

New Books

J. F. Gerecht, Book Review Editor

Advances in Steroid Chemistry and Pharmacology, Vol. 3, Edited by M.H. Briggs and G.A. Christie (Academic Press, New York, 1972, 257 p.).

The current volume of this series consists of six chapters by authorities in the diverse steroid areas discussed.

The first chapter, by H. Selye, S. Szabo, P. Kourounakis and Y. Tache, presents rules for the SSS designation of steroids. The SSS (Symbolic Shorthand System for Physiology and Medicine) was devised by Selye in 1956. It names compounds on line-formula notations based on the use of mnemonic symbols, a strict "left-to-right" procedure in coining of terms and avoidance of synonyms or other sources of ambiguity. By the SSS nomenclature, progesterone would be designated as P⁴ on_{3,20} instead of 4-pregnene-3,20-dione as it is in the IUPAC terminology. The authors feel that their system is easier to learn than the IUPAC or Wiswesser systems of nomenclature, but all require considerable knowledge and memorization and the IUPAC system is well established.

The second chapter, by R. Hill, describes preclinical toxicity studies with progestens and estrogens, in which the dog was the test species. In discussing the aim of such studies — predictive value of animal data relative to use in man — it is shown that the dog is certainly not the choice species for studies of steroid contraceptives.

Amino steroids are the theme of the third chapter, by W.R. Buckett. This series of compounds, which includes secondary amino and morpholine derivatives, acetamides, quaternary salts and oximes, displays a variety of types of central nervous system activity. Amino steroids that act as analgesics, muscle relaxants, CNS stimulants and depressants, anesthetics, anticonvulsants and neuromuscular blocking agents are described.

K. Fotherby and F. James discuss the metabolism of synthetic steroids in the fourth review. They compare the metabolism of synthetic estrogens, androgens, progestogens and corticoids in man, animals and in vitro. Very useful tables, including systems used and isolated major products, are provided.

In the fifth article, H. Jackson and A.R. Jones describe the effects of steroids and their antagonists on spermatogenesis. This article includes a discussion of the mechanism of spermatogenesis and how it is affected by androgens, estrogens, progestogens and various antiandrogens. Understanding of this area would be basic to work on development of a male "pill."

The final chapter, by W.W. Yotis, describes the responses of microorganisms to steroids. This review demonstrates that steroids play wider metabolic roles than those related to their mediation of endocrine-controlled processes. The influence of steroids upon microbial metabolism and on the reticuloendothelial system suggests the need for further investigation of their effect upon infectious processes.

The book is easy to read and contains thorough author and subject indices. It should be especially useful to steroid pharmacologists but provides much of interest to all pharmacologists and chemists.

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Blood Lipids and Lipoproteins: Quantitation, Composition and Metabolism, Edited by Gary J. Nelson (Wiley-Interscience Publishers, New York, 1972, 980 p., illustrated, \$40.00).

The formidable task of summarizing valuable research in the broad area of blood lipids and lipoproteins is undertaken in this book; the subject is long overdue and therefore welcome. By no means should this work be considered an all-inclusive exposition of the current status of the field, but the editor did manage to include in one volume valuable information in a field that embraces both lipids and proteins. The effectiveness of such an endeavor becomes less cohesive and spotty when some authors emphasize special accomplishments in so vast a field, as is often the case when 21 contributors work toward common goals. This production is a compilation of 16 chapters with notable contributions from specialists.

The book is divided into three parts: Part I, "Analytical Methods"; Part II, "Formed Elements of Blood"; and Part III, "Soluble Lipoproteins" (314, 151 and 409 pages, respectively).

Part I consists of six chapters: "Handling, Extraction and Storage of Blood Samples," "Quantitative Analysis of Blood Lipids," "Determination of Serum Triglycerides," "Analysis of Blood Lipids by Infrared Spectrometry," "The Isolation and Quantitative Analysis of Serum Lipoproteins" and "Integrated Approach to Plasma Lipid and Lipoprotein Analysis." Missing from this part of the book are specific analytical procedures for each blood lipid, with the exception of serum triglycerides. An entire chapter is devoted to IR technique, which is of only limited use for quantitative analysis of blood lipids. However the chapter of 67 pages contained a wealth of analytical information on IR spectra of lipid classes. Particular emphasis is placed on techniques used in the authors' laboratories, such as the use of automatic apparatus for purification of lipid extracts using Sephadex (Chapter 2) and electrochromatography as a tool of lipoprotein evaluation, phenotyping and separation.

