

<<细胞力学进展>>

图书基本信息

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内容概要

《细胞力学进展》(英文版)从交叉学科的角度系统地介绍和总结了细胞力学和细胞物理研究领域的前沿课题和最新进展。

其显著的特点是用分子力学和复杂连续介质力学的方法研究和计算细胞的演变和分化；将定量的数学力学分析方法与实验手段相结合来探讨细胞的生物物理特性。

《细胞力学进展》(英文版)适合作为从事分子生物学、生物工程和力学、软物质力学和物理、计算力学，以及生物化学和医学的科研人员和研究生的参考书。

《细胞力学进展》(英文版)的主编是美国加州大学伯克利分校的李少凡教授和南非科学院院士、开普半岛科技大学的孙博华教授。

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章节摘录

版权页：插图：In this method, the fluid flow through a chamber surface coated with a cell monolayer is used to study response of cells to fluid flow; a cellular probe is used to measure this response. Several cell types such as vascular endothelial cells and osteocytes are physiologically exposed to fluid flow and shear stress. Cells sense these external forces and react accordingly; this process is crucial for many regulatory processes. For example, endothelial surface layer has multifaceted physiological functions and behaves as a transport barrier, as a porous hydrodynamic interface in the motion of red and white cells in microvessels, and as a mechanotransducer of fluid shearing stresses to the actin cortical cytoskeleton of the endothelial cell. Endothelial cells adopt an elongated shape in the flow direction if they are subjected to a shear flow. A similar situation exists for osteocytes in bone where mechanosensing controls bone repair and adaptive restructuring processes. It is believed that strain-derived flow of interstitial fluid through lacuno-canalicular porosity mechanically activates the osteocytes. There are three candidates stimulating cells: wall shear stress, streaming potentials, and chemotransport. Controlling the wall shear stress and measuring its effect on fluid transport, bone cell nitric oxide, and prostaglandin production can be used to study the nature of the flow-derived cell stimuli. Fluid shear stress rate is also an important parameter for bone cell activation.

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