Stem cell secreted protein can be given to reduce scarring and improve heart function

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(PhysOrg.com) -- Heart tissue and stem cells spring into action to begin repairing muscle damaged in a heart attack, and researchers at Duke University School of Medicine found that a protein naturally produced in the body may potentially play a role in accelerating heart muscle repair. Giving the right dose of this protein named secreted frizzled related protein 2 (sfrp2) in studies of rats helped to prevent heart failure and reduce collagen layering that can form thick scar tissue after a heart attack (also called MI, or myocardial infarction). Previously the same researchers demonstrated that this protein also saves heart muscle cells from dying in response to heart attack.

These findings have the potential to be translated into a new therapy for study and evaluation in human clinical trials, said Victor Dzau, M.D., senior author of the study and James B Duke Professor of Medicine.

"We found that giving the study rats the protein sfrp2 strongly improved heart function in the critical pumping chamber, the left ventricle, after a myocardial infarction," Dr. Dzau said. "We observed that sfrp2 at therapeutic doses reduced heart muscle death and also directly prevented deposits of collagen, and thus reduced the scarring that can affect heart function."

The study was published the week of Nov. 15 in the Proceedings of the National Academy of Sciences *(PNAS)* Early Edition online.

Giving sfrp2 also helped prevent the heart wall from thinning, by the

fourth week after injection. Because the scarring process (fibrosis) and tissue remodeling in the heart are often complete within a month of a heart attack in rats, the team performed a heart test called echocardiography (heart ultrasound) on the rats at three and four weeks after the myocardial infarction.

"We found the sfrp2 reduced the area of fibrosis in the left ventricle and also significantly decreased the ratio of anterior-to-posterior wall thickness in the heart," said Maria Mirotsou, Ph.D., a co-author and assistant professor of medicine.

Previously, the Dzau laboratory showed that a genetically modified type of stem cell that over-produced a factor called Akt dramatically reduced the size of the area affected by a heart attack and restored cardiac function in rodent hearts. The team identified sfrp2 as a key factor released by these stem cells during heart tissue survival and repair, and this study showed sfrp2 was a likely candidate for inhibiting collagen production, as well.

Provided by Duke University

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