Part II consists of four chapters: "Lipid Composition and Metabolism of Erythrocytes," "Lipid Composition and Metabolism of Leukocytes," "The Lipids of Human Platelets" and "Protein Components and Their Role in the Structure of Red-Cell Membranes." The chapter on erythrocyte lipids is very thorough and deals with the complete analysis of lipid erythrocytes of many species, the influence of diet and disease on blood lipids, and the role of lipids in membrane function and structure. The leukocyte lipids and platelet lipids are equally well treated but limited to human leukocytes and platelets. Studies on erythrocyte-membrane proteins by electrophoretic and solubility characteristics, as well as by physicochemical techniques such as optical rotatory dispersion, circular dichroism, etc., are well treated in the next chapter.

Part III consists of six chapters: "Lipid Composition of Lipoproteins in Normal and Diseased States," "Lipid Class Distribution in Normal and Diseased States," "Fat Absorption and Chylomicron Formation," "Plasma Lecithin: Cholesterol Acyltransferase," "The Apolipoproteins: Their Structure and Functional Roles in Human Serum Lipoproteins" and "Serum Lipoprotein Synthesis and Metabolism." One has but to glance at the subheadings of each chapter to

realize the well assembled and well coordinated treatment of each of the topics discussed. These chapters are valuable reading material for lipid biochemists who wish to broaden their knowledge of blood lipoproteins.

In the 980 pages of this massive volume there is much useful information for those interested in blood lipids and lipoproteins. Each chapter is followed by a long list of references, and the book is endowed with an extensive subject index and an author index.

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Ether Lipids: Chemistry and Biology, Edited by F. Snyder (Academic Press, Inc., New York, 1972, 433 p., \$27.50).

Although the occurrence of glyceryl ethers of long chain fatty alcohols in fish oils and aldehydogenic compounds in tissues was described almost 50 years ago, it was only during the last decade that major efforts were made to study the chemistry and metabolism of these minor lipids. While the chemistry of these compounds is now well understood, progress in studies on their metabolism and functions in cells and tissues has been slow. Thus, while dihydroxyacetone phosphate and long chain fatty alcohols have been shown to be the precursors of alkyl and alk-1-enyl glycerolipids in animal cells and tissues, evidence against such a pathway in bacterial systems is accumulating. Aside from the postulated role of alkyl glycerols in the maintenance of buoyancy in certain fish, virtually no information is available on the biological significance and functions of plasmalogens.

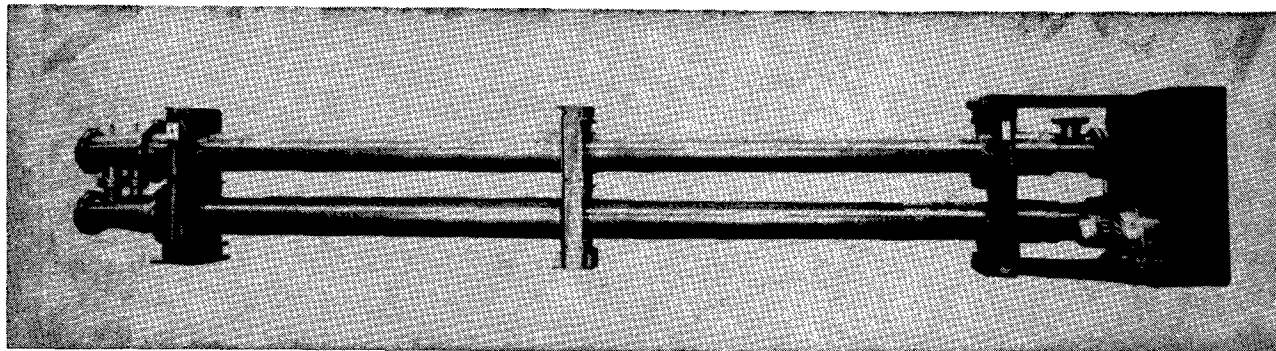
This book is a compilation of all available published information on the chemistry, biology and biomedical

applications of ether-linked lipids, and consists of 16 chapters. A lucid description of the discovery of plasmalogens and glyceryl ethers is given in Chapter I. The chemistry and analysis of these compounds as well as the reactions they undergo are well treated in Chapter II. Chapters III, IV and VI deal with chemical synthesis of alkyl glyceryl ethers, glyceryl ether esters, alkoxy phosphatides, S-alkyl ethers, hydroxy and methoxy O-alkyl ethers and O-alkyl dihydroxyacetone phosphate. An excellent review of the numerous attempts towards chemical synthesis of plasmalogens is provided in Chapter V. The enzymatic synthesis of alkyl and alk-1-enyl ethers of glycerol in animal tissues and cell-free systems is discussed in Chapter VII, and the meager and conflicting studies on toxic and therapeutic properties of these lipids are summarized in Chapter VIII.

