



Force Microscopy: Applications in Biology and Medicine

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A complete examination of the uses of the atomic force microscope in biology and medicine

This cutting-edge text, written by a team of leading experts, is the first detailed examination of the latest, most powerful scanning probe microscope, the atomic force microscope (AFM). Using the AFM, in combination with conventional tools and techniques, readers gain a profound understanding of the cell, subcellular organelles, and biomolecular structure and function.

The text begins with three chapters describing the molecular machinery and mechanism of cell secretion and membrane fusion in cells, using approaches that combine AFM, electron microscopy, X-ray diffraction, photon correlation spectroscopy, molecular biology, biochemistry, and electrophysiology. The discovery of a new cellular structure the "porosome" or fusion pore--the cells secretory machinery, the molecular mechanism of membrane fusion in cells, and the expulsion of intravesicular contents during cell secretion are outlined in the first three chapters. The book also covers:

- * Identification of the "porosome" in the growth hormone secreting cell of the pituitary gland
- * Probing the structural and physical properties of microbial cell surfaces
- * Scanning probe microscopic characterization of the higher plant cell wall and its components
- * Case studies of nano drug delivery systems using engineered dendrimers
- * AFM techniques for studying living cells
- * Investigating the intermolecular forces of leukocyte adhesion molecules
- * Protein-protein interactions
- * Micromechanical properties of lipid bilayers and vesicles

The text concludes with four chapters that examine new and emerging approaches in the use of force microscopy in biology and medicine.

This text is ideal for advanced undergraduate and graduate students and researchers in cell and molecular biology, genetics, genomics, physiology, neuroscience, biophysics, and biochemistry. Not only does it provide the theory, but also practical considerations such as the selection of the right tools and approach.

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