ABSTRACT

We had previously demonstrated that excitatory amino acid glutamate plays a role in the progression and severity of knee Osteoarthritis (OA), and early hyaluronic acid injection attenuates the OA progression by attenuation of knee joint glutamate level, which was also related to the cystine/glutamate antiporter system X (system XC) expression. System XC uptakes cystine into chondrocytes for glutathione (GSH) synthesis, but the role of system XC in OA is rarely addressed. Sulfasalazine (SSZ) is a system XC inhibitor; SSZ was applied intra-articularly to study the function of system XC in the development of OA in rats subjected to anterior cruciate ligament transection and medial meniscectomy (ACLT+MMx). Moreover, the system XC activator N-acetylcysteine (NAC) was also applied to verify the role of system XC. The intra-articular injection of SSZ significantly attenuated knee swelling and cartilage destruction in the knees of ACLT+MMx rats and this effect was blocked by NAC. The results showed that inhibition of system XC function can attenuate ACLT+MMx-induced cartilage destruction. In the present study, system XC inhibitor SSZ was shown to reduce glutamate content in synovial fluid and GSH in chondrocytes. It was also showed SSZ could attenuate ACLT+MMx-induced cartilage destruction, and treatment of NAC reversed the protective effect of SSZ.

Keywords: osteoarthritis; cystine/glutamate antiporter; sulfasalazine; anterior cruciate ligament transection...