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Groove Fibers based porous scaffold for cartilage tissue engineering application

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Abstract

A porous scaffold was prepared by gelatin groove fibers for cartilage tissue engineering. The morphology of groove fiber and porous scaffold were observed by Scanning Electron Microscopy (SEM). The water absorption property of scaffold was tested, and the results showed that the water absorption of this scaffold could achieve as high as 1187%. The compressive mechanical property scaffold were also evaluated. In wet state, this scaffold exhibited elastic property, and could bear 100 cycles compressive fatigue test. Moreover, this scaffold could promote rat chondrocyte and bone marrow mesenchymal stem cells (BMSC) proliferation. It suggested that this porous scaffold could be a good candidate for cartilage tissue engineering.

Keywords: *Groove fiber; 3D scaffold; Water absorption; Cartilage tissue engineering; Biomaterials; Elastic properties*

1. Introduction

Articular cartilage has limited capacity for self-repair and regeneration after injury. Tissue engineering provides a promising strategy for cartilage regeneration [1]. Since tissue engineering was first developed in the early 1990s, a wide range of biomaterial scaffolds have been fabricated for tissue engineering application [2]. Ideal cartilage tissue engineering scaffold should have many

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