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# Prospective Application of Partially Digested Autologous Chondrocyte for Meniscus Tissue Engineering

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## Abstract

**Background:** Meniscus tissue engineering has yet to achieve clinical application because it requires chondrogenic induction and *in vitro* cell expansion. Contrarily, cartilage engineering from autologous chondrocytes has been successfully applied in one-surgery. If the natural chondrogenic potential of meniscus cells can be demonstrated, meniscus tissue engineering would have value in clinical settings. **Materials and Methods:** In total, 10 menisci and pieces of cartilage were obtained during total replacements. The tissues were collected for cell isolation and expansion. Their chondrogenic properties were examined by immunohistofluorescence and gene expression analyses. **Results:** In native cartilage, immunofluorescence demonstrated presence of collagen I, aggrecan, and traces of collagen II, whereas comparable staining was seen in the inner and middle meniscus. The presence of collagen I but the absence of collagen II and aggrecan were observed in the outer meniscus. *In passage 1* chondrocytes showed the presence of collagen II and aggrecan, and the absence of vimentin. The vimentin and aggrecan staining were comparable in the inner and middle meniscus cells, whereas the outer cells showed only vimentin staining. In the expression analyses, the expressions of collagen II and aggrecan in the native chondrocyte and the inner and middle meniscus were higher than those of the cells from the outer meniscus, but they were not different in collagen I. In the passage 2 *in vitro* chondrocytes had a higher expression of collagen II and aggrecan than the meniscus cells. Cells from the inner and middle area showed higher collagen II and aggrecan expression than those from the outer meniscus. **Conclusion:** Without chondrogenic induction, inner and middle meniscus cells possess a chondrogenic phenotype. Specifically, native meniscus cells exhibited more chondrogenic potential compared with those of the passage 2 monolayer culture.

**Keywords:** meniscus cell; sustainable tissue engineering; cell-based therapy; chondrogenic expression; chondrogenic property; cell proliferation