

New research reveals combined cell therapy enhances cardiac performance following heart attack

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A new study from the Interdisciplinary Stem Cell Institute (ISCI) at the University of Miami Miller School of Medicine finds that combination stem cell therapy, using c-kit+ cardiac stem cells (CSCs) and mesenchymal stem cells (MSCs) can significantly enhance cardiac performance in chronic ischemic cardiomyopathy following a heart attack. This is the first time a combination of cells has been used in a large animal pre-clinical trial of established heart failure by researchers at ISCI.

Dr. Joshua Hare, director of Interdisciplinary Stem Cell Institute, led the study, "Synergistic Effects of Combined Cell Therapy for Chronic Ischemic Cardiomyopathy," which published on November 2, 2015 in the *Journal of the American College of Cardiology*.

"Previous work from our laboratory strongly supported the scientific rationale for cell combination therapy," says Hare. "Now, as the field is growing, ISCI is showing the benefit of combining multiple types of cells to produce a stronger, more effective treatment option for patients with severe heart damage and heart failure."

This study centered on large animals three months after experiencing a heart attack. The animals were divided into three cohorts. The first group received transendocardial injections of MSCs, while the second group received a combination of MSCs and cardiac-derived CSCs. The

third group acted as a controlled placebo group. Cardiac MRIs were performed to determine cardiac function before and after therapy.

Both groups of cell-treated animals exhibited a significant reduction in scar size. However, the group that received the combination of MSCs and cardiac-derived CSCs also demonstrated increased viable tissue, improved contractile performance, and increased formation of new cardiomyocytes, which contribute to heart repair. The group that received the combination cell therapy continued to show substantial cardiac enhancement for at least three months post treatment.

According to the American Heart Association, 85.6 million Americans are living with some form of [heart](#) disease. "This study has the potential to be a turning point for [stem cell research](#)," said Hare. "This is the first time, as scientists, that we are understanding how interactions between multiple cell types can create more effective treatments." While further testing is needed, these findings establish the safety and efficacy of combination cell-based treatments, taking the next steps in developing stem cell-based therapies for the prevention and treatment of cardiovascular disease in humans.

More information: University of Miami Vasileios Karantalis et al. Synergistic Effects of Combined Cell Therapy for Chronic Ischemic Cardiomyopathy, *Journal of the American College of Cardiology* (2015). [DOI: 10.1016/j.jacc.2015.08.879](https://doi.org/10.1016/j.jacc.2015.08.879)

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