TECHNOLOGY

Biodegradable Polymer Reinforced Pericardium as Hybrid Material for Vascular Grafts

OVERVIEW

Background

Cardiovascular disease is the leading global cause of death, accounting for 17.3 million deaths per year, a number that is expected to grow to more than 23.6 million by 2030. The direct and indirect cost of cardiovascular diseases and stroke combined total to more than $320.1 billion, including the health and loss of productivity expenditures. The 2011 cardiovascular procedure statistics indicate that each year, 275,000 replacement valves and 600,000 vascular grafts are implanted to correct damaged tissue. General and Pediatric cardiac surgeries utilize biological (animal) or synthetic tissue patch materials for reconstruction and repair procedures. One commonly used biological tissue is the pericardial tissue that is known for its inherent strength and elastic properties. Pericardial tissues from cows (Bovine) or pigs (Porcine) are common animal to biological sources. All biological tissues including the pericardium elicit an immune response when introduced into humans, and treatment with Glutaraldehyde (GA) is one way by which the tissue can be stabilized to lessen the immune response. However, GA-treated bovine or porcine pericardium may be associated with cellular toxicity, and may undergo severe calcification and subsequent matrix deterioration, once introduced into patients. There is need for materials that allow the pericardium to retain its strength, elasticity and stability with reduced calcification.

Innovative Technology
Researchers at the University of Maryland have developed a unique hybrid material that combines the biological pericardial tissue with a polymer. In vitro studies have demonstrated that this hybrid material has superior strength, resiliency, reduced calcification compared to untreated and GA treated pericardium. In vivo subcutaneous model studies have shown that the hybrid material maintains its structural integrity and elicits reduced immune response making it ideally suitable as vascular implant material.

Advantages
· Biocompatible
· Biodegradable
· Soft, pliable hybrid material conforms to anatomy
· Reduced calcification compared to GA treated tissue
Applications
· Repair or reconstruction of cardiovascular structures
· Cardiovascular Implants

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

LICENSE STATUS

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CATEGORIES

- Medical implants
- Biomaterials

EXTERNAL RESOURCES

- US Patent 9,795,471

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