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Embracing cellular complexity: Toward integrative, mechanobiological, and computational frontiers in cell science

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In recent decades, cell biology has evolved from a discipline centered on isolated structures and pathways into a vibrant, multidisciplinary science that seeks to understand the cell as a dynamic, complex system. This transformation has been fueled by progress in imaging, high-throughput omics, biomechanical measurements, and - critically - advanced computational modeling. These developments now allow us to probe, quantify, and simulate cell behavior across biological, temporal, and mechanical scales.

At the same me, the functional landscape of the cell has expanded. We no longer consider it a passive unit of life, but a responsive, mechano-sensitive entity capable of integrating chemical and physical cues to coordinate development, maintain homeostasis, and drive pathology. The interplay between intra- and extracellular signaling, cytoskeletal dynamics, adhesion, metabolism, gene regulation, and mechanical forces lies at the core of cell behavior - from stem cell fate and tissue morphogenesis to cancer progression and immunological responses.

Within this exciting and rapidly evolving context, *Advances in Cells* offers a unique platform to foster high-quality, open-access dialogue across the broad spectrum of cell science. Its scope - ranging from cell structure, signaling, and physiology to developmental biology, stem cell dynamics, and cellular pathology - makes it an ideal venue for both fundamental and translational contributions. As a strong supporter of open and accessible science, I applaud the journal's commitment to disseminating both experimental and theoretical work with maximum detail and without restriction.

From my own experience leading research at the intersection of cell mechanics, computational biology, and regenerative medicine, I have seen how integrative approaches can yield powerful insights. In my group, we use computational multiscale models to explore how mechanotransduction, cell-matrix interactions, and biophysical constraints shape cellular function and dysfunction. These approaches are vital for simulating realistic scenarios in development, aging, and disease, and for designing personalized therapeutic strategies, particularly in areas like tissue engineering and oncology.

Yet, no single discipline holds all the answers. The future of cell science demands that we embrace transdisciplinary collaboration - connecting biologists with physicists, engineers, computer scientists, and clinicians. This is not only a mater of methodology, but also of mindset: we must be open to complexity, to model-based hypotheses, and to new conceptual frameworks.

I warmly encourage colleagues across all domains represented in the journal - from cell adhesion and migration to genetic disorders, apoptosis, and plant cell biology - to contribute their findings and perspectives. Together, we can deepen our understanding of the cell and accelerate the scientific breakthroughs that tomorrow's medicine and biotechnology will depend on.

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