NUTRITION: BASIC AND APPLIED SCIENCE

A Series of Monographs

NUTRITIONAL TOXICOLOGY

Volume II

Edited by

John N. Hathcock

Nutritional Toxicology

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JOHN N. HATHCOCK

Experimental Nutrition Branch
Food and Drug Administration
Washington, D.C.

1987

ACADEMIC PRESS, INC.
Harcourt Brace Jovanovich, Publishers
Orlando San Diego New York Austin
Boston London Sydney Tokyo Toronto

ACADEMIC PRESS, INC.
Orlando, Florida 32887

United Kingdom Edition published by
ACADEMIC PRESS INC. (LONDON) LTD.
24–28 Oval Road, London NW1 7DX

Library of Congress Cataloging in Publication Data
(Revised for vol. II)

Nutritional toxicology.

(Nutrition, basic and applied science)
Includes bibliographies and index.
1. Nutritionally induced diseases—Collected works.
2. Nutrition—Collected works. I. Hathcock, John N.
II. Series. [DNLM: 1. Food contamination. 2. Food additives—Adverse effects. 3. Food poisoning.
WA 701 N976]
RC622.N894 1982 616.3'99 82-4036
ISBN 0–12–332602–8 (v. 2 : alk. paper)

PRINTED IN THE UNITED STATES OF AMERICA

87 88 89 90 9 8 7 6 5 4 3 2 1

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A SERIES OF MONOGRAPHS

WILLIAM J. DARBY, Editor
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Anthony W. Norman. *Vitamin D: The Calcium Homeostatic Steroid Hormone*, 1979.

Donald S. McLaren (Editor). *Nutritional Ophthalmology*, 1980.

John N. Hathcock (Editor). *Nutritional Toxicology*, Volume I, 1982. Volume II, 1987.

J. Christopher Bauernfeind (Editor). *Vitamin A Deficiency and Its Control*, 1986.

Contributors

Numbers in parentheses indicate the pages on which the authors' contributions begin.

Steven A. Belinsky[1] (41), Department of Pharmacology, University of North Carolina, Chapel Hill, North Carolina 27514

S. Berger (281), Institute of Human Nutrition, Warsaw Agricultural University, Warsaw, Poland

Jack Bergman (199), Harvard Medical School, Boston, Massachusetts 02115

C. Elizabeth Castro (129), Helicon Foundation, San Diego, California 92109

Joel R. Coats (249), Department of Entomology, Iowa State University, Ames, Iowa 50011

K. Cwiek (281), Department of Food Research, National Institute of Hygiene, Warsaw, Poland

P. B. Dews (199), New England Regional Primate Research Center, Southborough, Massachusetts 01772

Janet L. Greger (223), Nutritional Sciences Department, University of Wisconsin, Madison, Wisconsin 53706

Walter A. Hargraves (157), ABC Research Corporation, Gainesville, Florida 32607

Frederick C. Kauffman (41), Department of Pharmacology, University of Maryland, Baltimore, Maryland 21201

Kamala Krishnaswamy (105), National Institute of Nutrition, Hyderabad, India

Helen W. Lane (223), Department of Nutrition and Foods, Auburn University, Auburn, Alabama 36830

[1]Present address: S.A.B. National Institute of Environmental Health Sciences, P.O. Box 12233, Research Triangle Park, North Carolina 27709.

Mohsen Meydani (1), USDA Human Nutrition Research Center on Aging at Tufts University, Boston, Massachusetts 02111

Helmut K. Seitz (63), Alcohol Research Laboratory, Department of Medicine, University of Heidelberg, Heidelberg, Federal Republic of Germany

Ulrich A. Simanowski (63), Alcohol Research Laboratory, Department of Medicine, University of Heidelberg, Heidelberg, Federal Republic of Germany

Steve L. Taylor (173), Food Research Institute, University of Wisconsin, Madison, Wisconsin 53706

Ronald G. Thurman (41), Department of Pharmacology, University of North Carolina, Chapel Hill, North Carolina 27514

Preface

During the past few years nutritional toxicology has become increasingly recognized as an important new discipline with unique value as a scientific viewpoint. This perspective that nutrition and toxicology are fundamentally linked has led and continues to lead to a new and deeper understanding of each discipline. The intensity and diversity of interactions between nutritional phenomena and toxicologic processes and end points require extensive specification of experimental conditions for results to be predictable. Nutrients modify toxic responses and toxicants modify nutritional requirements and responses.

The purpose of this book is to expand on the topics covered in Volume I of Nutritional Toxicology. More specifically, it addresses particular subjects that have become substantially more important through the development of new knowledge, significant increases in knowledge, or increased awareness of potential effects on human health and well-being. The implications of such knowledge have impact on basic research, toxicity testing, public health, food and agriculture programs, and food safety regulation.

John N. Hathcock

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Nutritional Toxicology

VOLUME II

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Dietary Effects on Detoxification Processes

Mohsen Meydani

I. INTRODUCTION

Humans and animals are continuously exposed to wide varieties of chemical compounds which have some deleterious effects on well-being. The requirement of riboflavin for reduction of carcinogenic azo dye 4-methylaminobenzene by liver homogenates was the stimulating observation of Mueller and Miller (1950), which attracted a broad spectrum of scientists to investigate the role of nutrients on the metabolism and detoxification of foreign compounds. Chemical compounds foreign to the body, such as natural food products, food additives, pesticides, and industrial products, by-products, and pollutants are collectively named xenobiotics. Xenobiotics, after entry into the body, undergo metabolic changes whereby lipid-soluble compounds are converted into polar, water-soluble products and excreted from the body.

Several groups of enzymes participate in the biotransformation and detoxification of xenobiotics as well as in the metabolism of the endogenous substances such as fatty acids, prostaglandins, cholesterol, steroids, and vitamins. Some of the biotransformation process may take place in one tissue such as the liver and

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