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EDITORIAL

Reconsidering Arthritis: A Unified Approach

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ABSTRACT

This editorial suggests viewing arthritis as a single disease entity influenced by the host's response to articular cartilage trauma rather than as a group of distinct disorders. Environmental factors, predisposing conditions, lifestyle choices, and genetic predispositions significantly impact how individuals tolerate and respond to cartilage damage. Aging is identified as a major risk factor for osteoarthritis due to cumulative trauma over time, indicating that osteoarthritis involves complex degenerative processes rather than simple wear and tear. Frequent articular cartilage lesions observed in arthroscopic studies highlight the commonality across different arthritis cases, emphasizing the role of individual host responses in disease progression. The pathogenesis of osteoarthritis involves inflammatory mediators that degrade the extracellular matrix and cause cell death, similar to mechanisms in posttraumatic osteoarthritis. This unified view aligns with observed histopathological similarities between osteoarthritis and rheumatoid arthritis. Despite advancements in rheumatoid arthritis treatment reducing the need for joint replacements, the increasing need for replacements in posttraumatic arthritis, particularly among younger populations, underscores the need for early detection and intervention. Viewing arthritis as a continuum from cartilage trauma to individual host response could improve diagnostic specificity, timely treatment strategies, and overall management outcomes. This integrated perspective encourages a more precise and proactive approach to arthritis therapy and research.

Arthritis, often perceived as a heterogeneous group of disorders, could benefit from a simplified, unified perspective. This conceptual shift views arthritis as a single entity, influenced by the host's response to articular cartilage trauma. This perspective would potentially lead to innovative and timely treatment strategies.

Environmental factors, lifestyle choices, and genetic predispositions significantly impact our AC tolerance and response to these factors.[1] Aging is the major risk factor for osteoarthritis, with inevitably more repetitive articular cartilage damage throughout a lifetime. This emphasizes that osteoarthritis is not merely due to wear and tear but involves trauma and resulting in a following complex degenerative processes.[2]

Arthroscopic studies reveal frequent articular cartilage lesions, suggesting commonality across different cases.[3-5] However, the host response of each individual is different, highlighting the critical role of host response in disease progression and outcomes, which is modulated by an array of physiological and endocrinological factors. This is not totally unlike to what was seen from COVID-19 patients host response to the virus which varied markedly from mild to exuberant or so-called cytokine storm.

The pathogenesis of osteoarthritis involves inflammatory mediators like metalloproteinases and cytokines, which contribute to extra cellular matrix degradation and chondrocyte apoptosis.[6] Similarly, posttraumatic osteoarthritis emerges primarily from direct joint trauma, suggesting that categorizing all arthritis under this term could streamline our understanding of its initiation and progression, particularly in clinical variations due to genetic and environmental factors.[7-11]

This unified view also aligns with the observation that inflammation and synovitis in osteoarthritis and rheumatoid arthritis share histopathological similarities, challenging the distinct categorization of arthritis types.[12] Advances in rheumatoid arthritis treatment have significantly reduced a need for joint replacements, highlighting the impact of improved therapeutic strategies.[13]

However, despite advancements, the persistent and increasing need for joint replacements in posttraumatic arthritis cases, especially among the younger population, underscores the necessity for early detection and intervention to prevent the progression of articular cartilage damage.[14]

In conclusion, adopting a holistic approach to arthritis as a single disease continuum starting from articular cartilage trauma and followed on by individual host response influenced by both intrinsic and extrinsic factors could enhance the specificity of diagnosis, help tailor effective and timely treatment strategies including development of new disease modifying drugs, and improve overall management outcomes. This perspective encourages viewing arthritis through a lens of integrated pathophysiological processes rather than isolated incidents, thereby fostering a more precise and proactive approach to therapy and research.

