

required. Three clearances operating in study 1 are estimated in studies 2 and 3. Study 2 estimates the elimination clearance of I while study 3 estimates the elimination clearance of II. Studies 2 and 3 together estimate the formation clearance of II from I. Also, the elimination clearance of II operating in study 2 is measured in study 3. Intrasubject variability in any of these clearances leads to unrealistic values for the fraction of parent drug metabolized directly to metabolite II. This variability can be minimized by the simultaneous administration of metabolite(s) and precursor(s). This is possible with the use of stable isotope methodology.

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Huey-shin Lin

Biochemicals Department

Stine Laboratories

E.I. Dupont de Nemours and Company

Newark, DE 19711

René H. Levy^x

Departments of Pharmaceutics

and Neurological Surgery, BG-20

Schools of Pharmacy and Medicine

University of Washington

Seattle, WA 98195

Elizabeth A. Lane

Clinical Studies

National Institute of Alcohol Abuse and Alcoholism

Alcohol, Drug Abuse and Mental Health Administration

Bethesda, MD 20205

W. Perry Gordon

National Institute of Public Health

Geitmyrsvegen, 75-Oslo- Norway

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BOOKS

Natural Product Chemistry—A Mechanistic and Biosynthetic Approach to Secondary Metabolism. By KURT B. G. TORSSELL. John Wiley & Sons, Inc., One Wiley Drive, Somerset, NJ 08873. 1983. 401 pp. 16 × 23 cm. Price \$54.95.

This book presents an overview of the current known and postulated biosynthetic pathways of the secondary metabolites, those natural products whose precursors are the common α -amino acids, sugars, and low-molecular weight carboxylic acids of the Krebs cycle. Although the physiological functions of many of these natural products have not yet been established, some have been found to play important roles in the regulation of animal and insect social behavior and development, and plant protection mechanisms.

The contents of this volume are organized into eight chapters, each of which is subdivided into various topics. An overview of the natural products field and the importance of these metabolites are presented in the first chapter. The remaining chapters present the biosynthetic pathways for seven different classes of natural products in addition to a brief introduction about the general chemistry, nomenclature, and background of each class. In the second chapter on carbohydrates, photosynthesis, the Krebs or citric acid cycle, monosaccharides, and polysaccharides are among the topics discussed. The biosynthesis of shikimic acid; its conversion to aromatic amino acids, such as tryptophan, tyrosine, and phenylalanine; biological hydroxylation mechanisms, and the biosynthesis of aromatic carboxylic acids, coumarins, quinones, and lignins are included in the third chapter. Chapter 4 details the biosyntheses of compounds (such as saturated and unsaturated fatty acids and the aromatic anthraquinones, flavonoids, and tropolones) that originate from the polyketide pathway by condensation of acetyl CoA. The mevalonic acid pathway to the terpenes, squalene, steroids, and carotenes is the subject of the fifth chapter. In the sixth chapter, the biosyntheses of amino acids, peptides, and proteins are presented. The alkaloids derived from the amino acids ornithine, lysine, tyrosine, and tryptophan, from

anthranilic acid, and from the amination of terpenes are found in the seventh chapter. In the last chapter, the *N*-heterocyclic aromatic compounds, including pyrimidines, purines, pteridines, pyrroles, porphyrins, and corrin ring-containing compounds, are discussed. Each chapter also includes historical and biological information about some of the metabolites. The inclusion of this material appreciably enhances reader interest. A set of biosynthetic mechanistic problems and a bibliography are presented at the end of each chapter. Answers to the problems and author and subject indices are included at the end of the volume.

On the basis of the table of contents, this work appears to be an informative and valuable text on natural product biosynthesis which emphasizes the biosynthetic pathways in an organic mechanistic approach. This book is recommended by the publishers as a text for undergraduates and graduate students and a reference work for researchers in the field. However, many mechanistic discussions are vague and not very clear. The internal organization of paragraphs is poor. For example, the section on the NIH shift is very confusing for a reader not familiar with this topic. This lack of clarity is found in many other areas of this book. The absence of numbered structures forces the reader to search each figure or reaction sequence for a particular compound that is being discussed in the text. The absence of carbon atom numbering on some of the structures is not helpful. In conclusion, only those scientists well-versed in biosynthetic pathways will find this an easily readable text. The literature cited is very current, and the notable accomplishments of workers in the area of metabolic biosynthetic pathways have been included. The mechanistic approach to biosynthetic processes used by the author is a valuable and informative one.

Reviewed by Marcia Dawson
Life Sciences Division
SRI International
Menlo Park, CA 94025