Phenotypic changes in proliferation;differention;and migration of chondrocytes:3D in vitru models for joint wound healing.

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摘要

Abstract

We aim to establish a 3D model of cartilage wound healing, and explore the involvement of chondrocytes in its repair. To characterize chondrocyte involvement in wound healing, an in vitro 3D model composed of chondrocyte mixing with either type II/I collagen or type I collagen matrix was established. The defects measuring 5 mm in diameter were made on each collagen matrix-chondrocyte construct to mimic in vivo cartilage defects. The effects of basic fibroblast growth factor (bFGF) on chondrocytes migration and differentiation were studied. The migration and Glucosaminoglycan (GAG) synthesis of chondrocytes in the defect areas were observed by microscopy after Alcian-blue staining. In the presence of bFGF, GAG expression increased significantly when chondrocytes were cultured in type II/I collagen matrix compared to type I collagen matrix. However, mild GAG accumulation was also found when cells were cultured in either type I or type II/I collagens without bFGF. In a 3D model of cartilage wound healing, bFGF promote chondrocyte proliferation, migration and differentiation in the presence of type II/I collagen matrix, and showed potential to regulate wound healing. These wound healing models may provide feasible methods to explore various drugs prior to human trials. J Biomed Mater Res, 2010