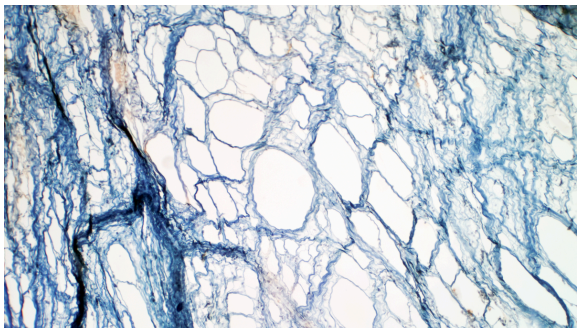
nature portfolio

npj Biological Physics and Mechanics

Call for Papers

Mechanobiology of the Extracellular Matrix



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The extracellular matrix (ECM) is a dynamic scaffold that governs tissue integrity, cellular behavior, and organ function through its biomechanical and biochemical properties. Emerging research highlights how mechanical cues—such as stiffness, viscoelasticity, and topography—orchestrate cellular responses across scales, from molecular mechanotransduction to tissue remodeling in development, homeostasis, and disease. Despite advances, the interplay between ECM mechanics, cellular signaling, and systemic pathologies remains incompletely understood. This Collection seeks to bridge this gap by uniting interdisciplinary research that deciphers how ECM mechanical properties shape biological processes, leveraging cutting-edge experimental, computational, and theoretical approaches aligned with the journal's focus on biophysical and mechanical principles at all biological scales.

This Collection aims to highlight fundamental and translational advances in ECM mechanobiology. By assembling work at the interface of physics, biology, and engineering, we hope to foster new insights that bridge scales from molecules to organisms and translate into biomedical innovation. We invite studies that combine experimental, theoretical, and computational approaches to unravel how mechanical properties of the matrix influence cellular behavior and tissue organization. Key areas of interest include, but are not limited to:

- ECM Mechanics in Health and Disease
- Multiscale Cell-ECM Modeling
- Advanced Matrix Mechanobiology Tools
- ECM in Tissue Engineering and Regenerative Medicine
- Translational ECM Mechanobiology
- Emerging Mechanotherapeutic and AI Approaches

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Submission Deadline: **14 May 2026**