Molecular Mechanism of Cartilage Turnover in Monosodium iodoacetate induced Knee Osteoarthritis

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Abstract:

Abstract: Osteoarthritis (OA) is characterized by a progressive degradation of cartilage and loss of joint function. A simple and reproducible animal model that mimics molecular and pathological changes in the articular cartilage of knee joint OA would help in understanding its pathophysiological mechanism and aid in the preclinical assessment of disease modifying drugs. The aim of our study is to evaluate changes in Aggrecan gene expression as a part of molecular events underlying cartilage turnover in monosodium iodoacetate (MIA)-induced knee OA through determination of aggrecan mRNA expression and immunostaining and its relation to disease chronicity and severity. OA was induced by single intra-articular injection of MIA into knee joints of male rats. Histologic and molecular changes in the knee cartilage were evaluated by light microscopy, real-time PCR and immunohistochemistry. Our results showed that injection of an MIA induced typical OA-like lesions in the knee joint within 3 weeks. Furthermore, there was a significant down-regulation of aggrecan gene expression in MIA-induced OA in a time dependent manner, and that reflects the severity of OA in terms of Mankin score. These results were confirmed through estimation of aggrecan content in cartilage by immunohistochemical analysis, which revealed a progressive decrease in aggrecan immunoeexpression. In conclusion, intra-articular MIA injection is an animal model that presents reliable profiling of the sequence, chronic and complex nature of OA. This would help studying the OA modifying drugs specially those suggested having anabolic effect and enhancing the PG contents both at early and late stages of the disease.

Keywords:

Keywords: Monosodium iodoacetate, Osteoarthritis, Cartilage, Aggrecan, Real time PCR.

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