Book Reviews

Advanced Pharmaceutical Solids, Drugs and the Pharmaceutical Sciences Series Volume 110. Jens T. Carstensen, Ed. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 1006-0602, http://www.dekker.com, 2001. viii, 518 pp., illustrations, $85.00.

This is a book that deserves a place on the bookshelf of any pharmaceutical scientist working on the development of solid dosage forms. I agree with the author that for proper formulation and usage of the newly available and sophisticated instrumentation one must understand the basic physical and chemistry principles governing solids.

The book will expose the readers to many areas frequently utilized during the initial preformulation of compounds. Advanced introductions on solubility, crystallization, polymorphism, moisture isotherms, dissolution, and other physicochemical properties related to polydispersed systems are presented in a readily comprehensive style.

There are brief explanations that discuss the issues faced during formulation development of solid dosage forms in suitable depth. The author has prepared an excellent initial reference for advanced students and scientists working on solids. Although some of the references date back to the primary pioneers in solid science, the book is well kept up to date with the latest references.

The initial chapters are more focused on discussions of solids as one component systems such as characterization of the drug individual particle and the properties they possess. Subsequent chapters, deal more with properties of typical solids found in pharmaceutical development, i.e., polydispersed multiparticulates. The later chapters highlight formulation processes with emphasis on the physical principles that affect the overall properties. The book will not serve as a troubleshooting aid, but will help the readers explain and rationalize certain phenomena typically found in formulation development.

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Liquid Interfaces in Chemical, Biological, and Pharmaceutical Applications, Surfactant Science Series, Volume 95. Alexander G. Volkov, Ed. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 1006-0602, http://www.dekker.com, 2001. xiii, 853 pp., illustrations, $250.00.

This book is a remarkable collation of reviews that illustrate the range of chemistries and physics that may only exist at interfacial boundaries. Intended for the researcher who is looking to gain expertise in specific techniques, each chapter is a review providing significant experimental detail and copious references to existing studies. Theoretical content is extensive in all but a few chapters. The first eighteen chapters deal mainly with the physics of the electrical double-layer; new techniques such as non-linear optical probing of liquid-liquid interfaces, and scanning electrochemical microscopy, and they make interesting reading for the novice and, I assume, also for the expert. Applications to fields such as solar energy conversion, food, interfacial catalysis and solvent extraction are discussed in various chapters.

Part II of the book focuses on the electrochemical study of plant, animal, and organic systems such as protein encapsulation and biocompatible ion sensors. Conveniently, Part I of the same volume provides much of the background information to the chapters in Part II. This emphasis on electrochemical techniques continues in Part III where we are introduced to the behavior of drugs at liquid interfaces. The final two chapters introduce us to NMR studies of lipid bilayers and the influence of lipid bilayers on drug delivery.

With contributions from around the world and references as recent as 2000, this 853 page book is especially useful and worth the hefty price.

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Angiotensin Protocols. Donna H. Wang, Ed. Humana Press, 999 Riverview Drive, Suite 208, Totowa, NJ 07512, http://www.humanapress.com, 2001. xiv, 530 pp., illustrations, $125.00.

For more than 100 years researchers have studied the renin-angiotensin system. Without dispute, the renin-angiotensin system is one of the body's most important hormonal systems for the control of sodium balance, fluid homeostasis and arterial pressure. From a pharmaceutical perspective, drugs have been developed against virtually every aspect of the renin-angiotensin system and are widely used to treat diseases such as hypertension, congestive heart failure, and more recently, atherosclerosis. Despite the extensive study of this system beginning in 1898 with the physiologist Robert Tigerstedt, research continues to identify new and important physiologic/pathologic roles for Angiotensin II, the major peptide of this system. This book, edited by Dr. Donna Wang, consists of a series of chapters on protocols used to study the renin-angiotensin system written by leaders in each respective area. Given the continued explosion of new findings in the renin-angiotensin field, a book dedicated to current protocols for the study of this system is valuable to both new and established investigators in this field.

