defined (YCB/lysine broth) and complex (Sabouraud dextrose broth) media as previously described.[9a,b] MIC and MFC values were also determined as previously described.[9] Minimum fungicidal activity (MFC) was defined as the lowest concentration of drug from which subcultures were negative or which yielded fewer than three colonies.[9b]

Systemic Infections with *Candida albicans* in Mice.[9c] Typically, 6×10^6 yeast cells of *C. Albicans 3153A* were injected into a tail vein of mice (weight: 20–22 g) to generate a subacute systemic model. Untreated animals expired within 7 days. For the therapeutic test, 2 mg of **3** and 4 or 1 mg of amphotericin B was administered once intraperitoneally on day 2 (2 days after the challenge). Efficacy was evaluated by the survival of mice on day 14.

Registry No. **3**, 123290-45-9; **4**, 123290-46-0; **5**, 123307-60-8; **6**, 123290-47-1; **7**, 123290-48-2; **8**, 123290-49-3; **9**, 123290-50-6; **10**, 123290-51-7; **11**, 123290-52-8; **12**, 123290-53-9; **13**, 123290-54-0; **14**, 123290-55-1; **15**, 123356-30-9; **16**, 123290-56-2; **17**, 123290-57-3; **18**, 123290-58-4; **19**, 123290-59-5; **20**, 123290-60-8; **21**, 123307-97-1; **22**, 123290-61-9; **23**, 123290-62-0; 14,15-sterol reductase, 69403-07-2.

Supplementary Material Available: ^{1}H NMR, MS, and TLC data for compounds **13–22** and **3–7** (1 page). Ordering information is given on any current masthead page.

Additions and Corrections

1989, Volume 32

Whei-Mei Wu, Emil Pop, Efraim Shek, and Nicholas Bodor*: Brain-Specific Chemical Delivery Systems for β-Lactam Antibiotics. In Vitro and in Vivo Studies of Some Dihydropyridine and Dihydroisoquinoline Derivatives of Benzylpenicillin in Rats.

Pages 1785–1786. During the printing process, Figures 2 and 3 were reversed (the captions are correct). In both figure captions the last symbol should be changed from ▽ to ○.

Book Reviews

The Muscarinic Receptors. Edited by Joan Heller Brown. Humana Press, Clifton, NJ. 1989. xviii + 478 pp. 15 × 23 cm. ISBN 0-89603-156-X. $89.50.

This is the sixth book in *The Receptors* series. Research on muscarinic receptors has been particularly intense during the past decade. It is now accepted that a family of these receptors exist. Advances of the understanding in this very important class of receptors are presented in 12 chapters written by experts in the field. These chapters present a wealth of information on a wide variety of topics including the history and fundamental properties of the muscarinic cholinergic receptors, their binding and pharmacological properties, purification, subpopulations, cloning, structural determinants of muscarinic agonist activity, regulation of cyclic AMP and phospholipid metabolism, calcium mobilization, allosteric interactions, regulation of cyclic GMP, eicosanoid production, ion channels, and the number and function of this class of receptors. The book concludes with an excellent discussion of future research anticipated for the muscarinic receptors.

Each chapter is followed by an excellent up-to-date list of references. An author index is also included. *The Muscarinic Receptors*, in keeping with other volumes in the series, is essential reading for those concerned with this class of receptors. Medicinal chemists will find chapter 5, Structural Determinants of Muscarinic Agonist Activity, to be a comprehensive review of particular interest.

Staff

Organic Functional Group Preparations. Volume III. Second Edition. By Stanley R. Sandler and Wolf Karo. Academic Press, San Diego, CA. 1989. xiv + 512 pp. 16 × 23.5 cm. ISBN 0-12-618603. $99.00.

The purpose of this series is to provide organic chemists with an up-to-date and convenient source of useful preparative procedures. For this second edition the literature for 13 functional groups has been reviewed from 1971 to the present. It includes new information where pertinent, new and expanded tables of data, and additional preparations. References are derived from journal as well as United States and foreign patent literature.

