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Antibody-directed cellularization of heart valve implants

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Abstract

Our goal is to develop and test a bioengineered heart valve for pre-clinical testing and eventualtranslation into clinical use. Initial efforts were to develop heart valve implants pre-seeded with autologous endothelial cells and then conditioned in a bioreactor prior to insertion. Simultaneously, we developed a column (containing speharose beads conjugated with CD133mAb that could collect endothelial precursor cells (EPCs) efficiently from the blood stream when placed as anarterio-venous shunt. Using this same basic approach Dr. Williams conceived of and conjugated CDE133mAb on to heart valve scaffolds – process that took 2 hours – and implanted them in the pulmonary position of sheep. The result showed that antibody conjugation accelerated receullularization and structural maturation of the implants and provided preliminary data that these valves may remodel and grow with the patient.

Biography

Williams is currently a Professor at the Wake Forest Institute for Regenerative Medicine (WFIRM). He spent his first 17 years at Wake Forest in The Department of Pathology/Section on Comparative Medicine exploring the effects of oral contraceptives and hormone replacement therapy on coronary heart disease risk in the coronary arteries of atherosclerotic monkeys. Eight years ago, he joined WFIRM and has since focused his research on regenerative medicine approaches for organ repair and replacement.