The book is organized into seven sections all focused on current protocols needed to comprehensively study each aspect of the renin-angiotensin system. The book begins in Part I with a strong chapter providing a historic perspective on research that identified each component of the renin-angiotensin system and defined the function of Angiotensin

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II. In Part II, molecular approaches to study the renin-angiotensin system are highlighted, including the production and use of chimeric mice (for components of the renin-angiotensin system), retroviral vectors, and antisense inhibition of specific components necessary to produce Angiotensin II. In Part III, the focus is at the molecular level describing approaches used to study transcriptional and translation regulation of renin-angiotensin components. Each chapter provides a description of the theory behind the methodology (which could apply to the study of any system), followed by point-by-point descriptions of the precise methods used in the specific protocol. In Part IV, assays for determination of mRNA levels for components of the renin-angiotensin system are described, including PCR, Ribonuclease protection and *in situ* hybridization. Again, specific protocols are provided at the end of the chapter describing the methodology as it relates to the study of the renin-angiotensin system. In Part V, the focus is at the protein level for immunohistochemical analysis of the Angiotensin receptor, as well as specific protocols for enzyme kinetic analysis of angiotensin converting enzyme. Included in this section of the book is a very good chapter on the quantification of angiotensin peptides extracted from tissue using HPLC with UV detection. This challenging methodology is very well described with accompanying HPLC chromatograms providing information on the separation of the different angiotensin peptides. Also included in this part of the book are several chapters on analysis of Angiotensin receptor populations using radioligand binding and autoradiography. In Part VI, a series of chapters describe protocols used for biochemical analysis of the renin-angiotensin system, primarily focused on the measurement of signaling pathways mediating responses to Angiotensin II. In Part VII, the circle is completed with a series of chapters detailing functional assay systems to study the renin-angiotensin system.

This book is a very useful detailed resource for specific protocols in use by major leaders in the field for the comprehensive study of the renin-angiotensin system. If you are an established researcher in the renin-angiotensin system, this book will provide a quick reference for methods used by other researchers to study the various components of the renin-angiotensin system. If you are beginning a research program in the renin-angiotensin system, this book is an excellent resource for detailed methods and theory for current protocols to study all aspects of Angiotensin II. In addition, the numerical list of point-by-point methods at the end of each chapter is very helpful to new investigators in this field. The book is well edited by Dr. Wang and the chapter authors were excellent choices for each specific protocol. The authors for chapters on specific protocols are established researchers in the field and the specific protocol descriptions are uniform in organization across the chapters. Overall, this is an excellent comprehensive book on current protocols in use to study the renin-angiotensin system from the molecular to the whole animal level.

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Biomedical Chemistry: Applying Chemical Principles to the Understanding and Treatment of Disease. Paul F. Torrence, Ed. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2000. xv, 415 pp., illustrations, $79.95.

Under an appealing and explicit title, this book aims at showing how chemistry and biochemistry serve medicine. There are at least three approaches to molecular medicine in its broadest sense, namely understanding the biochemical bases of physiopathology (chemical etiology), developing diagnostic assays, and searching for new drugs. Such a sequence has logical appeal and suggests that the three approaches are essentially independent. The same view could also be deduced from the fact that chemical etiology, diagnostic research, and drug research are seldom if ever covered in the same books. Not so with the present work, which gives equal importance to chemical etiology and drug research and treats them together. In effect, the book is the first one I know that so explicitly intertwines chemical etiology and drug research, thus recognizing their intimate connectedness and offering an integrated and inspiring view.

"Biomedical Chemistry" is subdivided into four parts, the first of which examines drug discovery and development based on enzymatic mechanisms. Four chapters here are devoted to anti-infectious agents, namely antitrypanosomal agents (Chapter 1), broad-spectrum antivirals (Chapter 2), and anti-HIV agents (Chapters 4 and 5). The logic of having a chapter on alcohol deterrent agents (Chapter 3) appearing in the middle of Part I defies my understanding. But this oddity should not hide the quality of the individual chapters. This reviewer with his interest in prodrug design has been particularly impressed by the clarity and value of Chapter 5 on biolabile phosphate protecting groups. The second part explores fundamental chemical principles in drug design and discovery, again with a heavy emphasis on chemotherapeutic agents and their mechanisms of action. Thus, Chapter 6 with its presentation of inhibitors of HIV replication could also have been placed in Part I. Chapters 7–10 discuss various classes of current or potential anticancer drugs, from phosphoramide mustard to tumor targeting to new *Vinca* alkaloids. There is also one noteworthy chapter (11) on fluorine substitution as modulator of biological processes.

Part III on the chemical bases of drug action and disease follows Part II without gap. Another approach to tumor targeting is presented in Chapter 12. New antimalarial peroxide drugs derived from artemisinin are aptly discussed in Chapter 13. There is a complete change in focus with the next chapter, which presents our current understanding of the chemical etiology of Parkinson's disease in a comprehensive and balanced way. Part IV is a short, coherent and forward-looking whole-centered on gene biotechnology. Its three chapters deal with DNA chips, future gene therapeutic drugs, and ribozyme mimics. There is much to learn and reflect in these three splendid chapters.

