

book reviews

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Nucleic acids in chemistry and biology.

Edited by C. Michael Blackburn and Michael J. Gait. Oxford and New York: Oxford University Press, 1996, pp. xix + 528. Price \$49.95. ISBN 0-19-963533-1.

Although there have recently been several excellent additions to this market, there are few modern texts that provide a broad overview of nucleic acid chemistry. The first edition of this book, published in 1990, filled this niche very effectively and can be found on the bookshelves of researchers in a wide variety of disciplines. This second edition retains all the successful features of the first and adds a number of excellent improvements. The text is suitable for use in graduate or advanced undergraduate courses dedicated to the study of nucleic acids and is appropriate for any chemist, biochemist or biologist seeking an introduction to nucleic acid structure and chemistry and the role of nucleic acids in biology. In addition, the treatment of the subject matter is sophisticated enough that even researchers in the nucleic acid field should find the book useful for its coverage of areas outside of their immediate specialties.

The book begins with an excellent short overview of the structure, biological role and history of nucleic acids. This is followed by a chapter dedicated to DNA and RNA structure. Chapters 2 and 3 offer coverage of the chemical synthesis of nucleosides, oligonucleotides and nucleic acids and the

biosynthesis of nucleic acids. The next three chapters deal with DNA sequence information, replication and rearrangement and RNA sequence information and transmission. Chapters 7 and 8 provide well organized descriptions of covalent and noncovalent (reversible) interactions of small molecules with nucleic acids, and chapter 9 discusses protein–DNA interactions. The final chapter is dedicated to techniques used to analyze nucleic acids and includes brief overviews of spectroscopic techniques (UV–vis, CD, fluorescence, NMR), X-ray diffraction, separation techniques (electrophoresis, centrifugation) and molecular modeling.

This new edition thus serves as an excellent educational introduction to the field of nucleic acids. Although the chapters are written by eleven different authors, the seamless feel of a single-author educational textbook is retained. There is little repetition of information among the chapters and in no case do authors resort to presenting a review article that covers only their own work. The chapters are presented in an order that allows them to build upon one another. In each chapter, fundamental principles are clearly described and introductory sections describing the importance of the area to be discussed are provided. Whenever possible, material is divided into logical classifications and categories. There are numerous high-quality diagrams and figures in each chapter, and a useful glossary

of nucleic acid terminology appears at the end of the book.

Readers familiar with the first edition of Blackburn and Gait will find a number of welcome additions in this second edition. One of the most significant drawbacks of the first edition was the dearth of literature citations, but this has been completely remedied in the new edition, where between 30 and 70 literature citations follow each chapter. In addition, the chapter covering protein–nucleic acid interactions is significantly expanded in response to the explosion of structural data in this field. That chapter now contains nearly twenty color diagrams (including a number of stereoviews). The final chapter, which provides an overview of methods for the study of nucleic acids, is new to the text. Other significant updates include discussions of enediyne antibiotics such as neocarzinostatin and calicheamicin, triple-helical DNA structures and RNA folding and catalysis.

In summary, the new edition of Blackburn and Gait provides a well organized, clearly written overview of the chemistry and biology of nucleic acids. The book will serve equally well as a teaching textbook and as an introductory reference source for chemists, biochemists and biologists at all levels.

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