Intra-articular CGRP plays a key role in development of osteoarthritis

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Abstracts will be considered for both poster and platform presentations

Other

Objective:
The goal of this study was to evaluate the use of a monoclonal agonist and antagonist of calcitonin gene-related peptide (CGRP) in the treatment of osteoarthritis (OA).

Materials and Methods:
We employed the Col1-IL1βXAT inducible model of joint inflammation. Histopathologic changes induced by intra-articular over-expression/inhibition of CGRP were evaluated by Alcian blue-orange G histochemistry. The function of CGRP on cell differentiation, cell differentiation, cAMP signaling were assessed in vitro employing the ATDC5 chondrocyte cell line.

Results:
#1: Historical changes (articular spurring and enlargement of soft tissue) in the articulatio genus structure of WT mice 4 weeks after FIV (CGRPfull) injection were observed.
#2: 4 weeks following FIV (CGRPa8-37) injection in the articulatio genus of OA model transgenic mice, histopathologic improvement in the articular cartilage of the joints (improved cellular disorganization and normal cytoarchitecture) was observed.
#3: Significantly, higher proliferation was observed in ATDC chondrocyte when treating with CGRP (0.5ug/ml) for than control (without CGRP).
#4: ATDC5 chondrocyte differentiation (Alcian blue, Alkaline phosphatase, Alizarin red) was significantly inhibited when treating with CGRP (0.5ug/ml).
#5: cAMP signaling in ATDC5 Chondrocyte was significantly higher when treating with CGRP (0.1ug/ml, 0.5ug/ml or 1.0ug/ml) than control with dose-dependent manner.

Conclusions: We demonstrated that intra-articular over-expression of CGRP is sufficient for the development of histopathologic changes in OA. Conversely, suppression of intra-auricular CGRP during joint osteoarthritis improved the attendant histopathology. Intra-aticular CGRP induces a direct effect on chondrocyte in terms of the proliferation, differentiation and cAMP signaling which are one of the potential mechanisms of the histopathologic changes in OA via CGRP.