In this issue, we present in vitro evidence that 2-hydroxyisocaproic acid (HICA) can significantly inhibit, down-regulate, or reduce the catalytic activity of aggrecan and type II collagen-degrading enzymes a disintegrin and metalloproteinase with thrombospondin motifs 5 (ADAMTS-5) and matrix metalloproteinase 13 (MMP-13). HICA may thus prove to be an effective treatment and preventive modality for destructive arthritic diseases.

Figure 1:

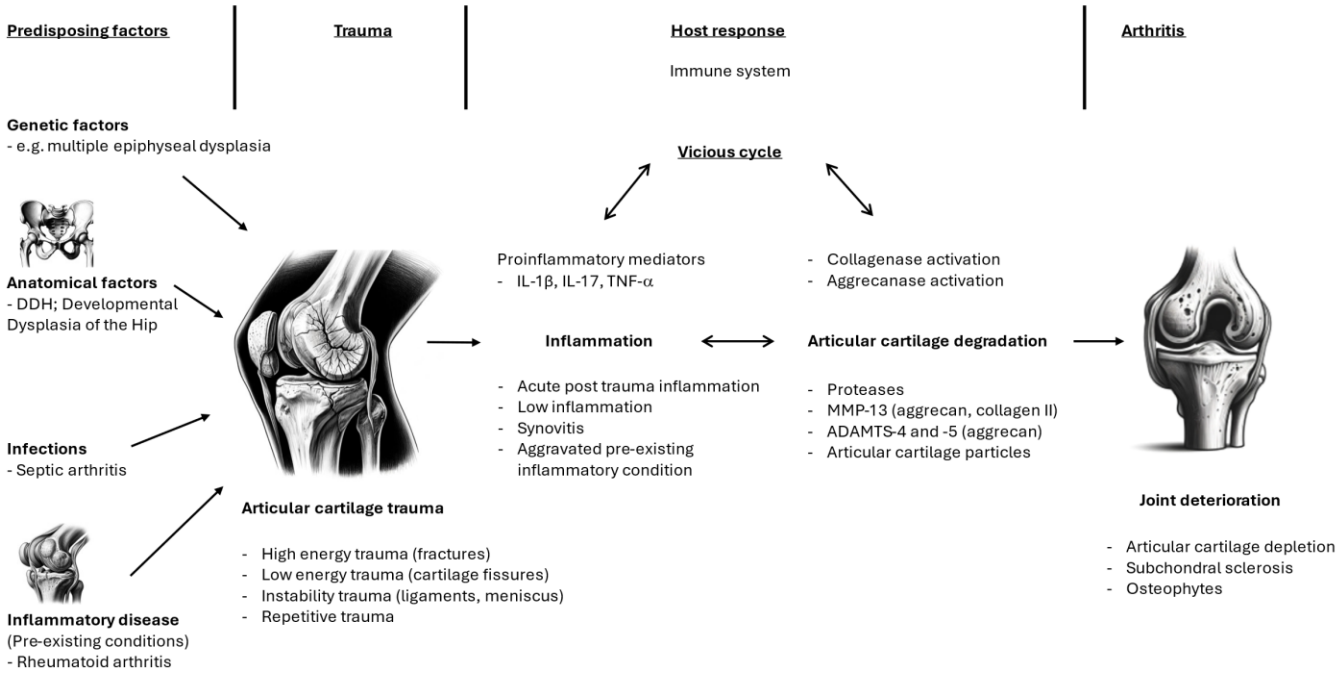

Figure 1. A Simplified perspective on the pathomechanism of arthritis. IL = interleukin, TNF = tumor necrosis factor, MMP = matrix metalloproteinase, ADAMTS = a disintegrin and metalloproteinase with thrombospondin motifs.

Disclosure of potential conflicts of interest

The authors are named as inventors on patents FI129515B and U.S. Patent No. 11,793,779 both of which were filed by Salarusta Ltd, these patents are related to this work and the patents cover the use of a substance on a treatment of arthritis. The authors have an ownership interest in Salarusta Ltd Oy. The authors have no other competing interests such as relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants, or patents received or pending, or royalties.

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