Stopping Aortic Valve Calcification

Calcific aortic valve disease is the most common valve disease in the United States. Calcific aortic valve disease causes calcification to form on valve leaflets, which inhibits proper valve function and impairs blood flow. Unfortunately, there are no medicinal treatments for reversing calcification. A patient’s only option is heart valve replacement. However, this calcification process is believed to be cell-mediated, giving hope that a pharmacologic treatment could be found. To assist in identifying and developing novel treatment targets and promising pharmaceutical candidates, a new technology has been developed at Worcester Polytechnic Institute (WPI). This technology uses micro-contact printing on polyacrylamide hydrogels to control valvular interstitial cell aggregate formation. By currently unknown mechanisms, once these cells form aggregates, calcification initiates. The ability of this technology to control the cell aggregate size is advantageous and allows for the time-course of calcification to be studied in a rapid, highly controlled manner in vitro which previously was not possible. This high content assay allows for many different metrics in one analysis to be captured, including immunohistochemistry, media for mass spectrometry, biophysical characterization, and high magnification imaging. Drug effectiveness at hindering, slowing, or reversing calcifications can be tested and promising therapeutics identified.

Above is a schematic showing this in vitro high-content assay. This product would be ideal for marketing to pharmaceutical, biotech companies, and research organizations interested in identifying targets critical in the calcification pathway, which can be inhibited for therapeutic purposes.

Key Features

- First method on the market to allow for further research into drug screening for stopping the growth of calcifications
- High content assay that provides a substantial amount of different information in one analysis
- Potential market in therapeutic usage

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