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Ankle cartilage is more resilient to cytokine-induced catabolism than knee cartilage: A potential target for prevention of knee arthritis?

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Introduction & Aim: The variation in prevalence of osteoarthritis has been hypothesized to result from the differential responsiveness of joints to catabolic stimuli; therefore the aim of this study was to determine whether ankle cartilage is less susceptible to the catabolic effects of pro-inflammatory cytokines when compared to the knee.

Methods: Human cartilage explants were taken from the talar domes (n=12) and the femoral condyles (n=7) following surgical amputation. Explants were cultured in the presence or absence of either a combination of high or low concentration of cytokines, and media analyzed up to 28 days. Sulphated glycosaminoglycan (sGAG) release to the media and expression levels of nitric oxide and prostaglandin E_2 (PGE_2) were measured.

Results: Significantly more sGAG was lost from knee cartilage explants exposed to 100 ng/ml TNFα (22.2% vs. 13.2%, P=0.01) and 100 ng/ml TNFα in combination with 5 ng/ml IL-1α (27.5% vs. 16.0%, P=0.02) compared to sGAG release from the ankle; low cytokine concentrations did not affect sGAG release. All high concentration cytokine treatments resulted in production of more nitrite and PGE_2 compared to low concentrations; however, no significant differences between the knee and ankle were noted for nitrite although there was significantly more PGE_2 production in knee cartilage.

Discussion: Cartilage explants from the knee and ankle have a divergent response to stimulation by pro-inflammatory cytokines, with high concentrations of TNFα alone, or in combination with IL-1α amplifying cartilage degeneration. This differential response may account for the high prevalence of knee arthritis compared to ankle OA and provide a future pharmacological target to treat OA of the knee.

Biography

Ali Abdullah is a 5th year Medical student and has attained a BSc in Biomedical Sciences (Anatomy) from Cardiff University. He has previously presented research at various national conferences.

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