

## PubMed Journals

Find a journal

[Journals](#) > [Clin Exp...](#) > [The Therapeutic...](#)

## The Therapeutic Nuclear Magnetic Resonance Changes the Balance in Intracellular Calcium and Reduces the Interleukin-1 $\beta$ Induced Increase of NF- $\kappa$ B Activity in Chondrocytes

B Steinecker-Frohnwieser et al. Clin Exp Rheumatol. 2017 Nov 28. [more](#)

**OBJECTIVES:** Osteoarthritis as the main chronic joint disease is characterised by the destruction of articular cartilage. Developing new, more effective and in particular non-invasive methods to achieve pain reduction of OA patients are of exceptional interest. Clinical observations demonstrated positive effects of therapeutically applied low nuclear magnetic resonance (NMRT) for the treatment of painful disorders of the musculoskeletal system. In this study the cellular mechanism of action of NMRT was examined on chondrocytes.

**METHODS:** Cal-78 human chondrosarcoma cells were kept under inflammatory conditions by application of IL-1 $\beta$ . NMRT treated cells were tested for changes in histamine induced Ca<sup>2+</sup> release by fura-2 calcium imaging. The effects of IL-1 $\beta$  and of NMRT treatment were further tested by determining intracellular ATP concentrations and the activity of MAP-kinases and NF- $\kappa$ B.

**RESULTS:** NMRT influenced the intracellular calcium signalling by elevating the basal [Ca<sup>2+</sup>]<sub>i</sub>. The peak calcium concentration evoked by 10  $\mu$ M histamine was increased by IL-1 $\beta$  and this increase was reversed under NMRT treatment. Screening of different kinase-activities revealed an apparent increase in activity of MAPK/ERK and MAPK/JNK in NMRT stimulated cells, p38 was downregulated. The IL-1 $\beta$ -induced decline in intracellular ATP and the elevated NF- $\kappa$ B activity was reversed under NMRT stimulation.

**CONCLUSIONS:** Under inflammatory conditions, NMRT influenced cellular functions by modulating cellular calcium influx and/or calcium release. Further, NMRT induced changes in MAPK activities such as down-regulation of NF- $\kappa$ B and increasing intracellular ATP might help to stabilise chondrocytes and delay cartilage damage due to OA.

PubMed: 29185963

## Similar Articles

### [Epigallocatechin-3-Gallate Suppresses the Global Interleukin-1beta-Induced Inflammatory Response in Human Chondrocytes](#)

N Akhtar et al. Arthritis Res Ther 13 (3), R93. 2011 Jun 17.

### [Mori Folium Inhibits Interleukin-1 \$\beta\$ -Induced Expression of Matrix Metalloproteinases and Inflammatory Mediators by Suppressing the Activation of NF- \$\kappa\$ B and P38 MAPK in SW1353 Human Chondrocytes](#)

JW Jeong et al. Int J Mol Med 37 (2), 452-460. 2015 Dec 23.

### [Lactoferrin From Camelus Dromedarius Inhibits Nuclear Transcription Factor-Kappa B Activation, Cyclooxygenase-2 Expression and Prostaglandin E2 Production in Stimulated Human Chondrocytes](#)

N Rasheed et al. Pharmacognosy Res 8 (2), 135-141. Apr-Jun 2016.

### [Peroxisome Proliferator-Activated Receptor \$\gamma\$ 1 Expression Is Diminished in Human Osteoarthritic Cartilage and Is Downregulated by Interleukin-1 \$\beta\$ in Articular Chondrocytes](#)

H Afif et al. Arthritis Res Ther 9 (2), R31. 2007 Mar 26.

### [Punica Granatum L. Extract Inhibits IL-1 \$\beta\$ -Induced Expression of Matrix Metalloproteinases by Inhibiting the Activation of MAP Kinases and NF- \$\kappa\$ B in Human Chondrocytes in Vitro](#)

S Ahmed et al. J Nutr 135 (9), 2096-2102. 9 2005.

## Popular

## Connect

## Resources

## Actions

### National Center for Biotechnology Information

8600 Rockville Pike, Bethesda MD, 20894 USA



NLM

USA.gov

[About NCBI](#)[Policies and Guidelines](#)