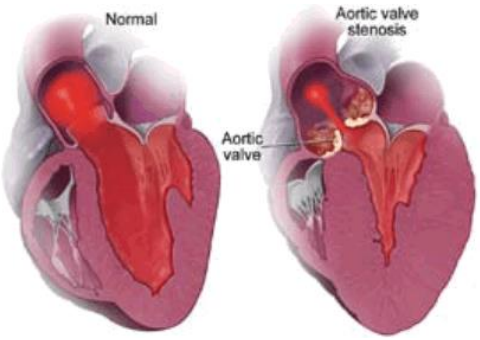
Treatment to Render Implants Resistant to Diabetes

Description:

Diabetes plays a role in the functionality of biomaterials in the body. Hyperglycemia, the condition arising from high blood sugar levels, causes occlusion and restenosis of vascular grafts and degeneration of heart valves. These conditions lead to heart disease, which made up 68% of all diabetes-related deaths in the U.S. in 2004[1]. A primary problem associated with hyperglycemia is the presence of advanced glycosylation end products (AGEs) in the bloodstream. These molecules induce crosslinking of collagen and elastin, thus increasing heart valve stiffness and consequently reducing their efficacy in the body.



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This technology from Clemson University introduces a novel method of treating biomaterials with a polyphenol to improve the effectiveness and lifespan of cardiovascular implants in diabetic individuals. Collagen and elastin scaffolds treated with pentagalloyl glucose (PGG) have shown that they are able to withstand the detrimental effects of AGEs. PGG also protects against glycoxidation and inflammation, and promotes scaffold remodeling by native fibroblasts. This simple treatment marks a significant improvement in the area of cardiovascular healthcare for diabetic patients.

Applications:

- Treatment of biomaterials with diabetic-resistant coating
- Scaffold stabilizer for regenerative medicine
- Wound dressing
- Anti-aging products

Benefits:

- Reduces effects of AGEs
- Protects against oxidative stress and inflammation
- Promotes fibroblast remodeling

Related Publications:

- Agneta Simionescu et al. "Mitigation of diabetes-related complications in implanted collagen and elastin scaffolds using matrix-binding polyphenol." *Biomaterials.* Vol. 34. Issue 3. Pg. 685-695. Jan 2013

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[1] (2011) Centers for Disease Control and Prevention