Department of Biochemistry and Molecular Biophysics Seminar

Wednesday, December 2 at 4:00 p.m. in Ackert 120

Coffee and cookies at 3:45 p.m. in Chalmers 168



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Tissue engineered heart valves for the treatment of congenital heart defects

Congenital heart disease is prevalent in the United States and worldwide. The clinical management of heart defects requiring the replacement of a heart valve is particularly challenging because the ideal valve substitute does not currently exist. All current replacement options have shortcomings, including the need for anticoagulation therapy, susceptibility to calcification and an absence of growth potential. The absence of growth is particularly problematic in children, as they are often subjected to multiple revision surgeries to replace outgrown valves.

The tissue engineered heart valve (TEHV) offers the promise of a growth-capable valve substitute, which, in principle, overcomes the shortcomings of current replacement options. However, challenges in identifying an optimal scaffold and any additional processing requirements (e.g., bioreactor-based cell seeding) have hindered translation of the TEHV. In addressing these challenges, our work focuses on the use of the decellularized heart valve as a scaffold for the TEHV. In particular, we seek to understand the impact of processing on the structural integrity, the i*n vitro* and *in vivo* function, and the potential for autologous, cellular repopulation of the scaffold. We have also explored bioreactor-based processing strategies to repopulate the scaffold with cells prior to implantation. Future work will seek to optimize these aspects of scaffold processing to bring the TEHV closer to clinical reality.