Huaping Wang, J Adv Chem Eng 2016, 6:3(Suppl)
http://dx.doi.org/10.4172/2090-4568.C1.002

Preparation and characterization of bacterial cellulose-based biomaterial as scaffolds for articular cartilage tissue engineering

Huaping Wang
Donghua University, China

Bacterial cellulose (BC) secreted by *Acetobacter xylinum (A. xylinum)* is a natural and promising biomaterial for application in tissue engineering. However, the low bioactivity and cell penetration capability due to the single cellulose component and the dense 3D microstructure have limited the application of BC for articular cartilage repairing. On the basis of the property requirements of ideal articular cartilage scaffolds, we have addressed the challenges and limitations on current technologies to improve surface bioactivity and enlarging porous structure of BC scaffolds. A biosynthetic approach was chosen to fabricate a series of BC/lotus root starch (BC/LRS) composites for simplifying preparation procedure, controlling microstructure and improving biocompatibility as articular cartilage scaffolds. Following pretreatment with PVP and SA, BC mineralized in 1.5×SBF solution, had reduced HA precipitation time and created an optimized crystal morphology along the fiber by increasing Ca^{2+} adhesion. Particularly, BC scaffolds coated with HA crystal showed increased bioactivity for simulating the calcified layer of articular cartilage. To reconstruct dense microstructure, we created porous structure within BC membrane by using surfactant assisted foaming method in azodicarbonamide aqueous solution (AC). The foaming method was more effective and gave higher-yield compared with previous reported methods. By introducing agarose microparticles into BC substrates as a poragen, we harvested porous BC scaffold with interconnected pores displaying dimensions of 300-500 μm, which were identified to facilitate cartilage cells' penetration into the internal BC structure and form a 3D distribution.

Biography

Huaping Wang serves as Executive Director of China Chemical Fiber Industry Association, Deputy Director of the Standards Committee and Deputy Director of Fiber Committee of China & Shanghai Chemical Fiber Textile Engineering Society. He was in charge of more than 20 major projects, such as National Science and Technology Support Program. He was rewarded National Sci-Tech Advance Award 3 times and Provincial and Ministerial Prize 8 times. He owns more than 60 authorized national invention patents, and has published more than 260 papers in domestic and overseas key academic journals.

wanghp@dhu.edu.cn

Notes: