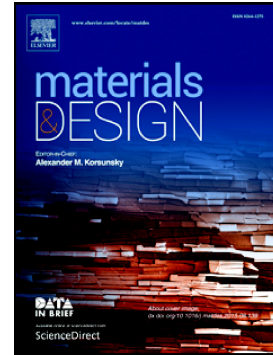


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Biphasic scaffolds of silk fibroin film affixed to silk fibroin/chitosan sponge based on surgical design for cartilage defect in osteoarthritis

Khanitta Panjapheree¹, Suttatip Kamonmattayakul², Jirut Meesane^{1*}

¹Institute of Biomedical Engineering, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand

²Department of Preventive Dentistry, Faculty of Dentistry, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand

* E-mail address: jirutmeesane999@yahoo.co.uk

Abstract

Osteoarthritis is inflammation that can occur at any joint, and is caused by cartilage degeneration. For severe cases, patients need surgery by substitution with performance tissue engineering scaffolds. Biphasic scaffolds of silk fibroin film affixed to a silk fibroin/chitosan sponge were constructed for osteoarthritis surgery. Silk fibroin film was fabricated before affixation to the sponge of silk fibroin/chitosan at different ratios of silk fibroin to chitosan: 100:0 (SF), 70:30 (SF70), 50:50 (SF50), 30:70 (SF30), and 0:100 (CS). The morphologies of the scaffolds were observed by scanning electron microscopy. Physical functionality as well as stability was evaluated from mechanical properties, and the percentage of swelling, and degradation. Biological functionality was evaluated using a rat mesenchymal stem cell (RMSCs) culture. Cell proliferation was analyzed and the histological structure was observed. SF30 showed suitable morphology, physical stability, and biological functionality to promote RMSC regulation into chondrocytes. This indicated that SF30 shows promise for cartilage regeneration in osteoarthritis surgery.

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