
Publications

Book reviews

Developments in Food Science 1: Aflatoxins: Chemical and Biological Aspects, by J.G. Heathcote and J.R. Hibbert (Elsevier Scientific Pub. Co., 52 Vanderbilt Ave., New York, NY 10017, 1978, 212 pp. \$53.50).

The authors' starting premise is that, since a decade has elapsed since Goldbatt's classic book on aflatoxin, the time has come to catch up on everything that has happened since that time. Reasonably comprehensive coverage is provided on the discovery of the aflatoxins, production, chemistry, assay, pathological effects, metabolism, biosynthesis and control of aflatoxins. Since the book has essentially only two authors the text flows from topic to topic in a relatively smooth manner without excessive duplication. The chapter on assay methods is organized along product lines, peanuts, cottonseed, cereals, milk, meats, coffee, cocoa beans and miscellaneous materials. Sample clean-up is discussed for each product and emphasis is on chromatographic procedures. The various minicolumns, e.g., Velasco and Holaday, and their various modifications by Pons, Stubblefield and others receives extensive coverage. TLC methods are also described in detail. Several topics such as aflatoxin M₂ and HPLC are barely mentioned. An extraordinary incidence of aflatoxin contamination in the southern United States a couple of years ago resulted in a surge of interest and activity in minicolumn screening techniques. At about the same time, progress was made in the application of HPLC to aflatoxin analysis. Through no fault of the authors some of the more recent significant advances in this field thus escaped coverage.

Although the text is apparently set in type, the right margin is not justified. Figures, including histological sections, are clear and of good quality. The authors have an aversion to simple direct sentences and personally I had a terrible time staying with this book. Despite the publication date the literature citations stop at 1976. The price seems extremely high at just over \$0.25/page.

Vitamin E, A Comprehensive Treatise, edited by L.J. Machlin (Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016, May 1980, 660 pp., \$79.50).

This apparently is the longest and most comprehensive text on vitamin E since 1962 (*Vitamins and Hormones* 20, 1962). The book is divided into 12 sections; history, chemistry, assay methods, tocopherols in foods, biochemistry, role in plants, microbes, invertebrates and fish, pathology, immune response, stabilization of milk and meat, environmental effects, health and disease and epilog. One of the high points is the massive chapter (100 pp.) by Farrell on deficiency states, pharmacological effects and nutrient requirements in man. The section on cystic fibrosis is particularly recommended. Farrell has gone through the clinical literature (over 300 references) in detail including the reports of the Shutes. As he states, the literature bearing on pharmacologic use of vitamin E is voluminous and replete with contradictory statements. Very little wheat is to be found among the

chaff. This chapter should be required reading for physicians recommending vitamin E for any condition unrelated to malabsorption.

It would seem that a book on vitamin E should be able to keep the nomenclature of the tocopherols straight, or at least consistent, particularly when the second chapter includes an extensive description of IUPAC recommendations. On page 433 it is [dl], on page 482 *d,l* and on page 498 *d,l* - α -tocopherol. None of these are in accord with the recommendations on page 17. In all but one case, (p. 76, par. 1) Chapter 3 refers incorrectly to δ (delta)-tocopherol as ζ (zeta)-tocopherol. Before getting down to the serious problems with this book it should be noted in passing that the number of minor errors is relatively high. Representative samples include: p. 291: pentavalent carbon; p. 480: trivalent carbon; p. 222: figure 11 and p. 240: figure 24 provide no clues to the identity of the lines; p. 228: table 7 has 2 identical headings but different sets of numbers (one might guess that the second heading should be micrograms per organ rather than micrograms per gram tissue); p. 291 and p. 293: the chemical structures used in the text and in figure 1 to describe initiation of lipid peroxidation do not agree; p. 181: "Other studies have lend support to these conclusions;" p. 279: "muscle dystrophy;" p. 498: "...: HO \cdot is also a product of lipid oxidation and it is among the most reactive of free radicals exposed to human beings."

The reader is severely jarred by the statement (p. 8) "This review covers the literature up to June, 1975." "More recent work" (p. 338) is found to be a citation of a 1964 reference and "an interesting new theory" (p. 343) appeared in 1973. One also finds statements such as (p. 403) "Relatively little is known about the specific biological function of selenium." Corwin (the role of vitamin E in mitochondrial metabolism) focuses largely on studies reported between 1956 and 1965. Molenaar, Hulstaert and Hardonk (function and ultrastructure of cell membranes) reach rather different interpretations based on somewhat more recent work. A study reporting normal blood levels of tocopherol in Battens disease (p. 335) is cited to support the contention that tocopherol may not act as an in vivo antioxidant. Such an interpretation completely ignores the existence of multiple enzymatic defense systems which protect against free-radical initiated tissue damage. The statement, (p. 237) "These findings have led Tappel (226) and Witting (227) to suggest that vitamin E in biologic systems might form a redox complex with vitamin C" actually leads Witting to protest vigorously. The reference cited (227) contains no mention of vitamin C and I completely disavow the suggestion. I would also claim to be misquoted on p. 504. "This has been attributed to selective peroxidative destruction of polyunsaturated fatty acids, particularly arachidonic acid, (45)." Exception is taken in this case to the phrase—particularly arachidonic acid. In discussing the E:PUFA ratio of Harris and Embree the statement is made (p. 606) "This is of course less than the 0.6 level which was prematurely accepted before adequate experimental confirmation (309)."

