

Toxicity Study of Gelatin-chitosan Films with Bone Marrow Stromal Cells Cultured in Rat

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Background

Gelatin and chitosan are known as biodegradable and biocompatible biopolymers. These biopolymers have recently **received** increasingly more **attention** for **tissue engineering**. The aim of this study was to evaluate the toxicity effects of gelatin-chitosan film on bone marrow stromal cell (BMSCs) culture in rat.

Material & Methods: First, gelatin-chitosan composite film were prepared by solution mixing, followed by film casting of both biopolymers in glacial acetic acid. After two passages of BMSCs culture, the cells were cultured in four plate groups including: control plates have no any film, gelatin plates, chitosan plates and gelatin-chitosan plates. The proliferation, differentiation, viability and apoptosis rates of BMSCs were studied during the second, fourth and sixth days. The activity of superoxide dismutase (SOD), catalase (CAT) and glutathione (GSH) and malondialdehyde (MDA) levels were determined by using biochemical methods.

Results: The results showed that the mean BMSCs proliferation significantly reduced in chitosan group compared to control group ($p < 0.05$), but in gelatin and gelatin-chitosan groups were similar to control group. Mean percentage of BMSCs apoptosis in all groups except chitosan group were similar to control group. Mean percentage of BMSCs viability at all groups was similar to control group except chitosan film. In addition, no significant changes were observed in CAT activity and GSH and MDA levels in comparison with control group. After 72 hours, SOD activity in gelatin-chitosan group was significantly reduced compared to other groups. No cell differentiation was detected in all groups.

Conclusion: Results of proliferation, differentiation, apoptosis and antioxidant activity in cultured BMSCs on a gelatin-chitosan film showed that gelatin-chitosan film can be used in tissue engineering and cell therapy as a good model of a biodegradable scaffold.

Keywords: Antioxidant system, Bone Marrow Stromal Cells, Cell Proliferation and Differentiation, Gelatin-Chitosan Film.

Poster Presentation

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