JOURNAL OF NATURAL PRODUCTS

Book Review

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Review of Natural Product Chemistry for Drug Discovery

Natural Product Chemistry for Drug Discovery. By Anthony D. Buss and Mark S. Butler (MerLion Pharmaceuticals, Singapore). RSC Publishing: Cambridge. 2010. xviii + 440 pp. 16 × 24 cm. £144.99. ISBN 978-0-85404-193-0.

The number of scientific journal reviews dealing with the subject of this book may, at first glace, discourage the reader from reading it, considering it to be perhaps "just another series of reviews" on related topics. On the contrary, the book is very much worth reading, not only because the chapters have been written authoritatively but mainly because the reviews are considerably *critical*, an uncommon feature in many reviews found in the literature. The book is divided into five sections comprising chapters of distinct focus: Introduction to Natural Products for Drug Discovery Sources of Compounds; Advances in Technology; Natural Products in Clinical Development; and Case Studies of Marketed Natural Product-derived Drugs. The selection of topics is quite comprehensive for a scholarly introduction to natural products drug discovery.

Section 1 starts with another of the now classical reviews by Newman and Cragg, a brief and anecdotal historical account of natural products as drug leads. The authors have updated their survey of NPs as new chemical entities for drug development at the end of the chapter. Chapter 2, by Singh and Culberson, describes and discusses in detail the chemical diversity, along with chemical properties, of bioactive natural products. In Chapter 3, La Clair provides a rather witty, optimistic, nicely illustrated overview of natural products' mechanisms of action.

Chapter 4, by Cordell, starts Section 2 with a very detailed discussion on legal issues associated with natural products bioprospecting. Personally, I found this chapter extremely important, considering that the Convention on Biological Diversity (CBD) will complete 20 years in 2012, and, according to the author, the access to biological resources must be reviewed in light of concerns regarding the access of natural sources for the discovery of new drugs leads. Chapter 5, by Appendino and Pollastro, is a very nice account on plant natural products. The discussion is not limited to examples of successful plant NPs as drug leads, but goes far beyond, including particular aspects of plant secondary metabolism, NPs from plant-associated microorganisms, particular aspects of plant NP pharmacology and of plant NP libraries, how to select plants for discovery of new natural leads, and the use of plants NPs and extracts for the treatment of diseases. Natural products from marine macroorganisms are briefly discussed in Chapter 6, by Carroll and Crews, including the seminal well-known examples of compounds that are considered as, or potentially as, "drugs from the sea". Surprisingly, though, conotoxins represented by Prialt (ziconotide) have not been included in the section devoted to mollusk bioactive natural products. Chapter 7, by Pearce, Eckard, Gruen-Wollny, and Hansske, is a very thoughtful and detailed discussion on microorganism-derived natural products in drug discovery, which discusses not only the achievements but also successful old and new approaches toward the isolation of bioactive microbial NPs.

Section 3 brings to the reader the most updated information on screening, isolation, and identification of NPs in drug discovery. Chapter 8, by Parker, Ottl, Gabriel, and Zhang, provides the current and novel automated screening technologies. The impressive advances in the area of screening instrumentation are currently of much importance for the success of a bioactive NP discovery program. Chapter 8, by Bugni, Harper, McCulloch, and Whitson, includes information on NP isolation and identification approaches. While the coverage of topics and discussion depth are rather comprehensive, a few more examples would have given the readers a better feeling on how useful a particular technique is for such purposes. Chapter 10, by Udwary, is a brief and provocative account of natural product combinatorial biosynthesis. While this is a field still in its infancy, the range of possibilities associated with molecular biology technologies applied in biosynthesis cannot be underestimated, although the real output in terms of drug discovery is still modest. However, this is a topic of major interest related to the discovery and engineering of new natural products as drug leads.

Section 4 includes a selection of chapters dealing with natural products in clinical development. Chapter 11 is an updated review by Butler on the section subject, related to his previous reviews in *Natural Product Reports*. Chapters 12 and 13 report detailed discussions of the clinical development of NPI-0052 (from salinosporamide A, anticancer) and bevirimat (betulinic acid, antiviral) by the respective teams involved in such venues. Finally, section 5 includes two chapters dealing with marketed natural products, daptomycin and micafungin, also provided by the people who participated intimately in the development of these natural product-derived drugs.

As mentioned before, the book's very authoritative and critical reviews in each chapter make it *must* reading. A gold mine of information, it should also be considered a source of inspiration for students and academic and industry researchers, as well as government and funding agency stakeholders, on the relevance of natural products in drug discovery. Although somewhat pricey, I strongly recommend it, since this book should be on the desk of all those who are interested in the many aspects related to the discovery of natural products as bioactive agents.

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Notes

The authors declare no competing financial interest.

Published: May 18, 2012

dx.doi.org/10.1021/np300162v | *J. Nat. Prod.* 2012, 75, 1256–1256