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Sonicated decellularised xenograft – a perfect scaffold for cell adhesion

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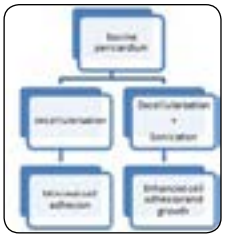
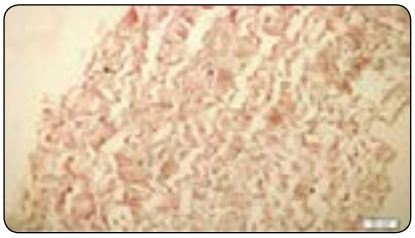
Tissue engineering aims at integrating cells, growth factors, tissues, material engineering to produce the best substitutes for organ transplantation. When it comes to valve replacement surgeries, Mechanical heart valves had always been cost effective and commercially successful but they show complications like thromboembolism, hemorrhage, imperfect hemodynamic performance and prosthetic endocarditis. To overcome the complications, increasing number of devices is being designed from biological scaffolds, like Decellularized Bovine pericardium, porcine valves tissues. The most important part of using a Xenograft for surgery is the processing technique employed. There had been lot of failures so far in using the tissue engineered scaffolds, like Ionescu-Shiley valves due to the problem with the decellularisation and stabilization protocols. There are effective decellularisation protocol employing Detergents and enzymes. Though, decellularisation is carried out properly, cell attachment may be difficult many times due to intact collagen matrices and low cell adherence spaces. In this study, we try to find out the effects of mechanical forces on the decellularised scaffolds that cause minimal damage on the extracellular matrices and create gaps within adjacent collagen bundles for cell attachment. We have subjected the xenograft scaffold to waterbath sonicator for particular time at specific conditions. The resulting scaffold was thinner, easy to handle and the H&E staining showed the scaffolds to have enough spaces among large collagen bundle enabling easy cell adherence. This scaffold can enhance cell adhesion and growth, which has always been a challenging task in the field of regenerative studies.





Recent Publications:

1. John C. Fitzpatrick, Peter M. Clark, and Franco M. Capaldi (2010) Effect of Decellularization Protocol on the Mechanical Behavior of Porcine Descending Aorta: International Journal of Biomaterials
2. Escande Rémi1,3, Nizar Khelil1, Isabelle Di Centa2, Caroline Roques1, Maguette Ba1,3, Fatima Medjahed-Hamidi1(2013) Pericardial Processing: Challenges, Outcomes and Future Prospects: Biomaterials Science and Engineering
3. Azhim A1, Syazwani N2, Morimoto Y3, Furukawa KS4, Ushida T (2014) The use of sonication treatment to decellularize aortic tissues for preparation of bioscaffolds: Journal of Biomaterial Applications
4. N. Syazwani, A. Azhim, Y. Morimoto, K. Furukawa, T. Ushida (2014) Immune Response of Implanted Aortic Scaffolds Decellularized by Sonication Treatment: The 15th International Conference on Biomedical Engineering pp 275-278
5. Swathy Sajith (2017) Comparative Study of Two Decellularization Protocols on a Biomaterial for Tissue Engineering: International Journal of Clinical & Experimental Cardiology.

Biography

Swathy R, a well presented, self motivated researcher having excellent research potential and an ability to actively contribute to the research projects goals as well as a proven publication track record. Able to plan research and organise tasks effectively. Major interest areas being Tissue engineering of bioprosthetic materials, to be designed for clinical applications, have worked on decellularisation protocols, stem cell isolation from different sources, and animal implantation studies. Has teaching experience, which developed after the interest in sharing ideas with upcoming people.

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