Topics included in the present volume are acetals and ketals, anhydrides, monoalkyl sulfates, and sulfenic acids and sulfenic acid derivatives, isonitriles (isocyanides), amidines, imides, imidates, nitrones, hydroxylamines and substituted hydroxylamines, oximes, hydroxamic acids, and thiohydroxamic acids. Where possible, the preparative details for each functional group are divided according to their reaction type, i.e., condensation, elimination, oxidation, and reduction.

This volume of *Organic Chemistry, A Series of Monographs, Volume 12-III* is of general organic synthetic importance. It will be a valuable addition to the libraries of medicinal chemists with focus on any of the 13 functional group preparations that are reviewed.

Staff

Molecular Structure and Energetics. Volume 9. Mechanistic Principles of Enzyme Activity. Volume 10. Environmental Influences and Recognition in Enzyme Chemistry. Edited by Joel C. Liebman and Arthur Greenberg. VCH Publishers, Inc., New York, NY and VCH Verlagsgesellschaft mbH, Weinheim, Federal Republic of Germany. 1988. Vol. 9: xii + 404 pp. 16 × 24 cm. ISBN 0-89573-706-x. $89.00. Vol 10: xv + 349 pp. 16 × 24 cm. ISBN 0-89573-707-8. $89.00.

These two volumes continue the title series with a focus on the influence of structure and energetics upon activities and properties of selected enzyme systems. The first of these books is intended to deal primarily with mechanistic principles, including experimental methods that have been employed in their study, and the second with structural and environmental influences on enzyme catalysis, including emphasis on theoretical considerations. The segregation of the included topics into two classifications,

Mechanistic Principles, and Environmental Influences and Recognition, seems somewhat arbitrary since there is considerable content from both these areas within each volume.

The nine contributions composing volume 9 include Structural Aspects of Zinc Protease Mechanisms (D. W. Christianson and W. N. Lipscomb), Stereoelectronic Analysis of Enzymatic Reactions (S. A. Benner), Intramolecularity: Proximity and Strain (A. W. Czarnik), Structural and Energetic Aspects of Protolytic Catalysis by Enzymes: Charge-Relay Catalysis in the Function of Serine Proteases (R. L. Schowen), Electron Transfer in Cytochromes C and B_5 (T. C. Bruice), Porphyrin Metalation Reactions in Biochemistry (D. K. Lavallee), Chemical Studies and the Mechanism of Flavin Mixed Function Oxidase Enzymes (T. C. Bruice), and Glutathione-Dependent Aldehyde Oxidation Reactions (D. J. Creighton and T. Pourmotabbed). Volume 10 contains 11 chapters: Vitamin B_{12} and Its Coenzymes: Structures and Reactivities (M. Rossi and J. P. Glusker), Influences of Solvent Water on Transition State Stabilization (R. Wolfenden), Structure of Hydration Shells Around Hydrophobic Molecules (E. Grunwald and L. Comeford), Proximate Charge Effects (P. Haberfield), Protein Folding (N. R. Kallenbach and J. W. Nelson), Fractal Surfaces of Proteins (M. Lewis and D. C. Rees), Artificial Allosteric Molecules-Especially Focussing upon Allosteric O_2 Binding Molecules of the Hemoglobin Type (I. Tabushi), Progess in Molecular Recognition (J. Rebek, Jr.), Computational Analysis of Molecular Recognition by Artificial Enzymes (C. A. Venanzi), Spcificity and Mechanism of the Chemical Nuclease Activity of 1,10-Phenanthroline-Copper Ion (D. S. Sigman, T. Thederahn, M.D. Kuwabara, T. C. Bruice, and A. Spassky), and Catalytic Antibodies: Generation and Characterization (P. G. Schultz and J. W. Jacobs).

Each chapter, written by individuals involved directly in research of the described topic, is autonomous and can be used as a tutorial or a review of the area. Yet, many of the principles described in these two volumes are interrelated and can be applied to other enzyme systems—as well as diverse areas of biological research. Ample references are provided for those interested in exploring specific topics further. The contents of these books provide timely overviews for those readers interested in reviewing the titled subjects with the added dimension of allowing for an appreciation of the experimental designs giving rise to the larger conceptual conclusions.

