Modification of Valve Replacements to Reduce Calcification

**Title:** Modification of valve replacements to reduce calcification

Invention: The invention is a modification of a replacement heart valve used for treating heart valve disease. The valve is modified with enzymes that generate adenosine, a known regulator of calcification. These tissue based heart valves will allow for the localized reduction of calcification, which will lead to a longer life span of the heart valve.

Background: Annually, over five million people in the United States alone are diagnosed with heart valve disease (HVD), a condition where one of the four valves of the heart is not functioning properly. HVD is treated through surgery that either repairs or replaces the valve with a tissue or mechanical valve. Mechanical valves last much longer life than tissue valves but also require anti-coagulants for the remainder of the person's life. Tissue valves only last 10-20 years, largely due to valve calcification. Valve calcification can occur due to aging, causing valve leaflets to become rigid and misshapen. While anti-calcification treatments are given with tissue valves, calcification can still occur and once it does, requires surgery to replace the valve. There is great interest in reducing calcification and preventing heart valve issues. Current management methods revolve around inhibiting the factors that promote calcification. There is a need to develop a solution that directly inhibits calcification for better outcomes.

Applications:
- Heart valve replacement

Advantages:
- Extends the life of replacement valves
- Unique process to reduce calcification on tissue based valves
- Prevents aortic stenosis
Licensing Manager:
Lisa Lin
LisaL@tla.arizona.edu

Inventors
Raymond Runyan
Professor, Cellular & Molecular Medicine
Zain Khalpey
Associate Professor, Surgery