Department of Biomedical Engineering
The Chinese University of Hong Kong

Staying Young at an Advanced Age: The Impact of Emerging Therapeutic Approaches in Osteoarthritis

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Abstract

Osteoarthritis (OA) is a chronic degenerative joint disease characterized by the progressive breakdown of articular cartilage and the subsequent remodelling of underlying subchondral bone. This pathological process triggers a local inflammatory response and the formation of osteophytes at the periphery, leading to joint space narrowing, mechanical dysfunction, and chronic pain. OA is a complex, whole-joint disease driven by low-grade systemic inflammation and exacerbated by metabolic dysregulation and common co-morbidities. The treatment landscape for OA is shifting from simple pain management to disease-modifying OA drugs (DMOADs), which aim to repair cartilage or stop the progression of joint damage. Indeed, many disease-modifying therapies are currently in development, aiming to change the course of disease progression rather than just achieving symptomatic improvement. Emerging biological interventions include regenerative approaches encompassing cell-therapy, gene-therapy, senotherapeutics and extracellular vesicles (exosomes). Many of these treatments are still in pre-clinical development but several therapies have reached Phase III clinical trials and are awaiting final regulatory approval. In addition numerous weight-loss drugs belonging to the incretin family of appetite regulators are being evaluated as potential DMOADs for obesity-related OA. This presentation will explore the biological mechanisms that protect synovial joint tissues, and how articular cartilage, subchondral bone and the synovium serve as immunometabolic sensors (1). It will also highlight how mechanoflammation and metaflammation drive catabolic pathways and cellular senescence at the cellular level (2), and how obesity and tissue fibrosis can trigger and exacerbate early structural damage (3). This presentation will also focus on promising therapies that aim to restore joint integrity and extend the functional longevity of synovial joints in older adults. Therapies that maintain joint longevity can significantly reduce the global burden of musculoskeletal disability associated with cartilage loss and OA. The future lies in preserving joints, not replacing them, an outcome desired by patients, patient organisations, healthcare systems, insurance companies and policymakers.

Biography

Ali Mobasheri is Professor of Musculoskeletal Biology in the Research Unit of Health Sciences and Technology, Faculty of Medicine, University of Oulu, Finland. He also serves as Chief Researcher and International Adviser at the State Research Institute Centre for Innovative Medicine, Vilnius, Lithuania. He was President of the Osteoarthritis Research Society International (OARSI) from May 2019 until April 2022. He currently sits on the Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO). He is also an advisor to the World Health Organization Collaborating Center for Epidemiology of Musculoskeletal Conditions and Ageing, Université de Liège, Liège, Belgium. He currently has visiting positions in Sun Yat-sen University, Guangzhou, China, University for Continuing Education Krems, Krems, Austria and Maastricht University Medical Center, Maastricht, The Netherlands. His research focuses on cartilage biology and osteoarthritis biomarkers. He has published more 450 scientific articles and has an h-index of 81 (Scopus).

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