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Chronic alcohol use and osteoarthritis - A novel risk factor for osteoarthritis and pain

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Chronic alcohol consumption is a major risk factor for liver and brain damage through endotoxemia. Alcohol affects bone health reflected by low bone mass, decreased bone formation rate, and increased fracture incidence in alcoholic patients. In the current studies, we addressed whether chronic alcohol abuse increases the susceptibility to osteoarthritis (OA). OA is the most common degenerative musculoskeletal disease and a major cause of pain and disability. We compared progression of OA between mice fed with a diet containing fish oil and alcohol (Nanji diet, 29% calories for mice; 4.5% v/v alcohol) or a dextrose-containing control diet for total 10 weeks. Our results revealed that chronic alcohol use significantly increases proteoglycan loss in knee joint articular cartilage. Mechanistically, this alcohol-induced loss of proteoglycan is linked to activation of a catabolic kinase-transcription factor pathway (e.g., PKCγ-RUNX2 axis) and to stimulation of key downstream cartilage-degrading enzymes (MMP-13, ADAMTS5). Furthermore, alcohol diet significantly suppresses cartilage anabolic and/or anti-inflammatory molecules such as SOX9, SOCS2 (suppressor of cytokine signaling-2), TIMP3 (tissue inhibitor of metalloproteinase) and HMGB2 [high-mobility group box protein-2]. Examination of pain-related spinal plasticity in the dorsal horn from alcohol-fed mice establishes that chronic alcohol use highly overexpress Monocyte chemotactic protein-1 (MCP-1) and its receptor CCR2. Our results strongly suggest that chronic alcohol abuse is a novel risk factor for development of OA and may alter OA-induced pain perception through spinal plasticity.

Biography

Dr. Hee-Jeong Im Sampen is an Associate Professor in the Department of Biochemistry with joint appointments in the Departments of Internal Medicine (Rheumatology Section) and Orthopedic Surgery as well as an adjunct appointment at the Department of Bioengineering, University of Illinois at Chicago (UIC). Dr. Sampen is a recipient of various awards and honors including the Arthritis National Research Foundation Scholar Award, OARSI Investigator Award, and Kappa Delta Elizabeth Winston Lanier Award. Her research focus is the signaling pathways that control musculoskeletal development and homeostasis, age-related disorders like osteoarthritis (OA). She has >70 publications, and serves as an Editorial Board Member for 12 different journals

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