



Role of Trace Elements for Health Promotion and Disease Prevention: Proceedings of the 1996 Annual Meeting of the European Academy of Nutritional Sciences, edited by Brittmarie Sandström and Paul Walter, 1998, 170 pages, hardcover, \$198.25. S Karger, AG, Basel, Switzerland.

The term "health promotion and disease prevention" has generally become euphemistic for measures to retard or avert the development of chronic diseases common to populations in affluent countries in later life. Because trace elements are implicated in the formation of free radicals, which are associated with genetic damage and tissue oxidation, and because the mechanisms of free radical formation are increasingly being implicated in the etiology of chronic degenerative diseases, it is not unreasonable that a book entitled *Role of Trace Elements for Health Promotion and Disease Prevention* was published.

Fifteen chapters have been crammed into 164 pages (134 pages of text and 33 pages of bibliography containing 709 citations) of a high-priced hodgepodge of presentations; the chapters are derived from the sessions of the August, 1996, annual meeting of the European Academy of Nutritional Sciences of the same title. The book is divided into 3 sections: "Trace Element Intake and Status" (7 chapters), "Trace Elements, Growth and Development" (4 chapters), and "Trace Elements and Chronic Disease" (4 chapters).

The first section contains an overview by the senior coeditor and 3 chapters each relating to the intake and status of trace elements. The intakes reported are generally those in Europe: one chapter discusses all elements and addresses the entire Continent; another chapter addresses food fortification, specifically that with iodine and iron; and the third chapter is a generic review of definitions and issues concerning the biological availability of trace elements. Topics of trace element status include iodine status in Austrian juveniles, iron deficiency and cognitive function, and a generic summary concerning deficiencies of all trace elements.

The second section apparently reflects the "health promotion" portion of the title. The growth and maturation of immune cells, fetuses, and young children are considered. Worth mention is a superb and unique meta-analysis of 25 published studies in which oral zinc was given to children with impaired growth.

The third section focuses on 3 diseases (bone disease, cancer, and cardiovascular disease), which are considered from the point of view of "disease prevention." To some extent, all 3 diseases are discussed in the context of trace element deficiency and toxic excess. In their entirety, the reported insights on trace elements and chronic diseases are less comprehensive, informative, and balanced than are comparable topics in the National Research Council document of 1990 (1).

The chapters are organized in various ways. Some authors present original data, including methods and results sections, whereas others provide a review of the literature, ranging from

Book Reviews

superficial to profound. There are chapters that surprise. For instance, in one chapter I learned that Austria had only had obligatory salt iodization for 6 y at the time of the meeting; otherwise, however, this chapter lacks important details about the methods used and presents internal inconsistencies in the findings cited. There are chapters that frustrate, such as one concerning the safety and adequacy of trace element intakes. For example, the provisional tolerable daily intakes (PTDIs) of trace elements are provided as the standard for determining toxicity, and trace element intakes are discussed as being above or below the PTDI; however, no listing of toxic cutoff intakes is provided for reference.

In summary, the book is an odd assortment of chapters that strangely interpret "health promotion" in the context of growth and development. With 17 of the 20 authors working in or having been born in Europe, at times the book's development seems to struggle between Eurocentricity and universal relevance; the former wins out in the end. Only 4 chapters are of outstanding quality; 2 of these are reviews of basic concepts such as might be found in a generic textbook on trace elements or general nutrition. The book's strength is its examination of both trace element deficiencies and overloads and its focus on the etiology of so-called "diseases of affluence." Otherwise, it adds little to the bookshelf of either nutritional epidemiologists or of trace element biologists.

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REFERENCE

1. National Research Council. Diet and disease: implications for chronic disease risk. Washington, DC: National Academy of Sciences Press, 1990.

IARC Handbooks of Cancer Prevention: Carotenoids, by the IARC Working Group on the Evaluation of Cancer Preventive Agents, Vol 2, 1998, 326 pages, softcover, \$135.00. Oxford University Press, Oxford, United Kingdom.

This is an outstanding book that addresses comprehensively the perennial question asked by the famous carrot-chomping cartoon rabbit, "Eh, what's up Doc?" In fact, the many different carotenoids found in fruit and vegetables are a fascinating group of compounds with highly significant implications for nutrition at many levels. The book covers the chemical and physical characteristics of carotenoids and the commercial sources of, use and application of, analysis of, and human exposure to carotenoids.

In addition, the metabolism of carotenoids, the kinetics and genetic variation of carotenoids in humans and other species, and the preventive and beneficial effects, the carcinogenicity, and other toxic effects of these compounds are also discussed. The book recommends that future research include investigation of better biomarkers, investigation of better animal models, more intervention studies, investigations of food composition, and studies to develop a better understanding of the metabolism of carotenoids and mechanisms of carcinogenesis. The discontinuation of 2 large clinical trials of β -carotene supplementation—the Alpha-Tocopherol Beta-Carotene Cancer Prevention Study and the Carotene and Retinol Efficacy Trial—left many questions unanswered when evidence was found that prospective β -carotene supplementation increased the incidence of lung cancer in heavy smokers. The unexplained effect of β -carotene was made more biologically plausible by the retrospective observation that the increased trend in new cancers could be traced linearly back to early times after exposure. The failure to observe a similar increase in cancer incidence after β -carotene supplementation of healthy men in the Health Professionals Study cohort led to the hypothesis that the smokers' metabolism of carotenoids played a special role in cancer promotion, perhaps by converting antioxidant molecules to prooxidant molecules. These intervention-trial findings were in stark contrast with the

epidemiologic findings that higher dietary intakes of β -carotene and higher blood concentrations of β -carotene were associated with a 20–50% decreased risk of lung cancer when persons with the highest concentrations were compared with persons with the lowest concentrations. How should carotenoid intakes from food be ensured or the diet supplemented when many populations clearly do not eat adequate amounts of fruit and vegetables? How do carotenoids interact with each other and with other antioxidants? For those interested in the chemistry, biology, and anticancer properties of carotenoids, this book is an excellent place to begin to explore the epidemiologic, animal science, human metabolism, and clinical intervention trial data in great detail. This book is suitable for postdoctoral fellows, professors, institutional libraries, and those in the government and industry who are interested in this important area of research.

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