Hormone replacement in joint fluid has potential regenerative effect

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German researchers determined that concentrations of the sex hormones, testosterone in men and estrogen in women, may have a positive effect on the regenerative potential of cartilage tissue. The study suggests hormone replacement in the joint fluid of men and women might be beneficial in treating late stages of human osteoarthritis (OA) by regenerating damaged tissue. Details of this evidence-based study appear in the April issue of *Arthritis & Rheumatism*, a journal published by Wiley-Blackwell on behalf of the American College of Rheumatology.

Free moving (diarthrodial) joints, such as the knee and hip, produce smooth and painless limb movement when there is adequate transmission of forces between the bones and joint (articular) cartilage. Disturbances in joint architecture due to trauma, abnormal load, endocrine diseases (diabetes, hypothyroidism) or inflammatory conditions may result in OA. Worldwide estimates say 9.6% of men and 18% of women 60 years or older have OA symptoms and the World Health Organization (WHO) projects that by 2020, OA will be the fourth leading cause of disability.

Nicolai Miosge, M.D., Ph.D., and colleagues from the August University in Goettingen, Germany examined the regenerative potential of chondrogenic progenitor cells (CPCs) that are present in arthritic tissue during the late stages of OA. The research team speculated that these CPCs might be influenced by sex steroids, and therefore hormone replacement therapy directed to the joint fluid could be beneficial in restoring damaged tissue. Tissue samples from 372 patients who underwent total knee replacement were analyzed. The mean age was 71

years of age for men and 72 years for women, with women representing 64.25% of participants.

Estrogens are known to influence bone metabolism and researchers found that 17β-estradiol (E2), which increases calcium deposition in both sexes, was present in the joint fluid of study participants. CPCs positive for estrogen receptors (ERα and ERβ) as well as androgen receptors were present in the OA tissue as well. Both estrogen and testosterone influenced the expression of all 3 receptor genes and the CPCs by regulating gene expression.

Researchers found late-stage OA cartilage populated with elongated cells that were not present in healthy connective tissue. Upon investigation of the elongated cells, the team identified a unique progenitor cell population (CPCs). "We were able to isolate CPCs in 95.48% of female patients and 96.97% of male patients, making these cells a good target for future therapeutic intervention for a very large number of OA patients," Dr. Miosge said. "Hormone replacement therapy in joint fluid may help mitigate the effects of OA and further investigation is needed," concluded Dr. Miosge.

More information: "Sex Differences of Chondrogenic Progenitor Cells in Late Stages of Osteoarthritis." Sebastian Koelling and Nicolai Miosge. Arthritis & Rheumatism; Published Online: March 30, 2010 (DOI:10.1002/art.27311); Print Issue Date: April 2010.

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