**The intra-articular injection of a new chitosan biomaterial prevents the progression of osteoarthritis in ACLT rabbit model**

**PURPOSE**

To evaluate the effects of a single intra-articular injection of a new biomaterial composed of alginate-chitosan (AC) beads dispersed in a viscous thermogelling chitosan-based (H) hydrogel on the development of osteoarthritis rabbit model. These effects were compared to those obtained with the intra-articular injection of either chitosan-based (H) hydrogel alone or saline solution.

**METHODS**

**RESULTS**

1. **AC beads in H hydrogel prevented from the development of OA based on the reduction of Kellgren & Lawrence score.**

   ![Image 1: A. Representative X-rays from each treatment group before the ACLT surgery and before sacrifice (6 weeks after surgery). B. X-ray grading according to the Kellgren and Lawrence scale. Data are presented as a box and whisker plot. Data were analyzed with an ANOVA followed by the Bonferroni multiple comparison test. * P vs saline.](image)

2. **AC beads in H hydrogel significantly reduced the histological score of cartilage lesion severity.**

   ![Image 2: A. Histologic sections showing the full thickness of cartilage and subchondral bone in the weight bearing zone of the femoral condyles and tibial plateaux stained with Safranin-O/Fast green in each treatment group. B. Cartilage global score. Data are presented as a box and whisker plot and analyzed with an ANOVA followed by the Bonferroni multiple comparison test. * P vs saline; H P vs H hydrogel alone.](image)

3. **No significant variation of biological markers was noted**

   ![Table 1: Serum levels of biological markers, PGE2 and CRP throughout the study, data are presented as a box and whisker plot and analyzed with an ANOVA followed by the Bonferroni multiple comparison test. The analysis revealed no difference between group.](table)

4. **The injection of AC beads also tended to reduce the synovial membrane inflammation.**

   ![Figure 3: Synovial membrane histological score and comparison treatment groups. Data are presented as a box and whisker plot and analyzed with an ANOVA followed by the Bonferroni multiple comparison test. The analysis revealed no difference between group.](image)

**CONCLUSIONS**

Alginate chitosan beads dispersed in H hydrogel prevented OA in ACL transection rabbit model. This effect was not observed with the H hydrogel alone, suggesting that alginate chitosan beads play a role in joint protection. The preventive effect was observed in all joint compartments indicating a global effect of this new implantable biomaterial.