Role of microRNA in knee joint OA and pain

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Development of therapeutic strategies that reduce pain caused by osteoarthritis (OA) requires a mechanistic understanding of how peripheral tissue injury alters gene expression in sensory neurons and how these changes contribute to the initiation and persistence of OA pain. To innovate our current mechanistic molecular models for OA related symptoms, we are addressing the under-explored causal links between micro RNA (miRNA) function and OA-induced chronic pain. The roles of miRs in OA pain were investigated using two different knee joint OA models [DMM and intra-articular injection of monosodium iodoacetate (MIA)] in Sprague Dawley rats. Symptomatic behavioral pain tests were performed to correlate pain responses with gradual structural alterations in knee joints during the development of OA as assessed by histological and γCT imaging analyses. MiRNA expression profiles were determined in spinal dorsal horns from animals with severe OA pain and compared to animals with neuropathic pain, as well as sham controls. Several miRNAs including miR-146 and miR-183 were markedly altered in animals with severe knee joint OA pain. Expression of these miRNAs was also analyzed in bilateral dorsal root ganglions (DRGs) and spinal cord to understand the pathological links between OA related knee joint pain and events in both the peripheral- and central nervous systems. Gain-of-function and loss-of-function analyses of miR-146 and miR-183 revealed that these miRNAs regulate inflammatory cytokines and the NFγB pathway in the central nervous system. Our findings suggest that OA pain-related miRNAs are powerful therapeutic agents with a dual function in alleviating knee joint pain and promoting cartilage regeneration in peripheral knee joints

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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