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Novel mesh based on nano bacterial cellulose and poly(lactide-coglycolide) composite

Chen Lai
Peking university, China

The current study was designed to evaluate and directly compare the biomechanics and biocompatibiltiy properties of the novel bacterial cellulose and poly(lactide-co-glycolide) composite meshes. Composite mesh was characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Photoelectron Spectroscopy (XPS), Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM), demonstrating that PLGA only adheres to the BC surface. Laser perforation generated isotropic, flat and stable structures that prevented deformation under pressure and reduced the risk of potential bacterial colonization. In contrast to the pure BC mesh, the results of the in vitro study, which involved protein adsorption and cell- material interaction, suggested that composite mesh preferentially adsorbed Bovine Serum Albumin (BSA) and enhanced the expression of type I collagen in fibroblasts. PLGA/BC mesh caused less inflammation and was surrounded by newly formed connective tissue composed of type I collagen after implantation in a rabbit model for one week, demonstrating that the novel mesh is fully biocompatible and can integrate into surrounding tissues. From this study, PLGA/BC mesh may prove to be a viable clinical alternative to existing materials.

Biography

Chen Lai received her PhD from Hunan University for studies on biomaterials. She is Vice director of biomedical engineering centre in Shenzhen institute Peking University, with responsibility for research activities on bacterial Nano-cellulose (BC). Major research areas are BC modification and its clinical applications.

laic@ier.org.cn

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