



## Introduction to Bioorganic Chemistry and Chemical Biology

During the past 20 years, the field of chemical biology and bioorganic chemistry has developed into a well-established area of study.

However, depending on the particular university or course, the definitions of the subjects taught may vary as widely as do the contents of textbooks that are recommended for these courses. *Introduction to Bioorganic Chemistry and Chemical Biology* fills a gap in the available literature by presenting the necessary basics of biochemistry from the viewpoint of organic chemistry, as well as explaining how to use the principles described in the book for the design and application of molecular tools. Through its selection of topics, it offers a reasonable, self-contained syllabus for a course in this area.

In the first place, this book aims at meeting the needs of undergraduate and graduate students of chemistry who are looking for an entry into chemical biology and bioorganic chemistry. Therefore, the first two chapters introduce the typical laboratory tools of chemical biology, re-state the basics of organic chemistry in the context of biochemistry, and discuss the chemical nature of all processes of life, using the example of the origin of the first biomolecules. In the following chapters, the principal classes of bio-macromolecules are introduced, following the central dogma of biochemistry: DNA, RNA, peptides and proteins, and protein functions, as well as oligosaccharides, polyketides, and terpenes as secondary metabolites with modular structure. Each chapter gives a description of the compound class, contrasts its biosynthesis with its chemical synthesis, and describes modifications by biological processes and by targeted approaches using chemical tools. The design of specific ligands and modified biomolecules for the manipulation of biochemical interactions is discussed and illustrated by describing research projects. In this context, analytical methods are also introduced, ranging from microarray techniques to immunochemical methods and to binding assays. These methods are presented only as basic concepts, without derivations or formulas, and are distributed throughout the book in the relevant context with suitable case studies. However, the reader gets a good idea of which physicochemical methods are most suitable to study particular biomacromolecules. The book is completed by a chapter about the chemical control of signal transduction. Here, the reader has arrived deep in the field of molecular biology, and is prepared for the

complexity and completely different formalism of biology with which he/she will be confronted in the field of bioorganic chemistry and chemical biology.

The book is well written and comprehensible, and invites even the experienced biochemist to browse. Case studies with everyday examples from biology, illustrated with colored figures, should provide striking and powerful insights, in particular for those readers with little biochemical background. Unfortunately, there are no lists of original publications or recommendations for further reading, either for the individual chapters or at the end of the book. It is only where figures have been reproduced from publications that a literature reference, data base accession number, or originator of the figure is cited. A detailed glossary (6 pages) aids the understanding of technical terms, and also the comprehensive index (18 pages) helps one to find individual topics.

In the areas of the biosynthesis and biological functions of the various substance classes, there is a definite overlap with the standard textbooks of biochemistry. However, the book delves more deeply into mechanistic considerations and the development of molecular tools, and does not need to refer the reader to biochemistry textbooks, in contrast to many other textbooks of chemical biology.

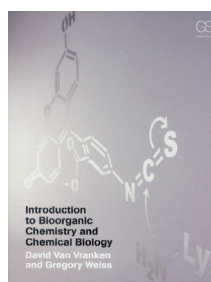
The clearly stated learning objectives at the beginning and end of each chapter, the appropriate arrangement of the chapters, and a formalism that is defined at the beginning and applied consistently throughout the book support the excellent didactic concept of this book. The summaries emphasize key aspects and help students to wrap up and consolidate the newly learned material. The problem sections provided at the ends of the chapters serve to complement the contents and deepen the focus on mechanistic considerations. Those types of problems that require the reader to design chemical tools or to search for information in online databases are particularly interesting. Therefore, this book is well suited for courses in which the lecture material is subsequently put into practice in tutorials.

In conclusion, *Introduction to Bioorganic Chemistry and Chemical Biology* is a didactically excellent textbook for readers who already have experience in chemistry, and provides an appealing and comprehensible introduction to this multifaceted field of research between chemistry and biology.

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**Introduction to Bioorganic Chemistry and Chemical Biology**

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