Chapters IX-XIV are devoted to reviews of the distribution, composition and metabolism of the O-alkyl and alk-1-enyl lipids in mammals and birds, neoplasms, marine organisms, molluscs, protozoa and bacteria, thus providing a comparative approach to the biochemistry of these lipids. The composition of the alkyl and alk-1-enyl and acyl moieties in the ether-linked lipids is presented in each chapter, and discussed in relation to the interconversion between fatty acids, alcohols and aldehydes and their roles as precursors in alkyl and alk-1-enyl ether synthesis. Possible functions of these lipids in the various organisms studied, although speculative, are discussed. The detailed studies on structure and configuration of dialkyl ether lipids of halophilic bacteria (Chapter XV) are extremely interesting. The last chapter, Chapter XVI, is appropriately titled "The Search for Alkoxylipids in Plants."

The authors, who have all contributed to our current knowledge of these compounds, have not only written a review but have also provided a comprehensive critical

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account of their respective areas of research. Some amount of repetition or overlapping is inevitable in a book of this kind, in which different authors deal with the same topic and different chapters are closely related, but this is kept to a minimum. This book should prove valuable to biochemists as a source of information on ether-linked lipids. However the cost of \$27.50 may prohibit individual purchase.

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Pharmacological Control of Lipid Metabolism, Edited by W.L. Holmes, R. Paoletti and D. Kritchevsky (Plenum Press, New York, 1972, 359 p., \$22.50).

This book constitutes Volume 26 of *Advances in Experimental Medicine and Biology* and is a collection of the papers presented at the Fourth International Symposium on Drugs Affecting Lipid Metabolism held in Philadelphia, Pennsylvania, September 8-11, 1971. This symposium was first held in 1960 and has been aimed at introducing new concepts in the area of lipid metabolism and drugs. The content of this book is essentially divided into three sections. The first section, "Newer Developments in Lipid Biochemistry," contains review articles on synthesis and secretion of plasma lipoproteins, chemistry of apolipoproteins and the mechanism of hyperlipoproteinemia, as well as some studies on lipolysis in adipose tissue and on progression and regression of atherosclerosis in pigeons. The second section, "Newer Aspects of Drugs Affecting Lipid Metabolism," is a collection of papers dealing with effects of drugs on metabolism of free fatty acids, plasma or tissue triglycerides, bile acids and plasma lipoproteins and also with treatment of hyperlipidemia and hypercholesterolemia. In the third section, entitled "Can Heart Disease Be Postponed or Prevented?" some opinions or philosophies on atherogenesis, various risk factors and possible approaches

to prevention of coronary heart disease are presented. At the end of this book, abstracts of other papers submitted to the symposium are included.

Since this symposium is devoted mainly to pharmacological and other means for control of atherosclerotic vascular disease, due emphasis is placed on plasma lipoproteins, which carry all cholesterol and other lipids in plasma. Hamilton provides a short review on the secretion of very low density lipoproteins, chylomicrons, low density lipoproteins and high density lipoproteins, although current information is very limited, especially on the latter two classes of lipoproteins. In an article on apolipoproteins, Fredrickson et al., review current nomenclature of apolipoproteins and summarize well the methods used for fractionation and characterization of apolipoproteins and some chemical features of six major proteins recognized as constant constituents of plasma lipoproteins. As the authors claim, this article serves as a handy guidebook for those to whom the terrain of the apoproteins may be new and confusing. Current knowledge of fat transport in lipoproteins and pathogenesis of secondary hyperlipoproteinemias is reviewed by R.J. Havel. A speculative view of primary hyperlipoproteinemias is also presented.

Most of the papers in the section "Newer Aspects of Drugs Affecting Lipid Metabolism" are somewhat limited in scope. This is inevitable due to the multiple effects of hypolipidemic agents on lipid metabolism. As pointed out by Levy and Langer, even though hypolipidemic drugs have primary effects on the intermediary metabolism of cholesterol and other lipids, their secondary effects on lipoprotein metabolism ultimately affect plasma lipid concentrations. A promising approach to study of the effect of drugs on lipoprotein turnover is described by these workers. The reader also finds that various types of hyperlipoproteinemias do not necessarily respond to the same type of therapy, thus indicating the importance of differentiation of hyperlipoproteinemias in patients and of proper selection or combined use of hypolipidemic agents together with appropriate dietary manipulations.

