Disclosure of Interests: Alexandra Damerau: None declared, Annemarie Lang: None declared, Moritz Pleffenberger: None declared, Timo Gaber Czeisler/research support from: Pfizer, Frank Buttgerst: None declared.

FR0508
OLIVE OIL POLYPHENOLS AS NOVEL NUTRACEUTICALS IN TREATMENT OF OSTEOARTHRITIS
Mia S. Meiss1, Marina Sanchez-Hidalgo2, Catalina Alarcón-de-la-Lastra3, José M. Fernández-Bolaños2, Richard Oc Orefio1, María C de Andres1,2,3. 1Centre for Human Development, Stem Cells and Regeneration, Institute of Developmental Sciences, Southampton, United Kingdom; 2University of Seville, Faculty of Pharmacy, Department of Pharmacology, Seville, Spain; 3Biomedical Research Institute of A Coruña-INIBIC, A Coruña, Spain

Background: Osteoarthritis (OA) is a degenerative disease of the joints characterised by the imbalance of anabolic and catabolic processes in articular cartilage. It is one of the most significant causes of disability in the world affecting over 60% of people over the age of 60, causing joint stiffness, pain and a decrease in the quality of life. Currently no successful disease-modifying agent has been found to prevent or treat the condition. To address this unmet need, alternative approaches, including the use of nutraceuticals as a novel therapeutic intervention are under examination.

Objectives: To analyse if nutraceuticals are able to reverse the catabolic activity that contribute to cartilage destruction in OA. Here two polyphenols from extra virgin olive oil (EVOO), oleocanthal (OLC) and ligstrose aglycone (LA), plus a chemically modified acetylated ligstrose aglycone (A-LA), and two marine polyunsaturated fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), were examined as potential anti-inflammatory agents for OA.

Methods: Human chondrocytes and cartilage explants were extracted from OA femoral heads, cultured and incubated with increasing concentrations of select compounds in combination with the pro-inflammatory cytokines IL-1β and interleukin-1 (IL1B) at both RNA and protein levels; decreased nitric oxide (NO) levels from cartilage explants and also MMP13 iNOS activity that contribute to cartilage destruction in OA. Here two polyphe-

Results: Acetylated ligstrose showed the most promising results for implementation in treating OA as it reduced the expression of pro-inflammatory genes such as inducible nitric oxide (iNOS), matrix metallo-pro tease-13 (MMP13) and interleukin-1β (IL1B) at both RNA and protein levels; decreased nitric oxide (NO) levels from cartilage explants and also reduced proteoglycan (PG) losses in human osteoarthritic cartilage explants and chondrocytes (Figure 1).

Conclusion: These results substantiate the role of nutraceuticals in OA with implications for therapeutic intervention and our understanding of OA pathophysiology.

REFERENCES:

FR0509
3D MICROSTRUCTURE OF INTACT AND OSTEARTHritic HUMAN MENISCUS USING MICRO-COMPUTED TOMOGRAPHY
Iida Kentila1, Elin Folkesson2, Mikko A. Finnila1, Aleksandra Turkiewicz2, Patrik Örnerford3, Velocity Hughes2, Jon Täismänd2, Martin Englund1,3, Simo Saarakkala1,4,1University of Oulu, Oulu, Finland; 2Lund University, Lund, Sweden; 3Boston University School of Medicine, Boston, United States of America; 4Oulu University Hospital, Oulu, Finland

Background: Degenerative meniscal lesions are highly prevalent in the general population and are associated with increased risk of knee osteoarthritis (OA). Development of novel methods for visualization of the early degenerative changes in the meniscus could help us better understand meniscal degradation and the onset of OA.

Objectives: To develop and perform ex vivo 3D imaging of meniscus posterior horn microstructure with micro-computed tomography (µCT), and to compare specimens from healthy references with end-stage OA using histology and qualitative µCT.

Methods: Medial and ipsilateral lateral menisci were retrieved from 10 patients undergoing total knee arthroplasty for medial compartment knee OA (age range 50 to 75 years, 5 women). Additionally, medial menisci were obtained from 10 cadaveric donors without known OA, to serve as reference (age range 18 to 77 years, 5 women). The samples were freshly frozen in -80°C. After thawing, the posterior horns were dissected and fixed, followed by excision of a piece for µCT imaging (Fig. 1A). The µCT samples were dehydrated in ascending ethanol concentrations, treated with hexamethyldisilazane (HMDS), and dried in room temperature. They were then imaged with a desktop µCT (scanning parameters: 40 kV, 250 µA, 2.0 µm pixel size, 1815 ms, no additional filtering). For histological analysis, Paul’s histopathological scoring1 was performed independently by two graders on sections from three regions (Fig. 1A). The graders’ consensus was given for each sub-score, from which the final overall consensus scores were calculated for each region. The mean difference in consensus scores (95% CI), adjusted for age and sex, were estimated between the menisci from OA knees and the reference menisci (medial OA meniscus vs reference menisci, and lateral meniscus from OA patients vs reference menisci) using a mixed linear regression model. The mean difference in consensus scores between the medial and lateral menisci from the same OA patient was calculated using a linear fixed effects model. The models were fitted on all three histological regions, but here we report histology results from region 2, because this region is adjacent to the piece analyzed by µCT (Fig 1A).

Results: 3D visualization of the meniscus with µCT revealed similar structural changes as histological analysis (Fig. 1C). The histopathological consensus scores were generally higher in medial OA samples as compared to both lateral menisci from OA patients and the reference menisci (Fig. 1B). The mean difference in histological scores (95% CI) was 4.3 (-2.5, 6.1) for medial OA meniscus vs reference menisci, -0.3 (-2.2, 1.5) for lateral meniscus from OA patients vs reference menisci, and 4.6 (3.0, 6.2) for medial OA meniscus vs lateral meniscus from OA patients.

Conclusion: An HMDS-based 3D µCT protocol allows unique 3D visualization of meniscus microstructures. The method enables the visualization of considerably large volumes and evaluation of the tissue’s 3D