The importance of meniscus in knee function is well recognized. Several growth factors have been reported to play an important role in meniscal healing. Platelet-Rich Plasma (PRP) is a rich source for tissue regeneration because of the growth factors contained[1]. In this study, to investigate the effect of PRP on meniscal injury, proliferation and extracellular matrix (ECM) synthesis of meniscal cells were assessed in vitro, and gelatin hydrogel, which controls the release of the growth factors[2,3], incorporating PRP was applied to rabbit meniscal defect.

Methods: Japanese white rabbits were anesthetized and 16 ml whole blood were drawn into tubes containing 4 ml of ACD-A solution as an anticoagulant. The tubes were centrifuged at 2000 g for 10 minutes. The platelet-rich plasma (PRP) (10 ml) was separated from the plasma (3 ml) by centrifugation at 1500 g for 5 minutes. The platelet-poor plasma (PPP) (1 ml) was added to the remaining plasma (2 ml). The platelet-rich plasma (PRP) and platelet-poor plasma (PPP) were used for the following experiments.

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Results: The platelet density showed about 5-fold increase in the resulting PRP preparations. Growth factor levels were remarkably elevated in PRP samples (Fig. 1). PRP stimulated both DNA synthesis of meniscal cells (p<0.05) and ECM synthesis in vitro (p<0.05) (Fig. 2). No significant change was found in the expression of collagen mRNA. Meniscal cells cultured with PRP showed about 2-fold increase in aggrecan mRNA expression and about 4-fold increase in decorin mRNA expression, though about 2-fold fall in biglycan mRNA expression (Fig. 3). No significant change was found in the expression of collagen mRNA. Meniscal cells cultured with PRP showed about 2-fold increase in aggrecan mRNA expression and about 4-fold increase in decorin mRNA expression, though about 2-fold fall in biglycan mRNA expression (Fig. 4). In vivo, no significant change was found histologically in terms of Safranin-O negative ECM in any group at 4 weeks, although there was a partial repair with fibrochondrocyte in group A. At 12 weeks, there was more Safranin-O positive ECM synthesis in group A, than the other two groups (Fig. 5).

Discussion: The vitro study findings show that PRP apparently contains many growth factors and has a mitogenic potential to meniscal cells. PRP enhances small proteoglycans mRNA expressions, though slightly suppresses aggrecan mRNA expression, which is rich in hyaline cartilage. These results suggest that PRP is a more attractive source of fibrocartilage than hyaline cartilage and that combined with gelatin hydrogel, controlled released PRP growth factors could promote the healing of meniscal defects in an animal study.


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** PLATELET-RICH PLASMA WITH BIODEGRADABLE GELATIN HYDROGEL PROMOTES RABBIT MENISCAL TISSUE REGENERATION.**

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**Introducton**

**Methods:**

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**Results:**

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- Growth factor levels were remarkably elevated in PRP samples (Fig. 1).
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- These results suggest that PRP is a more attractive source of fibrocartilage than hyaline cartilage and that combined with gelatin hydrogel, controlled released PRP growth factors could promote the healing of meniscal defects in an animal study.

**References**

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