

**Faculty Name:**

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**Lab:**

Laboratory for Stem Cells and Tissue Engineering

**Project Title:**

Engineering a Strategy for the Growth and Rehabilitation of Living Allogenic Heart Valves to Treat Children with Congenital Valve Disease

**Description:**

Pediatric patients with congenital heart valve disease undergo multiple reoperations throughout their lifetime to replace structurally degraded or outgrown valve replacements. The shortcomings observed in currently available cryopreserved valvular homografts (the clinical gold-standard) are motivating the introduction of living allogenic valve transplantation (LAVT). In LAVT, human allografts are harvested from a donor and immediately transplanted in the recipient, with lifelong immunosuppression preventing host immune response to the graft. This strategy has the ability to deliver a living valvular graft with the potential for growth and self-repair. Nevertheless, several key limitations thwart its widespread clinical implementation: limited donor availability, uncertainties surrounding ex vivo tissue viability, and graft immunogenicity. What remains lacking is a living valvular allograft that can be transplanted off-the-shelf with minimal risk of host rejection. Therefore, this project's goal is to develop a strategy for the preservation of living valvular allografts. To accomplish this, the project's specific aims are to: (i) identify the pathology associated with structural valve degeneration in currently-available cryopreserved allografts, and (ii) design a storage environment for preserving allograft viability and function ex vivo. We hypothesize that environmental control of the key factors inducing valve degradation, combined with biomimetic physical stimuli, will enable maintenance of valve viability, microarchitecture, and function.

**Location of Research:**

On Site

**# of hrs/week:**

35

**Department/Program:**

Biomedical Engineering

**Eligibility:**

MS

**To apply, please contact:**

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