

Chemical Biology

In the last few years, chemical biology has become established as a discipline in its own right at the interface of molecular biology and chemistry. It is concerned with the investigation of biological systems by chemical modifications and manipulations.

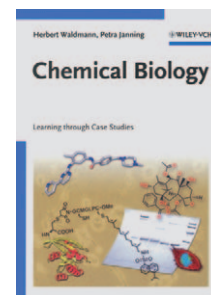
The book *Chemical Biology—Learning through Case Studies* is a compendium that aims to open the broad and interdisciplinary field of chemical biology for advanced students. Comprising biochemical, as well as pharmaceutical and synthetic approaches, it is the theoretically based complement to the practice-oriented book *Chemical Biology—A Practical Course* by the same editors, Herbert Waldmann and Petra Janning, published in 2004. The approach taken by the editors is straightforward and easy to comprehend, since the methods and techniques are introduced by examples from actual research projects. Experts were invited to describe their field of research in individual chapters, each one based on a single study, in order to cover the immense subject without overloading the book. This approach should also inspire scientific thinking.

Each of the 18 chapters starts with a short introduction to the scientific problem and the biological challenge, followed by a more-detailed presentation of the biological and chemical background of the method and recent research results. Integrated alongside the text are boxes that function as a glossary for terms and methods. At the end of each chapter is a bibliography. The uniform structure of the chapters makes it easy for the reader to navigate through the book and to find information on specific topics, although sometimes it would have been desirable to provide more informative cross-references between frequently occurring concepts and topics. Most authors have achieved a good balance of figures, boxes, and text, and it is only in a few chapters that the effect is disjointed and the multitude of single boxes makes reading difficult. The schemes and figures are generally limited to gray tones, but without any loss of clarity. Some chapters also include single color prints of biological experiments.

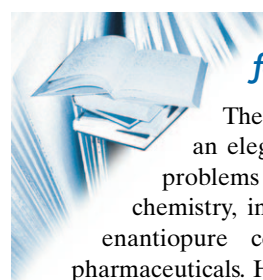
The book begins with an introduction to chemical genomics (Chapter 1). In the following chapters the topics range from classical methods of biochemical analysis or detection to synthetic libraries for the investigation of enzymatic processes, to protein immobilization strategies, to the development of vaccines, and to the manipulation/detection of intracellular processes and signal transduction. Other chapters introduce the reader to some techniques of bioorganic chemistry, in particular to chemoselective ligation and labeling strategies.

To summarize, although the book does not provide an overview of the broad biological background, the well-written short chapters offer the non-expert reader (and also to some extent the specialist) an opportunity to gain insight into the individual fields. In contrast to the three-volume compendium of the same title edited by Schreiber, Kapoor, and Wess, this book is mainly intended not for experts already working in the field but for beginners. Nevertheless, a basic knowledge of organic chemistry and biochemistry is absolutely necessary unless it is accompanied by an appropriate course of lectures. It is very suitable and highly recommended as a guideline for advanced seminars in biological chemistry and as a source of insight for interested junior researchers.

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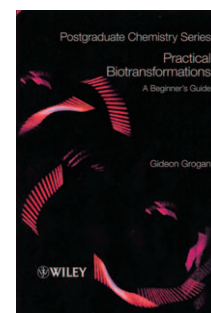
Chemical Biology
Learning through Case Studies. Edited by Herbert Waldmann and Petra Janning. Wiley-VCH, Weinheim 2009. 271 pp., softcover
€ 39.90.—ISBN 978-3527323302



Practical Biotransformations

The application of enzymes is an elegant solution to numerous problems in synthetic organic chemistry, in particular for generating enantiopure compounds, for example pharmaceuticals. However, for chemists who are inexperienced in this area the vastness and complexity of the subject of biotransformations is often seen as a reason to prefer a “classical” non-enzymatic strategy for the synthetic route. The book *Practical Biotransformations—A Beginner's Guide* by Gideon Grogan, in the Postgraduate Chemistry Series, is aimed specifically in this direction, to enable the reader to enter this increasingly important field of chemistry.

The author assumes that the advanced undergraduate and postgraduate students for whom this book is intended have good basic laboratory expertise, some knowledge of general analytical methods, and the usual skills needed for work in an organic synthesis laboratory. These elementary techniques are required for successful application of microorganisms or isolated enzymes in organic synthesis. Right from the beginning, it is pointed out that microbiology and enzymology cannot be covered comprehensively within the book's 344 pages, which are divided into 8 chapters. However, that would be necessary for an in-depth understanding of the subjects named in the chapter titles. Therefore, supporting review articles and recent literature on the various topics are cited in the



Practical Biotransformations
A Beginner's Guide. Postgraduate Chemistry Series. By Gideon Grogan. John Wiley & Sons, Hoboken 2009. 344 pp., softcover
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appendices linked to the individual chapters. In fact, the book focuses on the relevant aspects for setting up and carrying out enzymatic transformations, which—as is nicely shown by this book—can be accomplished without tedious technical efforts. This is emphasized by the inclusion of many instructive examples of routine transformations in a biocatalysis laboratory. Consequently, the reader gets a good impression of the structural diversity of compounds that can be produced by biotransformations, and learns that the use of such methods is often very straightforward.

The table of contents gives a good description of the topics of the chapters. After a general introduction, the author gives basic information about literature sources for the enzymatic synthesis step that is to be carried out, and safety issues for the handling of genetically modified organisms. The main part of each chapter deals with the practical aspects of methods and techniques used in various biotransformation strategies. It starts with the easiest option of enzymatic catalysis, which is usually carried out by using commercially available enzymes or whole-cell biotransformations with prokaryotes or, less commonly, eukaryotes. Finally, the book describes methods for the production of individual enzymes, including gene cloning by a polymerase chain reaction from a DNA template followed by heterologous expression in a suitable plasmid of a recombinant *E. coli* strain. Not all possible techniques are mentioned; instead the emphasis is on describing the most reliable and established methods. The last chapter of the book offers an introduction to enzyme engineering,

which is clearly outside the main intention of the book.

In summary, the author has written a book that is very well tuned to the needs of his target audience. He gives accurate instructions and practical details, for example for the isolation of a protein, or for the exact setting up of an SDS-PAGE. This is unnecessary for an experienced scientist, but for someone who is faced with this equipment for the first time it is absolutely essential. Thus, especially for beginners in this area, the book provides a detailed guide, anticipating problems that are likely to arise in practice and providing solutions for more difficult decisions, so that initial frustrations can be avoided.

The book provides a good overview and appropriately conceived outline of this complex topic, enabling the interested reader to begin work with enzymes quickly and without unnecessary complications. However, a critical revision of numerous errors, especially in the figures, and correction of some shortcomings in the layout, would be desirable. The book is not intended for experienced scientists, but is a beginner's guide as the subtitle indicates. It avoids a detailed presentation of the theory, and for the more difficult parts of the subject the reader is directed to more advanced literature.

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