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Chondroprotective and Anti-inflammatory Effects of ChondroT, A New Complex Herbal Medication

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Ganghwaljetongyeum (GHJTY) is a complex herbal decoction comprising 18 plants; it is used to treat arthritis. In order to develop a new anti-arthritic herbal medication, we selected 5 out of 18 GHJTY plants by using bioinformatics analysis. The new medication, called ChondroT, comprised water extracts of Osterici Radix, Lonicerae Folium, Angelicae Gigantis Radix, Clematidis Radix, and Phellodendri Cortex. This study was designed to investigate its chondroprotective and anti-inflammatory effects to develop an anti-arthritic herb medicine. ChondroT was validated using a convenient and accurate high-performance liquid chromatography. photodiode array (HPLC-PDA) detection method for simultaneous determination of its seven reference components. The concentrations of the seven marker constituents were in the range of 0.81-5.46 mg/g. The chondroprotective effects were evaluated based on SW1353 chondrocytes and matrix metalloproteinase 1 (MMP1) expression. In addition, the anti-inflammatory effects of ChondroT were studied by Western blotting of pro-inflammatory enzymes and by enzyme-linked immunosorbent assay (ELISA) of inflammatory mediators in lipopolysaccharides (LPS)-induced RAW264.7 cells. ChondroT enhanced the growth of SW1353 chondrocytes and also significantly inhibited IL-1β-induced MMP-1 expression. However, ChondroT did not show any effects on the growth of HeLa and RAW264.7 cells. The expression of cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS) was induced by LPS in RAW264.7 cells, which was significantly decreased by pre-treatment with ChondroT. In addition, ChondroT reduced the activation of NF-kB and production of inflammatory mediators, such as IL-1β, IL-6, PGE2, and nitric oxide (NO) in LPS-induced RAW264.7 cells. These results show that ChondroT exerted a chondroprotective effect and demonstrated multi-target mechanisms related to inflammation and arthritis. In addition, the suppressive effect was greater than that exhibited by GHJTY, suggesting that ChondroT, a new complex herbal medication, has therapeutic potential for the treatment of arthritis.

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