

Creighton researcher receives NIH grant to study gene, stem cell therapy in coronary artery bypass grafts

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A Creighton University researcher has received a National Institutes of Health grant to study the effects of gene and stem cell therapy in coronary artery bypass grafts, a first-of-its-kind undertaking that could transform the procedure, increase survival rates and dramatically reduce the possibility of re-occlusion of the grafted arteries and veins in the procedure.

Devendra K. Agrawal, Ph.D., earned the four-year, \$2.9 million NIH grant after more than a decade of research and collaboration with cardiothoracic surgeons intent on improving and lengthening the success rate of coronary artery bypass grafts involving the saphenous vein in the leg. The vein is one of two most often used in coronary grafts, but studies have shown it is susceptible to new blockages, sometimes within as little as two months following a procedure.

Operating on pigs — a procedure first demonstrated for Agrawal and his team of researchers and surgeons by Jeff Sugimoto, M.D., head of cardiothoracic surgery at Creighton University Medical Center — Agrawal was able to design a procedure whereby the defect in a protein causing the re-occlusion can be corrected before the grafting of the vein. The patients' own bone marrow-derived stem cells can also be used to regenerate a layer of cells on the luminal side of the artery, left denuded and vulnerable for the adhesion of circulating cells following a procedure. The weakening and denudation of that cell layer have both been cited as major contributors to coronary thrombosis in the wake of bypass graft surgery.

"We can significantly reduce morbidity, we can address myocardial infarction and we can save on the healthcare costs associated with this procedure," said Agrawal, who has been a professor of biomedical sciences at Creighton for 30 years and has multiple NIH grants to his credit. "Using pigs, we believe this will be translational to humans, based on the similarities in physiology and responses to the procedure."

Already at work on the strategy, Agrawal said his team is seeing a marked improvement in preventing re-occlusion, with no side effects. With continued success of the procedure in pigs, Agrawal said he's hopeful to see a Phase 1 clinical trial for humans in the near future.

"It's a novel and innovative approach that a number of people in my lab have worked extremely hard to make happen," he said. "To our knowledge, nobody has done both gene therapy and stem cell therapy, but we've seen that you have to have both for the success of the coronary procedure and to take care of the potential for re-occlusion and thrombosis afterwards."

Source:
Creighton University
