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Effects of platelet-rich plasma and platelet-rich fibrin with and without stromal cell-derived factor-1 on repairing full-thickness cartilage defects in knees of rabbits

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Aim: The purpose of this study was to create biomaterial scaffolds like platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) containing stromal cell-derived factor-1 (SDF1) as a chemokine to induce hyaline cartilage regeneration of rabbit knee in a full thickness defect.

Methods: We created a full thickness defect in the trochlear groove of 36 bilateral knees of 18 mature male rabbits. The knees were randomly divided into 6 groups (Group I: Untreated control, Group II: PRP group, Group III: PRF group, Group IV: Gelatin+SDF1 group, Group V: PRP+SDF1 group, and Group VI: PRF+SDF1 group). After 4 weeks, the tissue specimens were evaluated by macroscopic examination and histologic grading, Immunofluorescent staining for collagen type II and analyzed for cartilage marker genes was done by real time PCR.

Results: Macroscopic evaluations revealed that International Cartilage Repair Society (ICRS) scores of the PRF+SDF1 group were greater than those of the other groups. Microscopic analysis showed that ICRS score of the PRP group was significantly lower than those of the other groups. Immunofluorescent staining for Collagen II demonstrated a remarkable distribution of type II collagen in the Gel+SDF1, PRP+SDF1 and PRF+SDF1 groups as compared with the other groups.

Conclusion: Our results indicate that implantation of PRF scaffold containing SDF1 led to the greatest evaluation scores of full-thickness lesions in rabbits.

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