Who would guess from this phraseology that reference 309 is an editorial raising numerous objections to the ratio? Elaboration on several pages of the notes made while reading this book would only belabor the issues. Suffice it to say that: (a) while many of the chapters were excellent when written, the book is, on balance, out of date at this time; and (b) the citations and interpretations in some chapters do not always appear to be completely accurate. Reviews and symposium volumes on vitamin E are published every few years. In this case perhaps it might be preferable to wait for the next one.

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Clinical Nutrition for the Health Scientist, by D.A. Roe, (CRC Press, 1979, 126 pp.).

The aim of this manual is to acquaint health professionals such as physicians, nurses and pharmacists with the basic principles of nutrition and the application of this knowledge to the better delivery of health care.

The first section deals with the determinants of food intake. Concise descriptions of the cultural, social, personal, situational and medical influences on food choice are presented. This is followed by a section on food fallacies and some comments on the effect of smoking on eating habits.

Basic and applied concepts of human nutrition are presented in Section 11. Here the author defines food energy and nutrients, discusses energy requirements and the function, sources and requirements of all major nutrients. Also included are an explanation of recommended dietary allowances and discussions on dietary fiber, food additives and the special dietary requirements during pregnancy and lactation, and infant feeding. These topics are followed by descriptions of chemically defined diets and the indications for tube feeding or parenteral hyperalimentation. The section concludes with a consideration of the methodologies involved in nutritional assessment. This part contains many useful tables and sample questionnaires needed for the assessment of nutritional status.

The next section on the abuse of food substance deals, at some length, with obesity, its causes and treatment, and then briefly with nutrition and cancer, fat, cholesterol and coronary heart disease, salt and hypertension, diabetes and diet, sugar and dental caries, coffee, indigestion and antacid abuse, and the causes and management of constipation. The final part of this section deals with the risks of megavitamin therapy, hypervitaminoses and the consequences of mineral overloads.

The epidemiology of malnutrition is the subject of Section IV. The author considers the common nutritional deficiencies and factors determining their risk. This is followed by discussions of malnutrition in the hospitalized patient, nutrient deficiencies in people on special diets, malnutrition in newborn infants and in alcoholics.

An important question to health specialists is considered in Section V, namely, drug-nutrient interactions and incompatibilities. The final section outlines a team approach to nutritional care in the health delivery system.

This is an excellent book. It is short but packed with information. One very good feature is the table of contents which is very detailed, making for ready reference. Readers of *JAOCS* who have not specialized in nutrition would find this a handy little reference manual.

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Nutritional Management of Genetic Disorders. Current Concepts in Nutrition, Vol. 8, edited by Myron Winick, (John Wiley & Sons Inc., 1979, 231 pp., \$24.50).

This volume brings together current knowledge in the area of nutrition and genetic diseases. While most of the diseases discussed are those involving inborn errors of metabolism, others which simply have a genetic component, such as diabetes mellitus, are also considered.

The opening chapter by DeLuca considers vitamin D-resistant rickets as a prototype of nutritional management of a genetic disorder. This is followed by a part on proteins and amino acids. There is a discussion of dietary restriction in inborn errors of amino acid metabolism; and in the second chapter the use of cofactors in these inborn errors is considered. The third chapter deals with the use of keto acids in inborn errors of urea synthesis. Lactose and other carbohydrate intolerances are considered in part three. The next section includes an account of the genetics of diabetes mellitus and discussions on the nutrition management of adult, juvenile and pregnant diabetics.

The last three parts are on lipids. There are chapters on genetic obesity in man and rodents, human mutations affecting the low density lipoprotein pathway and nutrition management of hyperlipidemia. The final chapter is an account of the use of corn oil and vitamin E supplementation in cystic fibrosis.

There is some unevenness regarding the depth with which each subject is treated but this must be expected in an emerging field. For example, much has been learned about vitamin D-resistant rickets so the opening chapter is a lengthy review. The last chapter, on the other hand, is an account

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of a pilot study on attempts to overcome the effects of fat malabsorption in cystic fibrosis.

This volume will mainly be of interest to physicians and clinical nutritionists.

