

Collagen Type II Cleavage Sandwich Assay (IB-C2C-HUSA™)

Cat. # 60-1007

Brief literature review of some publications where IBEX C2C-HUSA ELISA assay was used.

- A population-based cohort with pre-radiographic disease and radiographic OA was evaluated at baseline and follow-up after 3.3 years. The study revealed that IB-C2C-HUSA degradation assay detects the generation of a pathology-related cartilage collagen peptide(s) that progressively increase(s) with onset of knee articular cartilage degeneration. Cross-sectionally, the assay could discriminate between the subgroups with the highest level of C2C-HUSA biomarker seen in radiographic OA group (Figure A). There was a progressive increase in C2C-HUSA levels with increasing cartilage degradation.
- Moreover, in subject already exhibiting cartilage pathology, analysis of baseline urine with C2C-HUSA assay was predictive of subsequent cartilage loss over 3 years, with progressors showing significantly increased levels compared to non-progressors (Figure B). (Poole *et al.* 2016).

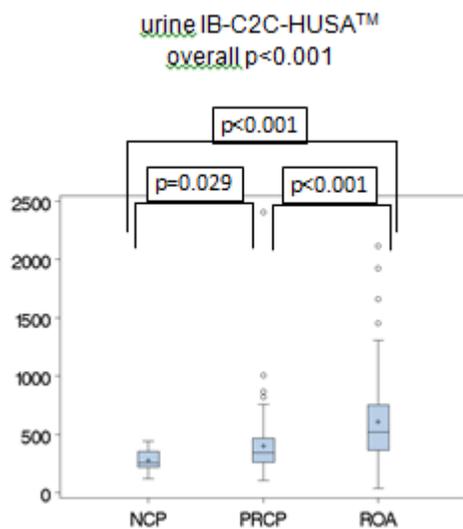


Figure A

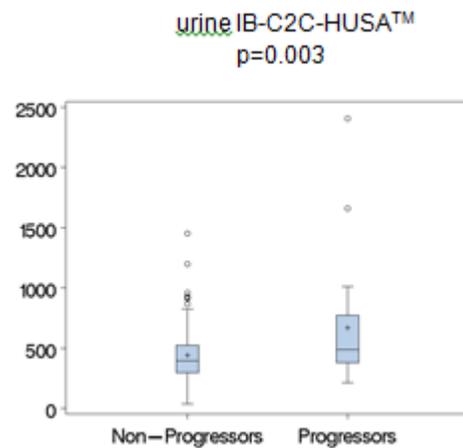


Figure B

- In an OA initiative head to head assessment of 18 biomarkers, C2C-HUSA was one of 8 biomarkers that predicted case status and one of only 2 biomarkers, the other one being CTX-II, that predicted individual group status, including pain worsening, joint space loss and their combination (Kraus *et al.* 2016).
- Tamm *et al.* (2014) also observed positive correlations with symptoms as well as joint function in a study with middle age patients with knee OA.
- In a recent study of adolescent and adult volleyball athletes, uC2C levels were reduced in adolescent with closed growth plates compared to open growth plates. In adults, uC2C as well as uCTX-II levels, showed a marked reduction from adolescent levels. Greater levels of uC2C in adolescents than in adults may reflect increased cartilage turnover in response to higher joint loading. (Boeth *et al.* 2017).

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1. Poole AR, Ha N, Bourdon S, Sayre EC, Guermazi A, Cibere J. (2016). Ability of a urine assay of type II collagen cleavage by collagenases to detect early onset and progression of articular cartilage degeneration: Results from a population-based cohort study. *J Rheumatol.* 43:1864-70.
2. Tamm AO, Kumm J, Tamm A, Lintrop M, Kukner A et al. (2014). Cartilage collagen neoepitope C2C and clinical parameters in middle-aged patients with knee problems. Correlations of urinary output of C2C with cartilage lesions, KOOS values and functional abilities of lower limb. *Osteoarthritis Cartilage* 22: S70-S71.
3. Boeth H, MacMahon A, Poole AR, Buttgerit F, Onnefjord P et al. (2017). Differences in biomarkers of cartilage matrix turnover and their changes over 2 years in adolescent and adult volleyball athletes. *J Exp Orthop* 4: 1-11.
4. Kraus VB, Collins JE, Hargrove D, Losina E, Nevitt M et al. (2016) Predictive validity of biochemical biomarkers in knee osteoarthritis: data from the FNIH OA Biomarkers Consortium. *Ann Rheum Dis.* 76:186-95.