

# Autologous Injectable Tissue-Engineered Cartilage by Using Platelet-Rich Plasma: Experimental Study in a Rabbit Model

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**Purpose:** Platelet-rich plasma (PRP) has been widely applied to promote tissue healing and used as a novel injectable scaffold in bone tissue engineering. However, there is no report about its feasibility to support chondrogenesis. This study aimed to investigate the feasibility of a PRP carrier to deliver chondrocytes and regenerate cartilage tissues in a rabbit model via injection.

**Materials and Methods:** Eight New Zealand rabbits were divided into a chondrocytes/PRP group ( $n = 4$ ) and a PRP-alone group ( $n = 4$ ). Chondrocytes harvested from the auricular root of New Zealand rabbits were cultured and harvested. The chondrocytes were then mixed with PRP solution to generate chondrocytes/PRP composites with final cellular density of  $5.0 \times 10^7/\text{mL}$ . Bovine thrombin was used as a cross-linking agent to gel chondrocytes/PRP composites, then, the composites were injected subcutaneously into the dorsal tissue of cell donor animals. As controls, PRP alone was injected into another 4 rabbits. At the second month after injection, rabbits were prepared for magnetic resonance imaging. The samples were then harvested for macroscopical examination, histological analysis, and glycosaminoglycan quantification.

**Results:** Two months after injection, the hard knobbls were easily palpated under the dorsal skin of the animals in the chondrocytes/PRP group, and magnetic resonance images showed the presence of cartilage-like tissues. In histological analysis, formation of new cartilage was observed in the chondrocytes/PRP composites. Safranin-O staining and Masson's trichrome staining showed proteoglycan and collagen were produced in matrices. In contrast, no tissue formed in the PRP-alone group.

**Conclusions:** This study suggests the feasibility of using PRP as injectable scaffold seeded with chondrocytes to regenerate cartilage and showed the potential of using this method for the reconstruction of cartilage defects.