To summarize, most chapters in this book examine a particular biochemical mechanism and its modulation by therapeutic agents, and go on to show how this knowledge can lead to novel potential agents and general principles. In other words, we are offered a bottom-up approach to drug research and chemical etiology. Only the chapter on fluorine

substitution and those making up Part IV follow a top-down approach and begin with general principles valid for a variety of targets and therapeutic applications. Both approaches have merit and in fact complement each other. That both can be found under a single cover is another attractive feature of this book. It is also a pleasure to note the clarity of presentation and style of all 17 chapters. They all contain a critical and informative selection of recent references, and their illustrations are of uniform quality. The editor has written a useful preface, and he introduces each part with a few meaningful paragraphs. There is also a good subject index. In conclusion, this book has much to offer to graduate students and more seasoned researchers in all branches of biomedicine and drug research. In an age of disposable artifacts and useless gadgets, this is a book to pick up frequently, read slowly, assimilate, and above all enjoy.

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Comprehensive Organic Transformations: A Guide to Functional Group Preparations, Second Edition. Richard C. Larock. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 1999. xliii, 2583 pp., illustrations, $150.00.

This book is an update to the unique and classic 1989 desk reference that has condensed decades worth of synthetic methods development chemistry into a compact and readily accessible form. The new edition is an invaluable resource, searchable based on a transformation index that first lists the target functionality, followed by a list of functional group types from which that bond type can be constructed. For example, if one is searching for methods to prepare a simple epoxide, one would look up "epoxide" under the alphabetical "To" listing. There one would find 30 different listing under the "From" heading, listed alphabetically, beginning with "alkanal" (i.e. a net conversion of an aldehyde to an epoxide). The final column, "Page," refers to the page on which that particular conversion is listed along with the original literature citations that describe such transformations. The listings in the "To/From/Page" section then continue to include another 100 or so listing for more complex epoxide target compounds such as epoxyamides, epoxynitriles, epoxyester, etc. This reference is a "must have" addition to the library of any practicing synthetic chemist in the pharmaceutical sciences.

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Solid-Phase Organic Synthesis. Kevin Burgess, Ed. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2000. xiv, 277 pp., illustrations, $69.95.

Solid-Phase Synthesis and Combinatorial Technologies. Pierfausto Seneci, Ed. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2000. xii, 637 pp., illustrations, $109.95.

The recent explosion of activity in the area of combinatorial and high-throughput methods is making profound changes in the pharmaceutical and polymer industries. The book "Solid-Phase Organic Synthesis" is a timely collection of eight monographs that review some of the major developments in the solid-phase synthesis field. The synthesis of guanidines using either resin-supported or solution-borne electrophilic precursors is the subject of Chapter 1. Chapter 2 reviews methods for palladium-catalyzed carbon-carbon bond formation, including Heck, Stille and Suzuki couplings, while Chapter 4 focuses on how this methodology can be extended to the formation of a diverse family of linear, dendrimeric, and hyperbranched phenylacetylene oligomers. The synthesis of [6,5]-, [6,6]-, [6,7]-, and [6,8]-benzofused heterocycles is reviewed in Chapter 3. Polymer-assisted solution-phase methods for chemical library synthesis are also covered, with Chapter 5 focusing on polymer-supported substrates, reagents and catalysts, and Chapter 6 describing biomolecular synthetic applications enabled by novel support materials. The use of FTIR and FT Raman microspectroscopy for product identification and reaction kinetics of intermediates generated by solid-phase synthesis is covered in Chapter 7. The book concludes with a review of ten natural product syntheses via the application of solid-phase methods. Authorship perspectives from both industry and academia are represented, making this a valuable addition to the library of any newcomer to the field.

The book "Solid-Phase Synthesis and Combinatorial Technologies" is a much more extensive book with eleven chapters covering the topics of solid-phase synthesis, combinatorial technologies, and the formation of synthetic organic, biosynthetic, and materials combinatorial libraries. It is a welcome addition to the rapidly developing field of combinatorial synthetic chemistry. The main focus of the book is to provide a general introduction to the core concepts of combinatorial technologies for graduate students, postgraduate students, and experienced chemists who lack experience with solid phase synthesis and combinatorial techniques. The first five chapters serve as a short course on the basic principles and applications of solid-phase synthesis methods to the preparation of small organic molecules, peptides, oligonucleotides, and oligosaccharides for the creation of combinatorial libraries of such compounds. The strengths and weaknesses of various approaches, as well as new trends and their possible impact on future combinatorial methods, are also discussed. The last six chapters deal with applications of discrete libraries, pool libraries, solution-phase libraries, encoding/decoding methods, and the applications of libraries to problems in pharmaceutics, agricultural chemistry, molecular recognition, and catalysis. The text includes citations to over 1700 articles, abstracts, and patents, which will increase its utility for the

experienced combinatorial chemist, however, this book will best serve the student or professional who has limited prior exposure to this field.

