In vitro experiment of aprotinin/tranexamic acid improved injectable fibrin glue. [Chinese]

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Abstract:

Background: Injectable fibrin glue brings a new direction for the clinical application of cartilage-defect tissue-engineered complete repair and regeneration, the key issue of which is-regulation of the degradation speed. Objective: To observe the influence of concentration on the degradation rate of the fibrin glue scaffold by adding different concentration of the aprotinin and tranexamic acid into the injectable fibrin glue. Design, time and setting: The in vitro cytology experiment was performed at the Laboratory of Tissue Construction and Detection of Guangdong Province from February to August 2008. Materials: Fibrin glue was prepared with fibrinogen, thrombin and calcium chloride. Methods: The chondrocytes from articular cartilage of 3-weeks-old New Zealand rabbit were isolated and monolayer cultured in vitro, then the cultured chondrocytes were seeded onto the standard fibrin glue scaffold and improved fibrin glue scaffold (adding with aprotinin 7 500, 12 500, 17 500 MIU/L and tranexamic acid 15, 20, 25 g/L compound liquid) and were cultured and amplified in vitro for 6 weeks. Main outcome measures: The degradation of scaffold. Results: At 3 weeks of in vitro culture, the standard group had completely disintegrated, and the volume of each improved group was 1/2 of its original volume. After 6 weeks of culture, the scaffold remained a certain shape with thickness and elasticity. The degrading speed of the fibrin glue was greatly alleviated by adding aprotinin and the tranexamic acid with various concentrations. No significant effect could be found on multiplication of chondrocyte, maintaining of surface type and cytoplasm secretion when the concentration was lower than 12 500 MIU/ L aprotinin and (or) 20 g/L tranexamic acid, however, the higher concentration of aprotinin and (or) tranexamic acid would

greatly inhibit multiplication of cbondrocyte, maintaining of surface type and cytoplasm secretion. Conclusion: The degradation rate of the fibrin glue scaffold can be controlled by regulate the content of aprotinin and tranexamic acid in the fibrin glue.