Equilibria and Kinetics of Biological Macromolecules

Description: Progressively builds a deep understanding of macromolecular behavior

Based on each of the authors' roughly forty years of biophysics research and teaching experience, this text instills readers with a deep understanding of the biophysics of macromolecules. It sets a solid foundation in the basics by beginning with core physical concepts such as thermodynamics, quantum chemical models, molecular structure and interactions, and water and the hydrophobic effect. Next, the book examines statistical mechanics, protein–ligand binding, and conformational stability. Finally, the authors address kinetics and equilibria, exploring underlying theory, protein folding, and stochastic models.

With its strong emphasis on molecular interactions, Equilibria and Kinetics of Biological Macromolecules offers new insights and perspectives on proteins and other macromolecules. The text features coverage of:

- Basic theory, applications, and new research findings
- Related topics in thermodynamics, quantum mechanics, statistical mechanics, and molecular simulations
- Principles and applications of molecular simulations in a dedicated chapter and interspersed throughout the text
- Macromolecular binding equilibria from the perspective of statistical mechanics
- Stochastic processes related to macromolecules

Suggested readings at the end of each chapter include original research papers, reviews and monographs, enabling readers to explore individual topics in greater depth. At the end of the text, ten appendices offer refreshers on mathematical treatments, including probability, computational methods, Poisson equations, and defining molecular boundaries.

With its classroom-tested pedagogical approach, Equilibria and Kinetics of Biological Macromolecules is recommended as a graduate-level textbook for biophysics courses and as a reference for researchers who want to strengthen their understanding of macromolecular behavior.

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