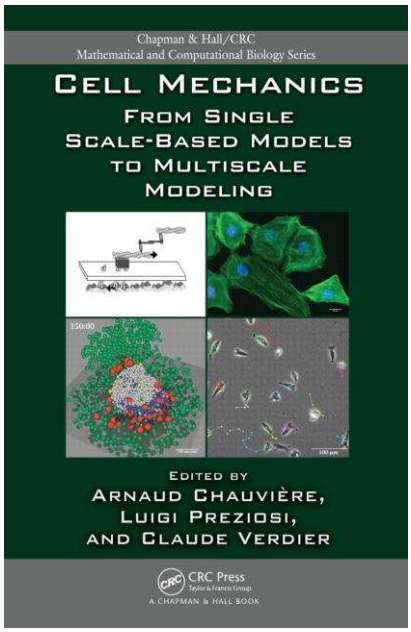
ARNAUD CHAUVIÈRE, LUIGI PREZIOSI, CLAUDE VERDIER (EDITORS)
CELL MECHANICS: FROM SINGLE SCALE-BASED MODELS TO MULTISCALE MODELING



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Ubiquitous and fundamental in cell mechanics, multiscale problems can arise in the growth of tumors, embryogenesis, tissue engineering, and more. **Cell Mechanics: From Single Scale-based Models to Multiscale Modeling** brings together new insight and research on mechanical, mathematical, physical, and biological approaches for simulating the behavior of cells, specifically tumor cells. In the first part of the text, the book discusses the powerful tool of microrheology for investigating cell mechanical properties, multiphysics and multiscale approaches for studying intracellular mechanisms in cell motility, and the role of subcellular effects involving certain genes for inducing cell motility in cancer. Focusing on models based on physical, mathematical, and computational approaches, the second section develops tools for describing the complex interplay of cell adhesion molecules and the dynamic evolution of the cell cytoskeleton. The third part explores cell interactions with the environment, particularly the role of external mechanical forces and their effects on cell behavior. The final part presents innovative models of multicellular systems for developmental biology, cancer, and embryogenesis. This book collects novel methods to apply to cells and tissues through a multiscale approach. It presents numerous existing tools while stimulating the discovery of new approaches that can lead to more effective and accurate predictions of pathologies.

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