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Repairing articular cartilage defects with an injectable gel engineered with gene modified BMSCs

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Researchers at Micro Orthopaedics, Zhongnan Hospital of Wuhan University, led by Dr. Ai-xi Yu, have suggested that articular cartilage defects can be repaired by a novel thermo-sensitive injectable hydrogel engineered with gene modified bone marrow mesenchymal stromal cells (BMSCs). The chitosan and polyvinyl alcohol composite hydrogel containing hTGFβ-1 gene modified BMSCs was injected into rabbits with defective articular cartilage. Sixteen weeks later the defected cartilage regenerated and was proven to be hyaline cartilage. This work can be found in the January 2013 issue of *Experimental Biology and Medicine*.

"No reliable approach is currently available for complete restoration of damaged articular cartilage", said Dr. Bai-wen Qi, "in this study, CS/PVA gel was combined with rabbit bone marrow stromal cells (BMSCs) transfected with hTGFβ-1 and used to repair rabbit articular cartilage defects and the repair effect was evaluated".

Tissue engineering combined with gene therapy technology has the potential to manage the repair of defective articular cartilage. In this study, through minimally invasive injection methods the authors were able to repair rabbit articular cartilage defects with CS/PVA gel and gene modified BMSCs. Dr. Qi said "CS/PVA gel can be applied to the repair of articular cartilage defects as an injectable material in tissue engineering, and the regenerated cartilage can secrete cartilage matrix

and perform the functions of hyaline cartilage. Use of this gel for cartilage repair has advantages such as the minor surgical procedure required, tight bonding with the damaged tissue and lack of rejection".

Dr. Steven R. Goodman, Editor-in-Chief of *Experimental Biology and Medicine* said "The study by Qi and colleagues is very exciting as it combines tissue engineering and gene therapy approaches to successfully repair defective articular cartilage. The approach should be adaptable in the future to human tissue repair".

Provided by Society for Experimental Biology and Medicine

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