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Report of the High Density Lipoprotein Methodology Workshop, (NIH Publication No. 79-1661, 1979, 398 pp., available free from Kenneth Lippel, Lipid Metabolism Branch, Federal Building, Room 4A10, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD 20205).

This report covers the workshop convened by the Lipid Metabolism Branch of National Heart, Lung, and Blood Institute on March 12-14, 1979, in San Francisco. The report consists of (I) Overview of High Density Lipoproteins, (II) Separation of Total HDL, (III) Quantitation of HDL Lipids, (IV) Immunoassay and Isoelectric Focusing of Apolipoproteins and (V) Separation and Analysis of HDL Subclasses. It recently has been demonstrated by population studies that an inverse relationship exists between HDL cholesterol levels and occurrence of coronary heart disease. This demonstration led to the postulation that HDL in some manner exerts antiatherogenic effects. Consequently, a number of laboratories have become involved in the measurement of HDL cholesterol and the separation and quantitation of total HDL, HDL subclasses and their lipid and apolipoprotein components. The report is especially useful in identifying the advantages and disadvantages of currently used separation and analytical methods as well as a number of unresolved questions related not only to methodology, but also to the structure, function and metabolism of HDL.

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Free Radicals in Biology, Vol. IV, edited by William A. Pryor (Academic Press, Inc., 111 Fifth Avenue, New York, NY 10003, 1980, 348 pp., \$46).

This is the latest volume of a well known review series of free radical biology edited by W.A. Pryor. The 10 chapters of this volume deal with several aspects of free radical biology. The chapters are written by well established investigators in the respective subspecialized areas.

In chapter 1, A.L. Tappel details the chemical basis of the formation and the biological significance of lipid peroxidation products, lipid soluble fluorescent products and exhaled pentane, as measurements of *in vivo* lipid peroxidation, as well as the protection against lipid peroxidation damage by the seleno-enzyme glutathione peroxidase. In Chapter 2, E.S. Reynolds and M.T. Moslen elucidate the possible mechanism of free-radical-initiated hepatotoxicity by a variety of xenobiotics, especially the halogenated compounds CCl_4 and halothane. In Chapter 3, L.S. Myers Jr.

describes the free radical involvement during radiation damage to nucleic acids and related components, with special emphasis on the direct absorption of energy from ionizing radiation.

E.G. Janzen expounds in chapter 4 on the background and methods of detecting free radicals in biological systems by electron spin resonance (ESR) and spin trapping techniques. Spin trapping is an indirect ESR method of detecting free radicals. The technique depends upon the reaction of highly unstable radicals with a spin trap to yield a free radical product which is stable and yields ESR parameters that reflect the nature of the trapped radical. Thus, the free radical can be studied more conveniently by the ESR method. In Chapter 5, P.B. McCay and associates comment on the application of the spin trapping method to the study of enzymes and other biological systems, including living animals.

The nature and relationship between free radicals and cancer have been the subjects of considerable recent interest. In Chapter 6, R.A. Floyd examines the possible mechanisms for the conversion of arylamine compounds to active carcinogens by free radical events. In Chapter 7, R.C. Sealy and coworkers discuss the use of ESR techniques in the study of the structure and reactivity of melanins. Melanins are biological polymers that contain stable free radicals and are largely responsible for pigmentation in animals. The possible role of free radicals in the biosynthesis of prostaglandin endoperoxides is presented in detail in Chapter 8 by N.A. Porter. In Chapter 9, L.A. Witting reviews the kinetic aspects of free-radical-initiated lipid oxidation reactions and the role of vitamin E and other antioxidant defense systems in controlling such reactions. In the last chapter, K. Ostrowski and associates cover the application of ESR techniques to the study of radiation-induced defects in bones and other calcified tissues.

Considerable portions of this volume have been devoted to the principle and application of ESR and spin trapping techniques for the study of free radicals in biological systems. The ESR-spin trapping method, when further characterized and refined, will enable investigators to probe mechanisms of free radical reactions in normal as well as pathological biological processes. With this and other approaches, the fundamental questions that hinder the understanding of the precise role of free radical *in vivo*, such as the very origin of the free radical that initiates lipid peroxidation reactions, the fate of free radicals and their products and compartmentalization of free radical cellular damage, may be answered in the near future.

The references cited in each chapter are current and rather extensive. Because of the nature of the subject matter, however, several chapters of this volume deal with highly specialized aspects that probably could be appreciated fully only by researchers interested in those particular areas. The recent recognition of possible involvement of free radicals in the cytotoxicity of a number of chemicals and environmental agents have greatly enhanced the interest in free radical biology by research workers of various disciplines. Therefore, this volume is timely and should be an excellent information source for graduate students and researchers in the fields of chemistry, biology, toxicology and others.

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