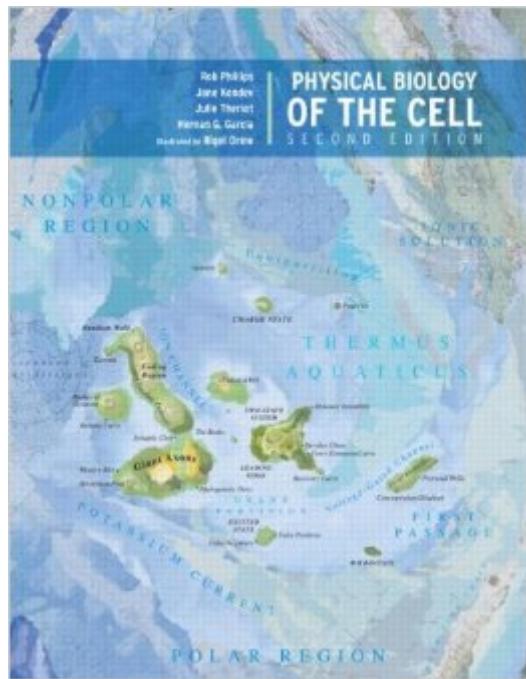


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Physical Biology Of The Cell



Synopsis

Physical Biology of the Cell is a textbook for a first course in physical biology or biophysics for undergraduate or graduate students. It maps the huge and complex landscape of cell and molecular biology from the distinct perspective of physical biology. As a key organizing principle, the proximity of topics is based on the physical concepts that unite a given set of biological phenomena. Herein lies the central premise: that the appropriate application of a few fundamental physical models can serve as the foundation of whole bodies of quantitative biological intuition, useful across a wide range of biological problems. The Second Edition features full-color illustrations throughout, two new chapters, a significantly expanded set of end-of-chapter problems, and is available in a variety of e-book formats.

Book Information

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Customer Reviews

This large, 800-page, 20 chapter, 9"x11" textbook is the size of a phonebook for a city of 200,000 people or so. Using many nicely-drawn figures and mathematical models, the authors work to unite the disciplines of biology, chemistry, and physics. Chapters 1 and 2 begin the book by first describing the molecular structure of the chemical compounds found in the cell, and then the geometry of the cell and its components. Chapter 3 addresses the time scale and time constraints for cellular processes. The hierarchy of biological time scales is summed up by Fig.3.2 on pp.78-79. There it is seen that protein synthesis requires tens of seconds, as does RNA transcription. Gating of ion channels requires only a single second, while enzyme catalysis requires only a microsecond. The authors provide a good example of complex molecular synthesis via an experiment showing the

evolving molecular components of the bacterial flagellum--the assembly of which is seen to require about 3 hours (p.104). The authors mention that the E. coli bacteria are able to divide in as little as 1000s, although copying its genome alone (i.e DNA replication) would seem to require 3000s (p.92). It is found, however, that E. coli are able to get a jump on DNA replication by starting to replicate its daughter's, granddaughter's, and great-granddaughter's chromosomes before it has even completed its own (p.113). It is also noted that the 3000s division time for E. coli division corresponds to the case where the environment supplies only glucose. For the case where the environment is rich in amino acids, the division time may be cut by a factor of two.

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