Physics

Motor Proteins and Molecular Motors

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Motor Proteins and Molecular Motors explores the mechanisms of cellular functioning associated with several specific enzymatic molecules called motor proteins. Motor proteins, also known as molecular motors, play important roles in living systems by supporting cellular transport and force generation via the transformation of chemical energy into mechanical work.

The book presents established results, theoretical methods, and experimental observations related to biological molecular motors. It uses fundamental physical-chemical concepts and methods to develop a systematic theoretical framework for understanding motor protein dynamics. The author introduces the main ideas using simple arguments that avoid heavy mathematical derivations in favor of more intuitive physical understanding. Although the book assumes some rudimentary knowledge of cell biology, calculus, and basic ideas from chemistry and physics, it gives explanations and derivations for most results.

Features

- Introduces a physical-chemical framework for a microscopic understanding of motor proteins
- Provides a full quantitative description of the properties of motor proteins
- Outlines the fundamental criteria necessary for understanding the molecular nature of motor proteins
- Offers a simple pedagogical presentation of complex theoretical ideas, avoiding heavy mathematics
- Employs many examples to illustrate the richness of the field

Accessible to students and researchers in a wide range of scientific fields, this book provides a unified molecular picture for analyzing motor proteins. It connects major experimental facts on molecular motors to principal theoretical concepts consistent with the fundamental laws of chemistry and physics.

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