Improved Fixation Method for Bioprosthetic Heart Valves

Description:

This technology features a novel improvement of bioprosthetic heart valves (BHVs). This technology is a new method for fixation of BHVs derived from porcine aortic valves. BHVs are used clinically to eplace defective or diseased heart valves, but a majority of these valves fail within a few years due to calcification and degeneration. Currently used methods of fixation, such as glutaraldehyde cross-linking, is not adequate to fix all extracellular matrix components, especially glycosaminoglycans (GAGs) present in the middle spongiosa layer. This technology presents methods for improving the structural and mechanical characteristics of implantable tissue as well as methods for increasing the lifespan of the implantable tissue. More specifically, these methods can include the bonding of one or more enzyme inhibitors in or on tissue in the course of a stabilization process. Through these methods, implantable tissue can be stabilized and can exhibit increased resistance to degradation, specifically, degradation due to enzyme activity following implantation of the tissues. These methods can lead to increased levels of beneficial extra cellular matrix components remaining in the stabilized implantable tissues as compared to previously known stabilized implantable tissues. Increased levels of such components can further improve the implantable tissues through improved mechanical characteristics and can also lead to a longer lifespan of a bioprosthesis.

Benefits:

- Improves the structural and mechanical characteristics of implantable tissue
- Increases the lifespan of the implantable tissue
- Increases resistance to degradation
- Increases levels of beneficial extra cellular matrix components remaining in the stabilized implantable tissues

Related Publications:

- N. Vyavahare et al. “Neomycin binding preserves extracellular matrix in bioprosthetic heart valves during in vitro cyclic fatigue and storage.” Acta Biomaterialia. Vol. 5(4). 983-992. May 2009.

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