

Dimethyl sulphoxide and dimethyl sulphone are potent inhibitors of IL-6 and IL-8 expression in the human chondrocyte cell line C-28/I2

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Abstract

AIMS:

Reactive oxygen species (ROS) are highly diffusable and reactive molecules which modulate gene transcription, particularly of pro-inflammatory cytokines which play a crucial role in the nascency and progression of chronic inflammatory diseases such as rheumatoid arthritis (RA) and osteoarthritis (OA). Since thiols could be potent inhibitors of the production of cytokines, the effects of dimethyl sulphoxide (DMSO) and dimethyl sulphone (DMS) on constitutive and IL-1 β -induced IL-6 and IL-8 expression in the human chondrocyte cell line C-28/I2 were evaluated.

MAIN METHODS:

C-28/I2 cells were incubated for 12h with different concentrations of DMSO or DMS. The secretion of IL-6 and IL-8 was quantified by enzyme-linked immunosorbent assays (ELISAs). The impact of DMSO and DMS on the regulation of p38 and ERK1/2 mitogen-activated protein kinases (MAPKs) was confirmed by Western blot experiments. Furthermore, C-28/I2 cells were stimulated with IL-1 β in the absence or presence of DMSO and DMS and IL-6 and IL-8 expression was quantified by ELISAs and quantitative real-time polymerase chain reaction (qRT-PCR).

KEY FINDINGS:

C-28/I2 cells constitutively expressed large quantities of IL-6 and IL-8. Long-term exposure of cells to DMSO (1%) or DMS (100mM) led to a dramatic downregulation of IL-6 and IL-8 expression which was accompanied by the deactivation of ERK1/2. Both substances also blocked IL-1 β -induced IL-6 and IL-8 expression.

SIGNIFICANCE:

In this study, we demonstrate that both DMSO and DMS represent strong anti-inflammatory properties by blocking constitutive as well as IL-1 β -induced IL-6 and IL-8 expression in the human chondrocyte cell line C-28/I2.

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