Nucleic Acids: Structures, Properties, and Functions. By Victor A. Bloomfield, Donald M. Crothers, and Ignacio Tinoco, Jr., with contributions from John E. Hearst, David E. Wemmer, Peter A. Kollman, and Douglas H. Turner. University Science Books, Sausalito, CA. 2000. ix + 794 pp. 17 × 25 cm. ISBN 0-935702-49-0. $85.00.

This book is the successor to the 1974 text *Physical Chemistry of Nucleic Acids* by the same authors. This is a completely revised book that presents a comprehensive account of the structures and physical chemical properties of nucleic acids, with an emphasis on implications for biological function. The intended audience includes molecular biologists, physical chemists, and biochemists. To reach such a diverse audience, the authors have organized the book such that each chapter begins with a highlight of the biological significance of the topic covered, followed by a presentation of the basic physical ideas and major results. Quantitative details are developed in special sections and in the appendices which follow certain chapters.

The book includes an introduction which gives an outline of the book chapters and useful guides to the periodical literature and electronic databases of nucleic acids. The following seven chapters focus on properties of nucleic acids as determined at the atomic and molecular structure levels. These chapters cover the physical and chemical properties of the monomeric building blocks, chemical and enzymatic reactivity of nucleic acids, diffraction, NMR, and theoretical methods for characterization of nucleic acid structure at atomic resolution, and conformational changes such as helix−coil transitions. Two additional chapters deal with the macromolecular size and shape of nucleic acids with detailed discussions of gel-electrophoretic, density gradient centrifugation, and other techniques. The final section of the book consists of four chapters dealing with the noncovalent interactions of nucleic acids with water and ions, drugs, and proteins and with the formation of higher-order nucleic acid structures.

While the coverage of topics in nucleic acid chemistry is almost comprehensive, certain subjects of recent interest, such as triplex and tetraplex nucleic acids, receive only scant discussion. Throughout the book, the examples cited are illustrative rather than comprehensive. Chapters contain extensive references to the literature; however, these appear to be current only to ca. 1996, with many references to the original literature from the 1970s and 1980s. The book includes an extensive and easy-to-use index and 25 color plates, most of which illustrate protein−DNA complexes.

Overall, this is an excellent book that should find use in graduate level biophysical chemistry and physical biochemistry courses and as a reference for physical chemists, physical biochemists, and molecular biologists. It would be a welcome addition to industrial and academic libraries.

Sean Michael Kerwin

Division of Medicinal Chemistry
College of Pharmacy
Institute for Cellular and Molecular Biology
The University of Texas at Austin
Austin, Texas 78712

JM000396P

10.1021/jm000396p