

Special Issue

Molecular Mechanisms of Stem Cell-Mediated Tendon Regeneration: From Signaling Pathways to Therapeutic Applications

Message from the Guest Editor

Tendon injuries present significant clinical challenges due to this tissue's limited intrinsic healing capacity and predisposition toward fibrotic repair rather than functional regeneration. While stem cell-based therapeutic approaches offer promising solutions, their efficacy depends on complex molecular mechanisms including tenogenic differentiation pathways, immune modulation cascades, and vascular integration processes that remain incompletely characterized. This Special Issue addresses the fundamental molecular basis of stem cell-mediated tendon repair through advanced tissue engineering methodologies. Central focus will be placed on 3D engineered microenvironments and scaffold systems that accurately recapitulate native tendon architecture, enabling the precise investigation of signaling networks, gene expression profiles, and protein interactions governing cellular behavior. These platforms facilitate the mechanistic exploration of paracrine signaling cascades and extracellular matrix remodeling processes that cannot be adequately studied using conventional 2D culture systems.

Guest Editor

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