

PAGE MORTON HUNTER DISTINGUISHED SEMINAR SERIES



STATIN FOR THE PREVENTION OF OSTEOARTHRITIS

Statins are an FDA-approved class of drugs prescribed to over 40 million U.S. people to control the cholesterol levels. Using the patient database at Christiana Health Care System at Delaware, we investigated the impact of statin use on the clinically defined osteoarthritis occurrence in the Delaware population. We found that the use of statin was associated with significantly lower occurrence of osteoarthritis. Bench experiments and bioinformatics analysis revealed that the joint-favoring effects of statins were through inhibiting a fundamental metabolic pathway called mevalonate pathway and its downstream Rho GTPase signaling in chondrocytes. Rho GTPases play essential roles in regulating aberrant phenotypic shift and catabolic activities of chondrocytes. Statins can directly inhibit the activation of Rho GTPase proteins and prevent the chondrocytes from entering a degradative state, therefore protecting the cartilage from degradation.

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X. Lucas Lu is an Associate Professor in the Department of Mechanical Engineering at the University of Delaware. He received his PhD from Columbia University in the City of New York in 2007 and became a faculty at UD in 2010. Dr. Lu also has affiliated appointment in the Program in Biomechanics & Movement Science, Bioinformatics and Computational Biology, and Biomedical Engineering. Dr. Lu's research focuses on cartilage biomechanics, prevention of post-traumatic osteoarthritis, cell calcium signaling, and TMJ biomechanics. Using mechanical technology, microscopy techniques, proteomics and big data analysis, Dr. Lu's lab is investigating new pharmaceutical solutions for the prevention of osteoarthritis after joint injuries, such as ACL rupture and meniscus torn. Dr. Lu sponsored his research through the funding from NIH, DOD, NSF, and private research foundations. Dr. Lu received the Rising Star award from Biomedical Engineering Society and the Outstanding Junior Faculty award at University of Delaware.

January 20, 2022 • 3:30 p.m.

Virtual seminar

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