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Tissue Engineered Cartilage Integration to Live and Devitalized Cartilage: A Study by Reflectance Mode Confocal Microscopy and Standard Histology

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ABSTRACT

This study investigated the in vivo formation of engineering cartilage within living or devitalized cartilage discs using reflectance mode confocal microscopy and conventional light microscopy. Pig articular chondrocytes were suspended in fibrin glue and placed between two cartilage discs. Four experimental groups were prepared: in groups 1 and 2, the cell-hydrogel composite was placed between two live or between two devitalized cartilage discs, respectively; in groups 3 and 4, acellular fibrin glue was placed between two live or between two devitalized cartilage discs, respectively. Samples were implanted in the back of nude mice and analyzed after 2, 5, and 8 weeks. Results showed that engineered cartilage seems to grow more homogenously when the cell-seeded gel was placed between devitalized cartilages than when it was placed between live cartilage matrices. Confocal microscopy provides valuable information on the integration of tissue-engineered cartilage with native tissue and could be useful for nondestructive imaging in vivo.