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Enzymes Hydrolysing Organophosphorus Compounds. Edited by Elsa Reiner, W. Norman Aldridge, and Francis C. G. Hoskin. John Wiley & Sons (Halsted Press), New York. 1989. x + 266 pp. 17 × 24.5 cm. ISBN 0-470-21447-3. $59.95.

This book is a summary of invited presentations from the International Meeting on Esterases Hydrolysing Organophosphorus Compounds held in Dubrovnik, Yugoslavia in 1988. The diversity of topics covered in this volume is indicative of the growing interest in the biological and pharmacological roles as well as the potential ecological impact imparted by organophosphorus compounds. Included are 27 chapters which cover a broad spectrum of subjects. The presentations can be classified into one of four catagories upon which the conference focused: (1) esterases in an historical perspective, (2) specificity, catalytic properties, and mechanisms of these enzymes, (3) progress toward the identification, isolation, and purification of organophosphorus esterases, including species differentiation, and (4) the biological and toxicological roles of these enzymes and the metabolites of their catalytic actions. The titles and authors of 32 poster presentations are included within an additional section.

Individual chapters are of varying quality and utility. Particularly disappointing is that each of the last four chapters consists only of a one-paragraph abstract. For readers already familiar with the subject areas, those chapters dealing with new research results should prove to be enlightening. Yet, since no one subtopic is covered in great detail, the book should not be taken as a comprehensive review of any one area of research. Rather, the information detailing the four broader catagories can be used as a starting point for individuals interested in delving into a particular subject.

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Medical, Biochemical and Chemical Aspects of Free Radicals. Edited by O. Hayaishi, E. Niki, M. Kondo, and T. Yoshikawa. Elsevier, New York, 1989. xxxiv + 1560 pp. 17 × 24.5 cm. ISBN 0-444-87482-8. $513.25.

This two-volume set contains the Proceedings of the 4th Biennial General Meeting of the Society for Free Radical Research held in Kyoto, Japan, 9–13 April 1988. This weighty set contains 319 contributions organized into the following 13 subject headings: Overview, Iron, Active Oxygen, Vitamin E, Antioxidant, Superoxide Dismutase, Assay Methods, Lipid Peroxidation, Lipid Peroxide, Prostaglandin, Ischemia-reperfusion, Pathology, and Cancer. In addition to the above subject headings, an extremely useful subject index has been compiled and included by the editors which serves to enhance the utility of this set. The author index is filled with most, if not all, of the leaders in the field of free-radical research.

Considering how rapidly the field of free-radical biology has progressed in this decade, the Proceedings from this Meeting may be slightly outdated. Most references are pre-1987. Despite this modest deficiency, this set does provide a comprehensive overview up to the date of the meeting which should still be of use to established investigators in the field. For the newcomer to the field of free-radical biology this set provides a compilation of clear, concise, original contributions, filled with useful tables and figures of data, as well as thought provoking schematic diagrams illustrating what is known and what is postulated in the field.

The cost of the 2 volume set may be prohibitive for inclusion into one's own collection, but I highly recommend its purchasing for a departmental library.

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Advances in Prostaglandin, Thromboxane, and Leukotriene Research. Volume 19. Edited by Bengt Samuelsson, Patrick Y.-K. Wong, and Frank F. Sun. Raven Press, New York. 1989. xxxvii + 723 pp. 16.5 × 24 cm. ISBN 0-88167-496-6. $115.00.

This volume contains the papers presented at the Taipei Conference on Prostaglandin and Leukotriene Research held in Taipei, Taiwan, on April 22–24, 1988 and is organized into the following general categories: Nobel Lectures (two papers); Plenary Lectures (six papers); Eicosanoid Metabolism (23 papers); Eicosanoid Receptors, Agonists, and Antagonists (seven papers); Renal Eicosanoids and Hypertension (nine papers); The Cardiovascular System (22 papers); The Cytochrome P-450 System and Eicosanoid Metabolism (five papers); PAF-Acether (Platelet Activating Factor) and Antagonists (seven papers); The Endocrine and Central Nervous Systems (four papers); Cell Growth and Differentiation (nine papers); Cellular and Molecular Biology of Eicosanoid Metabolism (10 papers); Inflammation, Allergy and Hypersensitivity (18 papers); Phospholipase Turnover and Signal Transduction (eight papers); Nutritional Intervention (seven papers); and Workshops (17 papers). The subject index is adequate and the references are generally timely, considering that this meeting took place over a year and a half ago (i.e. no references from 1989).

Most of the relatively short papers (4–8 pages) are well written, and in the style of this series, many have detailed experimentals. Some of the articles are written in the nature of a brief review and are largely useful for their references. However, a number of presentations at this meeting were first disclosures of important developments in this field. Two elegant pieces of work that come to mind are the cloning of human 5-lipoxygenase by Samuelsson et al. and the development of a LTD_4 receptor model by the Merck-Frosst group. The biological profiles of several drugs are

discussed, as well as the putative role of eicosanoids in various disease states. Also noteworthy are the proposals that PGD_2 is the major factor in the brain for inducing sleep (rats and monkeys) and that, at least in vitro, the phenotype of mast cells and eosinophils is regulated by their microenvironments.

This book is a valuable resource for both the medicinal chemist and the pharmacologist and is an excellent overview of the major work being done in this area.

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Excitatory Amino Acids in Health and Disease (Biological Council Symposium on Drug Action). Edited by David Lodge. John Wiley & Sons, New York, NY. 1988. xvi + 402 pp. 15.5 × 23.5 cm. ISBN 0-471-91662-5. $79.95.

In the past decade, research into the contribution of excitatory amino acid (EAA) mediated neurotransmission to central nervous system (CNS) function has expanded enormously. When I first became interested in the field in 1980, the number of laboratories actively engaged in this area could be counted on both hands. Today, nearly every university, and many industrial institutions, are investigating EAAs. The volume edited by Lodge, which chronicles the proceedings of the 37th Symposium on Drug Action (London, 1987), is yet another tribute to the widening recognition of the importance of EAAs in the brain. Importantly, as research efforts are now reaching fruition and human trials with EAA antagonists are nearing, this book attempts to bring together information relevant to both basic and clinical scientists.

Consisting of 19 chapters written by some of the foremost experts in the field, *Excitatory Amino Acids in Health and Disease* is logically constructed, informative, and entertaining. The first portion of the book (chapters 1–5) consists of detailed discussions of specific EAA agonists or antagonists as well as the characteristics of the interaction of agonists or antagonists with EAA receptors. For anyone who has wanted to assemble comparative data or tried to find the structure of lesser known compounds, the chapters are particularly useful. Building upon this essential background, chapters 6–11 proceed to review the localization of EAA neuronal systems and the biochemical and electrophysiological characteristics of EAA receptor subtypes. Three chapters are devoted to the interactions of barbituarates, σ opiates, and phencyclidine with EAA-mediated neurotransmission. The final five papers take the reader across a spectrum from the neuronal level of synaptic plasticity, to the effects of EAAs on learning and memory, to the role of EAAs in CNS diseases (Alzhiemers, epilespsy, and neurodegenerative states).

The average chapter length in Excitatory Amino Acids is 21 pages (12–34 pp), making each paper easily readable. Notably, I was impressed with the clarity of data presentation and the abundance of graphs, tables, and diagramatic models. Each chapter contained a concise introduction, sufficient information on methodology to interpret the results, and a short conclusion summarizing key points or suggesting further research. When warranted, chapters were subdivided in a logical progression. References were generous (average of 70), inclusive through 1987 and, with one exception, included full author and title listings. The 12-page index made location of individual material straightforward.

Overall, I was impressed with *Excitatory Amino Acids*. Even through the papers are over 15 months old (for instance, there is no mention of polyamines), the book contains sufficient information to warrant including it in the laboratory. This would be particularly true where students new to the area are being trained.

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