

MOLECULAR AND CELLULAR BIOPHYSICS

From quantum theory to statistical mechanics, the methodologies of physics are often used to explain some of life's most complex biological problems. Exploring this challenging yet fascinating area of study, **Molecular and Cellular Biophysics** covers both molecular and cellular structures as well as the biophysical processes that occur in these structures. The book features a quantitative approach that avoids being too abstract in its presentation.

Logically organized from small-scale (molecular) to large-scale (cellular) systems, the text first defines life, discussing the scientific controversies between mechanists and vitalists, the characteristics of living things, and the evolution of life. It then delves into molecular structures, including nucleic acids, DNA, RNA, interatomic interactions, and hydrogen bonds. After looking at these smaller systems, the author probes the larger cellular structures. He examines the cytoplasm, the cytoskeleton, chromosomes, mitochondria, motor proteins, and more. The book concludes with discussions on biophysical processes, including oxidative phosphorylation, diffusion, bioenergetics, conformational transitions in proteins, vesicle transport, subcellular structure formation, and cell division.

Features

- Provides comprehensive coverage of both molecular and cellular biophysics using a quantitative approach
- Covers small-scale structures that include DNA, RNA, and hydrogen bonds
- Explores large-scale systems, such as basal bodies, mitochondria, and vesicles
- Examines the biophysical processes of exciton energy transfer, muscle contraction, and mitosis
- Includes worked examples, exercises and references at the end of each chapter, and a glossary at the back of the book
- Contains many illustrations to enhance comprehension of the material



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