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Protein Formulation and Delivery, Drugs and the Pharmaceutical Sciences, Volume 99. Eugene J. McNally, Ed. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 1006-0602, http://www.dekker.com, 2000. viii, 262 pp., illustrations, $150.00.

This book concerns a very timely topic, as a growing number of researchers in our field struggle to find the best way to formulate and deliver the protein drugs of the future. The text, prefaced by the editor, consists of a brief overview of the topic by James Wright of Alkermes followed by seven substantive chapters, which include: 1) the basics of protein stability; 2) the practical aspects of analytical techniques with proteins, preformulation, solution stability, and freeze-drying; and 3) some advanced new methods of protein delivery (pulmonary and controlled-release injectable depots) primarily aimed at improving efficacy and decreasing the invasiveness of daily protein injections. One principal goal of the book, as described by the editor in the Preface, was to provide protein formulation scientists new to the field some direction of how to begin their development efforts. The text is organized just right, and by-and-large efficiently accomplishes this goal.

Chapter 2, entitled "Chemical and physical considerations in protein and peptide stability," provides a very well referenced review of protein stability, which was co-authored by Paul M. Bummer of the University of Kentucky and Sandy Koppenol of the University of Washington. For those not so familiar with protein formulation, this chapter presents many of the deleterious reactions and processes that a protein must experience during formulation, i.e., a good place to begin organizing one's closet of the numerous things that can go wrong when formulating proteins. In Chapter 3, Helmut Hoffman of Boehringer Ingelheim focuses on analytical methods and stability testing of biopharmaceuticals. Analyzing proteins is a very complicated subject, and any pharmaceutical text concerning proteins should probably have a chapter devoted to protein analysis. The author focuses on the different types of analytical methods and how these methods may be used to characterize proteins during stability testing, as opposed to describing the basic principle of each analytical method. A very nice table is given, which provides a partial list of different analytical methods used to detect denatured forms of the protein. Some useful examples of detecting different degradation pathways during stability testing are also listed. In Chapter 4, Eugene McNally and Christopher Lockwood of Boehringer Ingelheim tackle preformulation issues with proteins in the importance of a thorough preformulation study. This chapter describes how to get familiar with a specific new protein candidate and how to identify key destabilizing stresses and mechanism relevant for its formulation. At the end of the chapter some case studies are provided.

In Chapter 5, entitled "Freeze-drying concepts: the basics," freeze-drying is introduced with an emphasis on the basic physical chemistry and equipment used in freeze-drying. There are some very useful practical information given, but little emphasis is placed on freeze-drying of proteins. The book closes out with two protein delivery chapters: "Formulation of proteins for pulmonary delivery" by Andrew Clark at Inhale Therapeutic Systems and Steven Shire at Genentech, and "Formulation of proteins for incorporation into drug delivery systems" by OluFunmi Johnson of Alkermes. In the former chapter, the special features of aerosol dosage forms and when aerosols are used for delivering proteins are described. This was a particularly interesting and informed discussion. In the final chapter, a general description of protein stability in controlled-release dosage forms is presented by a co-developer of the Nutropin Depot™ (Alkermes-Genentech), the first controlled-release depot formulation for a protein (human growth hormone) approved by the US FDA. A clear strength of this chapter is with the author's experience and focus on relevant issues.

Overall, the book is well written and organized. The strengths of the book involve the importance of the topic, the organization of the book, and many practical examples. The reviewer welcomes this and other books in this area, because it is a very challenging and evolving part of pharmaceutics. A principal weakness of the book involves its scope, which appears to be quite broad for merely 7 chapters. For example, lyophilization-induced structural changes in proteins and interesting new techniques for transdermal protein delivery were not examined in any detail. The authors appeared to overcome this impediment fairly well in most instances.

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Computational Biochemistry and Biophysics. Oren M. Becker, Alexander D. MacKerell, Jr., Beoît Roux, and Masakatsu Watanabe, Eds. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 1006-0602, http://www.dekker.com, 2001. xii, 512 pp., illustrations, $195.00.

