Hyaluronic Acid Suppresses the Expression of Metalloproteinases in Osteoarthritic Cartilage Stimulated Simultaneously by Interleukin 1β and Mechanical Load.

Abstract:
In patients with osteoarthritis (OA), intraarticular injection of hyaluronic acid (HA) frequently results in reduced pain and improved function for prolonged periods of time, i.e. more than 6 months. However, the mechanisms underlying these effects are not fully understood. Our underlying hypothesis is that HA modifies the enzymatic breakdown of joint tissues. To test this hypothesis, we examined osteochondral cylinders from 12 OA patients. In a bioreactor, these samples were stimulated by interleukin 1β (IL1β) (2 ng/ml) plus mechanical load (2.0 Mpa at 0.5 Hz horizontal and 0.1 Hz vertical rotation), thus the experimental setup recapitulated both catabolic and anabolic clues of the OA joint. Upon addition of HA at either 1 or 3 mg/ml, we observed a significant suppression of expression of metalloproteinase (MMP)-13. A more detailed analysis based on the Kellgren and Lawrence (K&L) OA grade, showed a much greater degree of suppression of MMP-13 expression in grade IV as compared to grade II OA. In contrast to the observed MMP-13 suppression, treatment with HA resulted in a suppression of MMP-1 expression only at 1 mg/ml HA, while MMP-2 expression was not significantly suppressed.
affected by either HA concentration. Together, these data suggest that under concurrent catabolic and anabolic stimulation, HA exhibits a pronounced suppressive effect on MMP-13. In the long-run these findings may benefit the development of treatment strategies aimed at blocking tissue degradation in OA patients.

Zeitschriftentitel / Abkürzung:  
PLoS ONE

Jahr:  
2016

Band:  
11

Heft / Issue:  
3

Seiten:  
e0150020

Sprache:  
eng

Volltext / DOI:  
doi:10.1371/journal.pone.0150020

Pubmed:  

TUM Einrichtung:  
Orthopädische und Sportorthopädische Klinik und Poliklinik

Occurences:  
Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Klinik für Orthopädie und Unfallchirurgie > 2016

Entries: