Book Reviews

Cancer Chemotherapeutic Agents. Edited by William O. Foye. American Chemical Society: Washington, DC. 1995. xx + 700 pp. 17.5 × 25 cm. ISBN 0-8412-2920-1. $149.95.

Thirty-six senior authors provide for an authoritative treatment of the discovery, development, and understanding of cancer chemotherapeutic drugs. The work is summarized in 17 chapters with some references into 1994 but most only through 1992. A useful index is included, and the biochemistry, biology, toxicity, resistance, and clinical utility of important drugs are discussed. Structures are provided for the most useful entities, and generally, structure−activity relationships and summaries of synthetic chemistry are included. Often, stability, pharmacokinetics, and metabolism are dicussed, but the presentation of this information are uneven. Following an introduction and historical background (S. A. Schepartz) is a chapter on the prediction of biochemical mechanisms of action from the NCI *in vitro* antitumor screening (K. D. Paul, E. Hamel, L. Malspeis). Analysis of data is performed by a program called COMPARE. The COMPARE algorithn ranks an entire data base according to the similarity of the responses of 60 cell lines to the compounds in the data base to the responses of the cell lines to the "seed" compound. The "seed" compound can be specified by using the compound's NCI accession number. Interestingly, compounds matched by mean graph patterns frequently have the same or related biochemical mechanisms of action.

The "Antimetabolite" and "Agents That React with DNA" sections follow as Chapters 3 and 4. There is a "General Introduction" (J. A. Montgomery) with specific subsections on "Fluoropyrimidines" (S. Ananthan), "Thiopurines" (J. A. Montgomery), "...Nucleoside Diphosphate Reductase" inhibitors (W. B. Parker), "2′-Deoxyribonucleoside Analogues" (J. A. Secrist, III), "Other Nucleosides" (J. A. Montgomery), "Folic Acid Analogues" (C. G. Temple, Jr.), "Methotrexate and Related Diaminoheterocycles" (J. R. Piper), "6-Diazo-5-oxo-L-norleucine" (J. A. Montgomery), "L-Asparaginase" (J. A. Montgomery), and "*N*-(Phosphonoacetyl)-L-aspartic acid" (J. A. Montgomery). Under "Agents That React with DNA" are found discussions of "Nitrogen Mustard and Related Structures" (R. F. Struck), "Platinum Complexes" (W. R. Waud), "Nitrosoureas" (R. D. Elliott), "Alkyl Sulfonates" (Y. F. Shealy), "Triazenylimidazoles..." (Y. F. Shealy), "Aziridines" (R. C. Reynolds), "Procarbazine" (J. A. Maddry), and "Hexamethylmelamine" (J. A. Maddry).

Chapter 5, "Topoisomerase II Inhibitors" (S. K. Sengupta), provides sections on "Intercalating Drugs, Acridines and other Tricycles" (W. A. Denny) and "Epipodophyllotoxins, Aminoanthraquinones, Ellipticine, Merbarone, Benzisoquinolinediones..." (C. C. Cheng). Chapter 6 considers "Inhibitors of DNA-Transcribing Enzymes" (S. K. Sengupta), and Chapter 7 discusses topoisomerase I inhibitors under the heading "Camptothecin and Analogues..." (M. E. Wall and M. C. Wani). The remaining 10 chapters consider "DNA Minor Groove Binding Compounds..." (M. Cory), "Antimitotic Agents" (M. C. Lu), "Bleomycin-Group Antitumor Agents" (S. M. Hecht), "...Steroid Hormone..." antagonists (C. J. Kendrick-Parker and V. C. Jordan), "Photodynamically Activated..." (T. J. Dougherty), "Immune-Modifying Agents" (M. Awwad, H. R. Axelrod, and S. G. Gilman), "Hypoxia-Selective Cytotoxins" (W. A. Denny), "...Radiation Sensitizers and Protectors" (B. A. Teicher and E. A. Sotomayor), "Oligonucleotides and Polynucleotides..." (A. R. Heiter and T. J. Bardos), and "Antitumor Antibiotics" (W. A. Remers and B. S. Iyengar).

This is an excellent treatise and a very fine starting place for a summary of the properties of anticancer drugs. The reference work is a particularly good source of material for lectures, both for undergraduate and graduate students.

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Advances in Chromatography, Volume 34. Edited by P. R. Brown and E. Grushka. Marcel Dekker, Inc., New York, NY. 1994. xvi + 438 pp. 15.5 × 23.5 cm. ISBN 0-8247-9087-1. $165.00.

A wide range of topics is covered in the 34th volume of this prestigious series on chromatography. Seven chapters ranging over approximately 400 pages affords one ample information. The topics may be so varied, in fact, that one may not wish to make the financial investment as only a fraction of the material will be of interest to the average reader. Nevertheless, this volume should make a great reference text for future referrals. The first chapter deals with high-performance capillary electrophoresis of human serum and plasma proteins; however, in truth only the last third of the rendering deals with this subject. A useful summary of the various modes of electrophoretic separations is provided. Routine analysis of serum and plasma proteins is concluded to only be applicable to capillary zone electrophoresis as opposed to capillary isotachophoresis, capillary isoelectric focusing, and capillary gel electrophoresis.

Chapter 2 concerns infrared detection after gas chromatography. Flow cell and matrix isolation interfaces are reviewed. The most attractive feature of this offering is the practical and interpretive discussions of matrix isolation/infrared spectrometery. Anyone performing this technique should read this chapter to learn the pitfalls of changing the noble gas matrix and using traditional infrared spectral libraries, for example. Statistical theories of peak overlap in chromatography are discussed in Chapter 3. One section addresses statistical concerns in a single dimension of space such

as capillary chromatography, while a second section deals with multidimensional spaces such as in two-dimensional thin-layer chromatography. The author notes that there is a remarkable consistency among the predictions of the various theories presented. No doubt the practical relevance of overlap theories awaits the test of time. Chapter 4 constitutes another treatise on high-performance capillary electrophoresis (HPCE), but the emphasis is quite different. Mono- and polysaccharides, glycoproteins, and glycolipids are the focus. A very useful discussion of strategies employed to overcome the lack of both ionizable functions and chromophores in the carbohydrate molecule is provided. The interested reader should find the sections on columns, detection, and applications very informative. Environmental applications of supercritical fluid chromtography (SFC) are reviewed in Chapter 5. The authors limit their discussion to polychlorinate biphenyls, pesticides and herbicides, phenols, and polyaromatic hydrocarbons. The major emphasis is placed upon the various detection modes afforded to these compounds in the literature rather than to stationary phase selectivity and approaches to method development. Several times the authors allude to the relationship of SFC to liquid chromatography, yet no experimental comparisons are given for these analytes.

Chapter 6 deals with the HPLC of homologous organic anions and cations. This offering would have been considerably enhanced if there had been given some justification for the study and a conclusion section for the review. Nevertheless, the discussions of reversed-phase, ion-exchange, and ion-exclusion chromatography should prove helpful to those working in this area. Both conjugate bases of carboxylic acids and conjugate acids of aryl and alkyl bases are considered. The last chapter of this monograph concerns uncertainty structure, information theory, and optimization of quantitative analysis in separation science. The differences between mutual information and measurement-elicited information are described in the model optimization. Some examples of practical optimization are given. Discussions of optimal mobile phase composition in pesticide analysis, optimization of wavelength and amount of internal standard, merit of short columns, and evaluation of columns for optical resolution are given.

In summary, the 34th offering in the series of Advances in Chromatography is well written, extensively referenced, and quite timely. It appears to maintain the high quality of the volumes which have preceeded it.

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TAXOL®: Science and Applications. Edited by Matthew Suffness (National Cancer Institute). CRC Press, Boca Raton, FL. 1995. xii + 426pp. 17.5 × 25 cm. $136.95. ISBN 0-8493-8382-X.

Over the last several decades, Natural Products Chemistry has played a pivotal role in advances in cancer chemotherapy by providing a valuable source of novel anticancer drugs, and some of these agents are currently being used effectively in the treatment of hematological malignancies. However, there is a dearth of agents endowed with a broad spectrum of activity against the more common human solid tumors such as neoplasms of the breast, lung, colon, ovary, etc. In these cases, surgery and radiation therapy have remained the main treatment of choice where possible. Introduction of Taxol into the armamentarium of clinical chemotherapeutic agents is a timely morale booster for natural products chemists, cancer patients, and the oncology community at large. This is due to the very encouraging spectrum of clinical activity manifested by Taxol (paclitaxel) in several common solid neoplasms which were previously difficult to treat successfully. In addition, Taxol belongs to a unique class of tubulin-interacting anticancer agents which differs in its mode of action from other antimitotic agents such as the *Vinca* alkaloids.

TAXOL®: Science and Applications is a comprehensive review of the full developmental history of paclitaxel and the current research status of science associated with this important drug. It is written with a natural products bias and more importantly is edited by a natural products chemist who was intimately associated with much of the early developmental aspects of this drug. The late Dr. Matthew Suffness has done a marvelous job of assembling a cast of contributors who have excelled in bringing to full light the developmental hurdles a natural product can face en route to market and in highlighting the efforts and research strategies employed in attempts to surmount those barriers.

The book consists of five sections (14 chapters) which are logically organized as follows: (1) Introduction, (2) Supply of Taxol®, (3) Biology of Taxol®, (4) Chemistry of Taxol®, and (5) Clinical Studies. The introduction is unique in the sense that it outlines two aspects of the drug which have not previously been covered in a work of this type: the history of the discovery and development of Taxol and a brief history of the yew tree. Both chapters will be fascinating reading for an ardent natural products chemist. The section on supply is an excellent mix, covering yew plants, plant cell culture technology, and total and semisynthetic chemical approaches as sources of paclitaxel. The research progress outlined on the total synthesis of taxol is somewhat outdated in light of the several recently completed total syntheses, but it lucidly conveys the sense of complexity involved in chemical assembly of a highly functionalized natural product like paclitaxel. The sections on biology, chemistry, and clinical studies are well written by experts in the field, and the information presented is well referenced. The specific chapters on biopharmaceutics, preclinical antitumor evaluation, and clinical studies of Taxol excel in providing important information for the reader to appreciate the relevance of these research disciplines in helping to guide and define the future optimal use of Taxol as an anticancer drug.

TAXOL®: Science and Applications contains a wealth of information and insight that will be valuable to natural products chemists, medicinal chemists, and researchers in other disciplines such as biology and

oncology. The book is especially recommended for university libraries and institutions involved in drug research.

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Organic Synthesis Highlights II. Edited by Herbert Waldmann (Institut für Organische Chemie, Universität Karlsruhe, Germany). VCH Publishers, Inc., New York. 1995. ix + 410 pp. 17 × 24 cm. ISBN 3-527-29200-4. $95.00.

Organic Synthesis Highlights II is a collection of 40 articles which provide an overview of some of the most recent and important accomplishments in organic synthesis. The articles were chosen from contributions made from 1988 to 1993 to the short review section in the members' journal of the German Chemical Society.

Organic Synthesis Highlights II is divided into two major parts. Part I, subdivided into six chapters, deals with the development of new methods and reagents. The first chapter, Asymmetric Synthesis, includes sections on the Sharpless epoxidation, enantioselective *cis*-dihydroxylation, enantioselective deprotonation and protonation, carbohydrate complexes in enantioselective C−C bond formation, asymmetric aza-Diels−Alder reactions, and C_2-symmetric amines as chiral auxiliaries. Chapter 2, Organometallic Reagents in Organic Synthesis, includes sections on iron η^5-complexes, rhodium-catalyzed carbenoid cyclizations, nickel activated C_1-synthons, aminocarbene complexes in ligand and metal-centered C−C bond formation, organolanthanides in reduction and nucleophilic addition, and carbon−carbon bond formation with group IV metallocenes and aluminum enolates. Chapter 3, Silicon in Organic Synthesis, includes monographs dealing with selective transformation with pentacoordinate silicon compounds, oxidative cleavage of Si−C bonds, and temporary silicon connections. Chapter 4, Enzymes in Organic Synthesis, includes two short sections on enzymatic C−C bond formation and synthesis of *O*-glycosides. Chapter 5, Cyclization Reactions, includes three articles on the electrophilic cyclizations to heterocycles: iminium, oxonium, and sulfonium systems and polycyclization in the synthesis of complex alkaloids. The final chapter in Part I, General Methods and Reagents for Organic Synthesis, includes domino reactions, group selective reactions, hypervalent iodine reagents, furan as a synthetic building block, and fluorine in organic synthesis. Part II, subdivided into two chapters, looks at applications in total synthesis. The first chapter in Part II, Synthetic Routes to Different Classes of Natural Products and Analogs Thereof, includes sections on the synthesis of hydroxyethylene isosteric dipeptides, natural products for plant protection, penems, O-glycosides, carbacyclines, mitomycins, ergot alkaloids, piperidine alkaloids, and taxanes. The second chapter, Synthesis of Individual Natural Products, includes strategies for total synthesis of the antitumor compound CC-1065, morphine, calicheamicin γ_1^I, and rapamycin.

Organic Synthesis Highlights II is well-organized, and each of the topics are well-referenced and timely. The diverse nature of the topics included in this text make it a very valuable reference to anyone interested in organic chemistry.

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