This multi-authored book on Computational Biochemistry and Biophysics is a timely publication in a rapidly expanding area of intensive research. It is divided into four major parts: computational methods, experimental data analysis, modeling and design, and advanced applications. It is intended for non-specialists as well as advanced users. For the non-specialists to benefit from this book, considerable effort has to be spent in self-study, so they will not get lost among numerous terms, acronyms, and formidable equations. Fortunately, most of the chapters are well referenced with respect to the commonly used programs and concepts. Many come with excellent graphics to illustrate the results of computation. Several authors spell out many limitations encountered in solving problems associated with macromoleculars, but

quickly point out the prospect of progress in the near future when further improvement in computation and refinement in software can be achieved.

Due to the overlap of the subject matters among the 21 chapters, ranging from atomistic models, force fields, to conformational analysis of proteins, enzymes, nucleic acids, and membrane, there is some redundancy in the presentation and some presumed prior knowledge (e.g., Fourier transformation, and Laplace operator which has been used in deblurring of EEG). This may not be a serious problem for advanced users, but it may be an "energy barrier" for the nonspecialists. Fortunately, at the end of the book (as well as some chapters), there is the Appendix of Useful Internet Resources, including online tutorials. This should eliminate any excuse for not being able to overcome the barrier, be it biophysical, mathematical, or computational. Overall, this is a comprehensive book written by experts in many different branches of the chemistry/biology interface, and edited by Drs. Becker, MacKerell, Roux and Watanabe from four major universities.

This book should be in the library of chemistry, biology, medicine, and pharmacy departments/schools, as well as pharmaceutical companies and research laboratories engaged in computational chemistry and biology. The quality of printing is excellent and the price is reasonable, considering the amount of information contained within.

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Books Received

Analysis

Encyclopedia of Analytical Chemistry. Applications, Theory and Instrumentation, Volume 15. R. A. Meyers, Editor-in-Chief, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2000. xxi, 951 pp., illustrations, $6000.00/15 volume set.

This is the last volume of the 15 volume series on Encyclopedia of Analytical Chemistry. From the contents of the series, one would appreciate the editor's intention of preparing the largest, most comprehensive compendium of analytical chemistry in existence. Analysis of pharmaceuticals and drugs are covered in Volume 8. Volume 15 covers Raman spectroscopy, thermal analysis, X-ray photoelectron spectroscopy, and other general articles such as Karl Fisher moisture determination. As the last volume of the series, Volume 15 also contains the lists and index of contributors, reviewers, the contents in alphabetical order, and keyword index. This series is distinguished from other compendium in terms of its breadth and depth.

Dictionary of Colloid and Interface Science. Laurier L. Schramm, Ed. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2001. xi, 218 pp., illustrations, $59.95.

Herbal Medicine

Journal of Herbal Pharmacotherapy. Innovations in Clinical & Applied Evidence-Based Herbal Medicinals. Lucinda G. Miller, Ed. The Haworth Herbal Press, 10 Alice Street, Binghamton, NY 13904-1580, http://www.HaworthPress.com/,2001. x, 100 pp., illustrations, $50.00.

Journal of Cannabis Therapeutics Studies in Endogenous, Herbal & Synthetic Cannabinoids. Ethan Russom, MD, Ed. The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580, http://www.HaworthPress.com/, 2001. x, 113 pp., illustrations, $48.00.

Materials

Properties of Advanced Semiconductor Materials. Michael E. Levinshtein, Sergey L. Rumyantsev and Michael S. Shur, Eds. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2001. xvii, 194 pp., illustrations, $74.95.

Pharmaceutics

Antimicrobial/Anti-Infective Materials: Principles, Applications and Devices. Samuel P. Sawan and Gurusamy Manivannan, Eds. Technomic Publishing Company, Inc., 851 New Holland Avenue, Box 3535, Lancaster, PA 17604, http://www.techpub.com, 2000. vii, 121 pp., illustrations, $149.95.

Sterilization Validation & Routine Operation Handbook: Ethylene Oxide. Anne F. Booth, Ed. Technomic Publishing Company, Inc., 851 New Holland Avenue, Box 3535, Lancaster, PA 17604, http://www.techpub.com, 2000. vii, 121 pp., illustrations, $64.95.

Pharmaceuticals: Classes, Therapeutic Agents, Areas of Application, Volume 1, *Introduction, Cardiovascular Drugs* J. L. McGuire, Ed. John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, http://www.wiley.com, 2000. vi, 303 pp., illustrations, $206.25.

Off-Label Drug Facts: The Primary Source For Unlabeled Drug Use. Joyce A. Generali. Facts and Comparisons, 111 West Port Plaza, Suite 300, St. Louis, MO 63146-3098, www.factsandcomparisons.com and www.drugfacts.com, 2001. xxi, 547 pp., illustrations, $175.00.

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