The search for hypocholesterolemic or hypolipidemic agents is based on the assumption that reduction in serum cholesterol or in low density lipoproteins and very low density lipoproteins may prevent the incidence of coronary atherosclerosis. However, as described in the third section of this book, unequivocal proof for this hypothesis has not been provided. Page points out that prevention of coronary heart disease would more likely be achieved if we knew the cause of atherosclerosis. Intensified studies appear necessary for understanding the multiplicity of atherogenesis, the metabolism of lipoproteins and the multiple causes of hypolipidemic disorders.

Since this book is a collection of review or research papers presented at the symposium, the range of topics is diversified and not as well coordinated as similar collections. However those people working on the pharmacological aspects of atherosclerosis and on lipid metabolism in relation to atherosclerosis may find it useful in reviewing the complexity of the problem.

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Obituary

Word has been received of the death of AOCS member Koji Hayashibe. He was employed by Nippon Yuryo Kentei Hyokai, Naka-Ku, Yokohama, Japan, and was a referee chemist. ■

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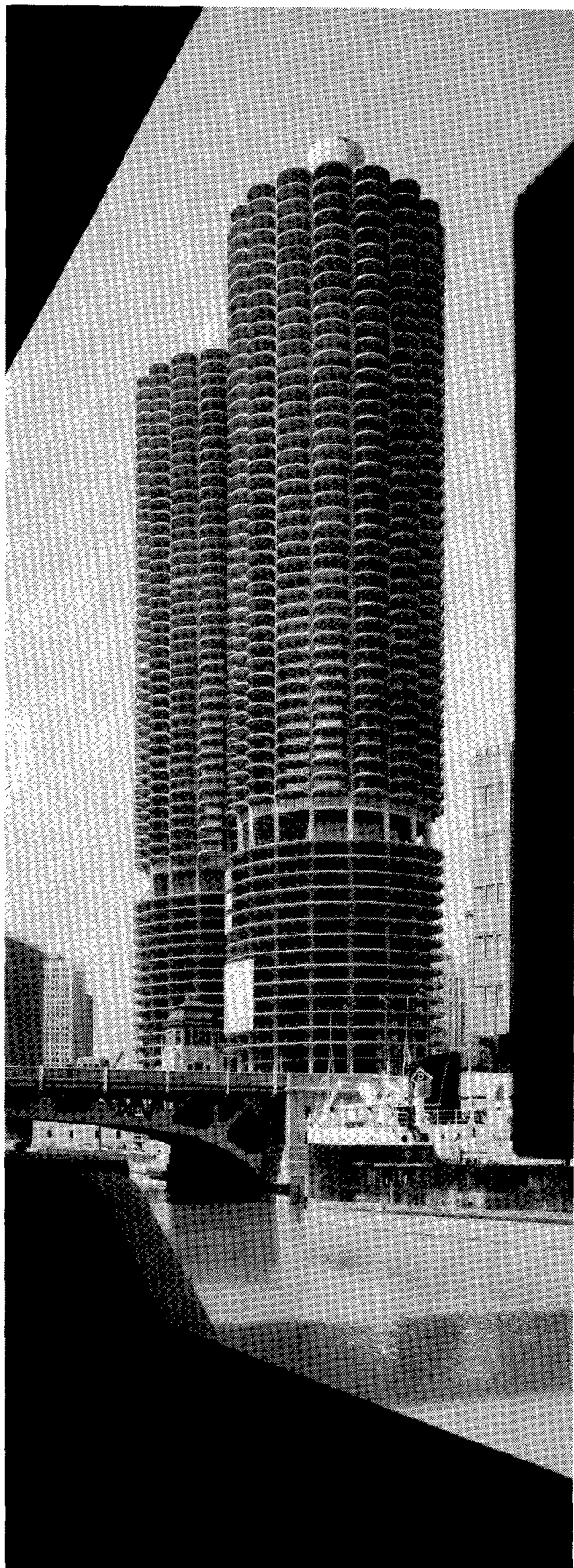
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Analysis of Lipids and Lipoproteins

June 17-20, 1973

Ramada Inn

Champaign, Illinois

The 1973 AOCS Summer Conference on Analysis of Lipids and Lipoproteins, is designed to cover broadly the areas of lipid isolation, separation and characterization. Virtually all classes of lipids will be taken into account in the discussion.

