1. Record Nr. UNINA9910830701503321

Titolo	Single molecule dynamics in life science [[electronic resource] /] / edited by Toshio Yanagida and Yoshiharu Ishii
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2009
ISBN	1-282-02540-6 9786612025402 3-527-62613-1 3-527-62614-X
Descrizione fisica	1 online resource (348 p.)
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Disciplina	572.6 572.8
Soggetti	Biology Molecules
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Single Molecule Dynamics in Life Science; Contents; Preface; List of Contributors; 1 A Road Map to Single Molecule Dynamics; 1.1 Visualization of Single Molecules; 1.2 Single Molecule Position Tracking; 1.3 Single Molecules in Live Cells; 1.4 Fluorescence Spectroscopy and Biomolecular Dynamics; 1.5 Single Molecule Manipulation and Molecular Motors; 1.6 Mechano-Chemical Coupling of Molecular Motors; 1.7 DNA-Based Motors; 1.8 Imaging with AFM and Force Measurements; References; 2 Single Molecule Study for Elucidating the Mechanism Used by Biosystems to Utilize Thermal Fluctuations 2.1 Introduction2.1.1 Differences between Man-Made and Biological Molecular Machines; 2.1.2 Single Molecule Imaging and Nano-Detection; 2.2 Simultaneous Measurements of Individual ATP Hydrolysis Cycles and Mechanical Events by a Myosin Motor; 2.2.1 ATP Hydrolysis Cycles; 2.2.2 Mechanical Events; 2.2.3 Simultaneous Measurements; 2.3 Resolving the Process of a Displacement by Scanning Probe Nanometry; 2.3.1 Observation and Manipulation of a Single Myosin Motor; 2.3.2 Displacements; 2.3.3 Sub-steps within a Displacement; 2.3.4 Nature of

Sub-steps

2.3.5 Comparing the Actions of Individual Myosin Motors with those of Muscle2.3.6 Other Types of Molecular Motors; 2.4 Biased Brownian Step Model; 2.4.1 Asymmetric Potential; 2.4.2 Comparison with Other Studies; 2.4.3 Computer Simulation: from a Single Molecular Motor to Muscle; 2.5 Conclusion for the Unique Mechanism of Biological Molecular Machines; References; 3 Imaging and Molecular Motors; 3.1 Introduction; 3.2 Methods; 3.2.1 Detection of Single Fluorophores; 3.2.2 Sub-Diffraction Localization of Fluorescent Molecules; 3.2.3 Darkfield Imaging with One Nanometer Accuracy (DIONA)
3.2.4 Single-molecule High Resolution Imaging with Photobleaching (SHRImP)3.2.5 Single Molecule Fluorescence Resonance Energy Transfer (smFRET); 3.2.6 Orientation of Single Molecules; 3.2.7 Polarized Total Internal Reection Fluorescence Microscopy (polTIRF); 3.2.8 Defocused Orientational and Positional Imaging (DOPI); 3.3 Molecular Motors; 3.3.1 Myosin V; 3.3.2 Myosin II; 3.3.3 Myosin VI; 3.3.4 Conventional Kinesin; 3.3.5 Other Kinesins; 3.3.6 Dyneins; 3.3.7 Single Molecule Intracellular Imaging; 3.4 Conclusions; References; 4 Ion Channels; 4.1 Introduction; 4.2 Articial Bilayers
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5.6 Stochastic Signal Processing and Transduction in Living Cells

Sommario/riassunto

In this first comprehensive resource to cover the application of single molecule techniques to biological measurements, the pioneers in the field show how to both set up and interpret a single molecule experiment. Following an introduction to single molecule measurements and enzymology, the expert authors consider molecular motors and mechanical properties before moving on to the applications themselves. Detailed discussions of studies on protein enzymes, ribozymes and nucleic acids are also included.