Molecular Investigation of Sesamin on Chondrocyte Metabolism

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Abstract

Sesamin is the lignan found in *Sesamun indicum* Linn. Since, there are many reports of health benefit such as anti-inflammatory effects and unsaturated fatty acid biosynthesis inhibition but little is known about chondroprotective effects. The chondroprotective effects of sesamin were thus studied in a porcine cartilage explant induced with interleukin-1beta (IL-1β) and in a papain-induced osteoarthritis in a rat model. In the porcine cartilage explant, IL-1β induced release of sulfated-glycosaminoglycan (s-GAG) and hydroxyproline release, and this induction was significantly inhibited by sesamin. This ability to inhibit these processes might be due to its ability to decrease the expression of MMP-1, -3 and -13, which can degrade both PGs and type II collagen, both at the mRNA and protein levels. Interestingly, activation of MMP-3 might also be inhibited by sesamin. Moreover, in human articular chondrocytes (HACs), some pathways of IL-1β signal transduction were inhibited by sesamin: p38 and JNK. In the papain-induced OA rat model, sesamin treatment reversed the following pathological changes in OA cartilage: reduced disorganization of chondrocytes in cartilage, increased cartilage thickness, and decreased type II collagen and PGs loss. Sesamin alone increased formation of type II collagen and PGs in the cartilage tissue of control rats. The results from qRT-PCR found that sesamin promoted the expression of chondroitin sulfate proteoglycans synthesis genes (*ACAN, XYLT1, XYLT2, CHSY1* and *CHPF*). Taken all together, these results demonstrate that sesamin efficiently suppressed the pathological processes in an OA model. Thus, sesamin could be a potential therapeutic strategy for treatment of OA.

Recent major publications:

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4. Klangjorhor J, Nimkingratana P, Settakorn J, Pruksakorn D, Leerapun T, Arpornchayanon O, Rojanasthien S, Kongtawelert P, **Pothacharoen P**. Hyaluronan production and chondrogenic properties of primary human chondrocyte on gelatin based hematostatic spongostan scaffold. J Orthop Surg Res. 2012 Dec 19; 7: 40.

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2. Kongtawelert, P., Hardingham, TE., Ong-chai, S., Sugahara, K., **Pothacharoen, P.**, and Tiengburanathum, N. Antibody. United Kingdom Patent Application, Date: August 18, 2004.
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