Synovial Fluid Uric Acid is a Marker of Joint Tissue Degradation in Osteoarthritis

**INTRODUCTION**

Uric acid is constitutively present in normal cells, increased in concentration when cells are injured, and released from dying cells. Based on a theory proposed by Matzinger, the products of cell stress and tissue damage may represent "danger signals" that function as endogenous adjuvants recognized by the immune system. Shi subsequently identified uric acid (UA) as one of these principal endogenous "danger signals" released from injured cells and mediating the immune response to antigens associated with injured cells. These data form the basis for our hypothesis that elevated synovial fluid (SF) uric acid may be a potentiating factor in osteoarthritis (OA).

**METHODS**

Patients: A total of 159 participants were enrolled in the NIH sponsored Strategies to Predict Osteoarthritis Progression (STOP) study. Informed consent was obtained from all subjects and the entire study was approved by the Duke University Institutional Review Board. Participants met the ACR criteria for symptomatic OA of at least one knee. All participants met radiographic criteria for OA with a Kellgren-Lawrence (KL) score of 1-4 in at least one knee. Exclusion criteria included the following: bilateral knee KL4 scores; exposure to a corticosteroid within 3 months prior; knee arthroscopic surgery within 6 months prior; known history of avascular necrosis, inflammatory arthritis, Paget’s disease, joint infection, periarticular fracture, neuropathic arthropathy, Reiter’s syndrome, or gout involving the knee; and current use of anticoagulants. Radiographic Imaging: Posteroanterior semi-flexed knee radiographs were obtained and read for Kellgren Lawrence (KL) grade and individual radiographic features of OA, including joint space narrowing (JSN) and osteophytes (OST).

**RESULTS**

This study was limited to 69 study participants (49 women and 20 men) with knee OA and adequate SF volume for these analyses. The mean (±SD) age was 64.5±10.1 years. The mean (±SD) body mass index was 32.4±7.1 kg/m². Knee OA was graded 1-4 in severity (23.1%, 14.6%, 49.2%, 13.1% for each KL grade). SF measurements were possible for both knees of 63 participants, and for single knees of 6 participants. The mean uric acid (UA) concentration was 3.17±1.79 mg/dl for the right knee SF, and 4.93±1.95 mg/dl for the left knee SF.

**DISCUSSION**

The strong association shown here between OA severity and synovial fluid uric acid, demonstrates that uric acid is a marker of joint tissue injury and raises the strong possibility that uric acid may be a factor contributing to the pathological process of OA. The constitutive release of uric acid from injured and dying cells in the OA joint may exacerbate the chronic immune response, and raises the strong possibility that uric acid may be a factor contributing to the pathological process of OA.

**REFERENCES**