Curcumin inhibits interleukin-6, -8, nitric oxide and prostaglandin E_2 synthesis by bovine chondrocytes

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AIMS OF THE STUDY

Curcumin (Curc) [1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione] derived from the plant *Curcuma longa* possesses anti-inflammatory and antioxidant properties. Inflammatory mediators such as interleukin (IL)-6 and -8, nitric oxide (NO), and prostaglandin (PG) E_2 play a key role in the pathogenesis and progression of osteoarthritis (OA). This study aims to investigate the effects of Curc, on the production of IL-6, IL-8, NO, and PGE_2 by primary bovine chondrocytes.

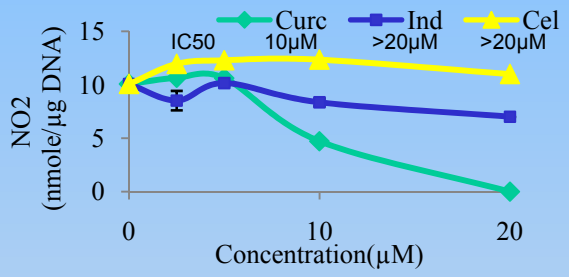
METHODS

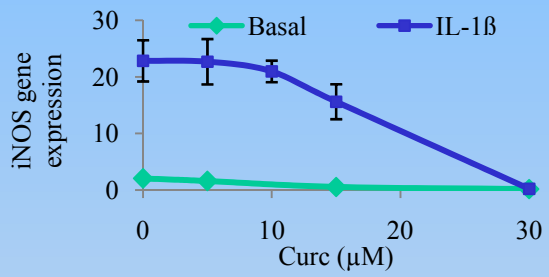
Primary bovine chondrocytes were cultured in monolayer until confluence and then incubated for 24h in the absence (basal condition) or in the presence of IL-1β (10^{-11}M) and with or without Curc, indomethacin (Ind) and celecoxib (Cel) at a concentration ranged between 1 to 30 µM. Cell viability was determined by measuring MTT tetrazolium salt reduction and lactate deshydrogenase release. NO production was assessed by quantifying nitrite in the culture supernatants using the Griess spectrophotometric method. PGE_2 was measured in the culture supernatants by a specific radioimmunoassay. Inducible NO synthase (iNOS), cyclooxygenase COX-2, IL-6 and IL-8 gene expression were determined by real-time RT-PCR.

RESULTS

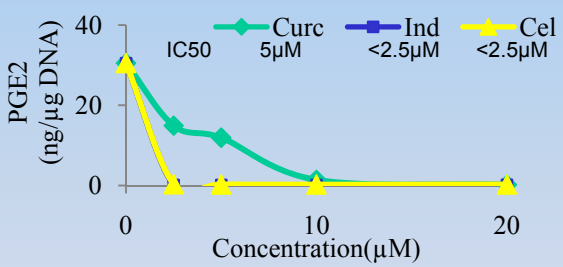
•Curc had no significant effects on DNA content, MTT reduction and LDH release.

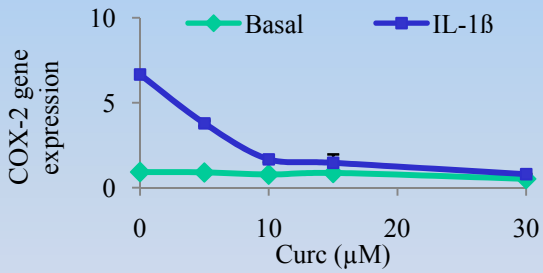
•Curc inhibited IL-1β induced NO production and iNOS gene expression.



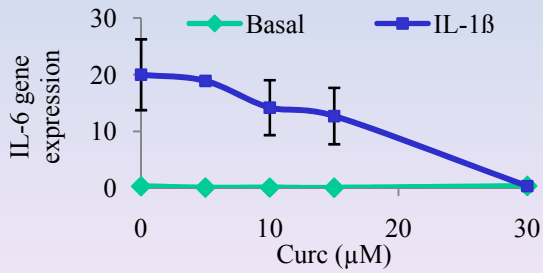


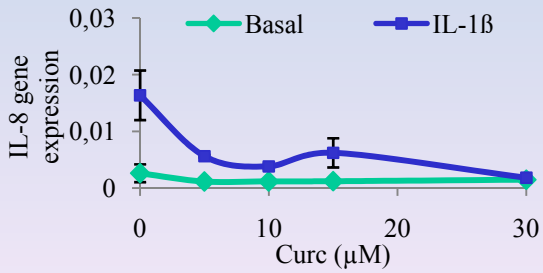
•Curc inhibited IL-1β induced PGE_2 production, COX-2 but not COX-1 gene expression.





•Curc inhibited IL-1β induced IL-6 and IL-8 gene expression.





CONCLUSIONS

Altogether, these in vitro results indicate that curcumin may reduce inflammation and pain in OA by reducing the production of inflammatory mediators by chondrocytes. These findings provide a preclinical basis for the in vivo testing of curcumin and suggest that this natural compound could be helpful to alleviate symptoms in OA patients.