The last time a conference of this nature was held was in late 1964 at Pennsylvania State University. Since that conference, many new developments and advances in lipid methodology have occurred. These will be discussed by the participants in Champaign.

The section on separation and characterization will appeal to all types of lipid chemists, while the section dealing with lipoproteins will be of special interest to chemists with a clinical orientation, as will the discussion on the use of TLC and automated analysis in the clinical laboratory. The presentation concerning L/S ratio techniques will be of certain interest to the clinical lipid biochemist.

Papers will be presented by individuals who are actively engaged in laboratories and who are currently practicing the techniques they will be discussing. Emphasis will be placed on the practical aspects of the techniques to be presented.

Program Chairman: E.G. Perkins, Professor of Food Chemistry, Burnsides Research Lab., Dept. of Food Science, University of Illinois, Urbana.

Technical Program

Monday

1. Isolation of Lipids from Tissues
G. Nelson, Senior Staff Scientist, Biomedical Div., Lawrence Livermore Lab., University of California, Livermore.
2. GLC of Lipid Derivatives
N. Pelick, Chairman of the Board, Supelco, Inc., Bellefonte, Pa.
3. GLC of Neutral Lipids
A. Kuksis, Associate Professor, Banting and Best Dept. of Medical Research, University of Toronto, Toronto, Canada
4. Qualitative and Quantitative Aspects of Neutral Lipid TLC
F. Snyder, Head of Biological Chemistry, Oak Ridge Associated Universities, Oak Ridge, Tenn.
5. Fractionation of Phospholipids
G. Nelson

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6. Separation of Complex Lipids: Gangliosides, Galactosides, Sphingolipids, etc.
L.A. Witting, Associate Professor, Dept. of Food Science and Nutrition, Texas Woman's University, Denton
7. Structure Determination of Lipids Using Chemical Means
B.L. Walker, Associate Professor, Dept. of Nutrition, University of Guelph, Guelph, Ontario, Canada

Tuesday

8. Analytical Liquid Chromatography of Lipids
O. Privett, Professor, The Hormel Institute, Austin, Minn.
9. New Techniques in Lipid Analysis: Isomeric Fatty Acids
H.J. Dutton, Head, Chemical and Physical Properties Investigations, Oilseed Crops Lab., Northern Regional Research Lab., USDA, Peoria, Ill.
10. NMR of Lipids: Use of Chemical Shift Reagents
P.E. Pfeffer, Research Chemist, Eastern Marketing and Nutrition Research Div., USDA, Philadelphia, Pa.
11. Mass Spectrometry of Lipids (General)
W.K. Rohwedder, Principal Chemist, Oilseeds Crops Lab., Northern Regional Research Lab., USDA, Peoria, Ill.
12. GC-MS: Pyrolysis of Lipids
E.G. Perkins, Professor, Dept. of Food Science, University of Illinois, Urbana
13. Nutritional Aspects of Lipid Research
B.L. Walker
14. Centrifugal Methods for the Separation and Analysis of Lipoproteins
F.T. Lindgren, Research Biophysicist, Donner Lab., University of California, Berkeley

Wednesday

15. Electrophoretic Methods for Lipoprotein Separation
K.A. Narayan, Research Nutritionist, Food Lab., U.S. Army Natick Labs., Natick, Mass.
16. Fluorescence Methods for Study of Lipids and Lipoproteins
T. Nishida, Professor, Dept. of Food Science, University of Illinois, Urbana
17. Newer Techniques for the Study of Lipoproteins
A. Scanu, Professor of Medicine and Biochemistry, Pritzker School of Medicine, University of Chicago, Chicago, Ill.
18. Automated Methods of Lipid Analysis
D. Kemper, Director of Biochemistry, Gilford Instrument Co., Oberlin, Ohio
19. Use of TLC in Lipid Clinical Laboratory
P. Tocci, Director of Biochemical Genetics, Assistant Professor of Pediatrics and Biochemistry, University of Miami Medical School, Miami, Fla.
20. Lecithin-Sphingomyelin Ratio Technique in Assessment of Amniotic Fluids
L. Gluck, Professor of Pediatrics and Obstetrics, School of Medicine, University of California, San Diego, La Jolla