac repair could be brought about by infusing the CDCs slowly into coronary arteries of the diseased as well as normal areas of the heart.

"Whereas most research has focused upon irreversible damage and scarring following a heart attack, we have shown that a single CDC infusion is capable of improving heart function in areas of the heart that are viable but not functioning normally," explains study co-author John M. Canty Jr., MD, the Albert and Elizabeth Rekate Professor of

Medicine in the UB medical school and UB's chief of cardiovascular medicine.

He explains that areas of myocardial dysfunction without fibrotic scarring are common in patients with heart failure from coronary artery disease and that they arise from remodeling in response to a heart attack, as well as adaptations that develop from periods of inadequate blood flow, sometimes called hibernating myocardium.

"The rationale for our approach is somewhat analogous to planting seeds in fertile soil versus trying to grow plants in sand," Canty comments.

"We have shown that cells derived from heart biopsies can be expanded outside of the body and slowly infused back into the coronary arteries of animals with chronic dysfunction from restricted blood flow or hibernating myocardium," says Gen Suzuki, MD, research assistant professor of medicine in the UB medical school and lead author on the research. "The new cardiac muscle cells are small and function more normally than diseased large, hypertrophied myocytes."

Canty adds that infusing stem cell formulations directly into coronary arteries also delivers the cells throughout the heart and is much simpler than injecting cells directly into heart muscle which requires equipment that is not widely available.

The research currently is in a preclinical phase but the UB researchers expect that translation to determine effectiveness in patients could take place within two to three years or possibly even sooner.

Provided by University at Buffalo

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