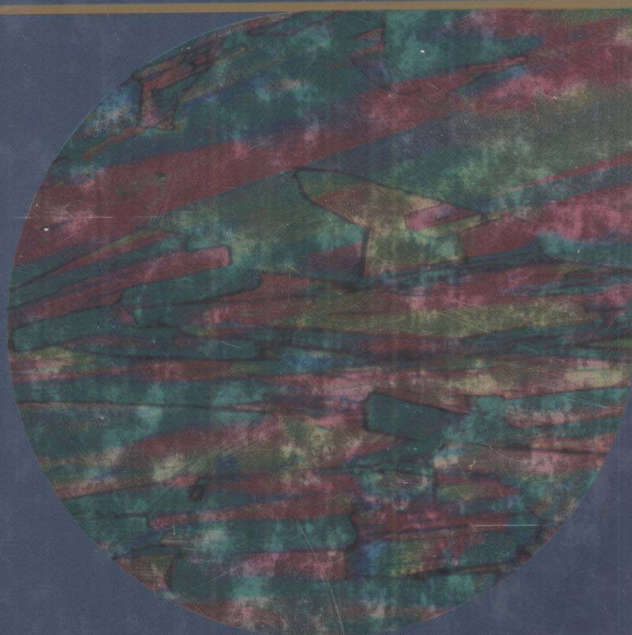


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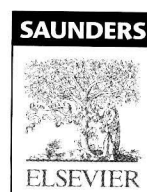
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Biochemical, Physiological, & Molecular Aspects *of* Human Nutrition

MARTHA H. STIPANUK, PhD

Professor
Division of Nutritional Sciences
Colleges of Human Ecology and
Agriculture and Life Sciences
Cornell University
Ithaca, New York

SECOND EDITION



SAUNDERS

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Physiological,
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Contributors

Tracy G. Anthony, PhD

Assistant Scientist and Professor
Department of Biochemistry and Molecular Biology
Center for Medical Education
School of Medicine
Indiana University
Evansville, Indiana

J. Thomas Brenna, PhD

Professor
Division of Nutritional Sciences
Cornell University
Ithaca, New York

Qi Chen, PhD, Research Fellow

National Institute of Diabetes & Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Christopher P. Corpe, PhD

Research Fellow
National Institute of Diabetes and Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Robert R. Crichton, PhD, FRSC

Professor
Unité Biochimie
Université Catholique de Louvain
Belgium

Karen Crissinger, MD, PhD

Professor
Pediatric Gastroenterology
University of South Alabama
Mobile, Alabama

William T. Donahoo, MD

Assistant Professor
Department of Medicine
Section of Endocrinology, Diabetes, and
Metabolism
University of Vermont
Burlington, Vermont

Hedley C. Freake, PhD

Professor
Department of Nutritional Sciences
College of Agriculture and Natural
Resources
University of Connecticut
Storrs, Connecticut

Arthur Grider, PhD

Assistant Professor
Department of Foods and Nutrition
College of Family and Consumer Sciences
University of Georgia
Athens, Georgia

Michael F. Holick, MD, PhD

Professor, Department of Medicine
Director, General Clinical Research Center
School of Medicine
Boston University
Boston, Massachusetts

Susan M. Hutson, PhD

Professor
Department of Biochemistry
School of Medicine
Wake Forest University
Winston-Salem, North Carolina

Ronald J. Jandacek, PhD

Adjunct Professor
Department of Pathology
University of Cincinnati Medical Center
Cincinnati, Ohio

Elizabeth H. Jeffery, PhD

Professor of Nutritional Toxicology
Department of Food Science and Human
Nutrition
College of Agricultural, Consumer, &
Environmental Sciences
University of Illinois at Urbana-Champaign
Urbana, Illinois

Anna-Sigrid Keck, PhD

Visiting Assistant Professor
Department of Food Science and Human
Nutrition
College of Agricultural, Consumer, &
Environmental Sciences
University of Illinois at Urbana-Champaign
Urbana, Illinois

Martin Konrad, MD

Department of Pediatric Nephrology
University Children's Hospital
Inselspital Academic Health Centre
Bern, Switzerland

Taru Kosonen, PhD

Senior Medical Writer
Schering Oy
Helsinki, Finland

Susan M. Kundrat, RD, MS

Adjunct Lecturer
Department of Food Science and Human
Nutrition
College of Agricultural, Consumer, &
Environmental Sciences
University of Illinois at Urbana-Champaign
Urbana, Illinois

Je-hyuk Lee, PhD, Research Fellow

National Institute of Diabetes & Digestive &
Kidney Diseases
National Institutes of Health
Bethesda, Maryland

James A. Levine, MD, PhD

Professor of Medicine
Endocrine Research Unit
Mayo Clinic College of Medicine
Rochester, Minnesota

Mark Levine, MD

Chief, Molecular and Clinical Nutrition Section
Senior Staff Physician
National Institutes of Health
Bethesda, Maryland

Betty A. Lewis, PhD

Associate Professor
Division of Nutritional Sciences
Cornell University
Ithaca, New York

Joanne R. Lupton, PhD

Regent's Professor of Nutritional Sciences, Food
Science and Technology, and Veterinary
Integrated Biosciences
University Faculty Fellow
William W. Allen Endowed Chair in Nutrition
Department of Nutrition and Food Science
College of Agriculture and Life Sciences
Texas A&M University
College Station, Texas

Donald B. McCormick, PhD

Professor Emeritus
Department of Biochemistry
Emory University
Atlanta, Georgia

Mary M. McGrane, PhD

Associate Professor
Department of Nutritional Sciences
University of Connecticut
Storrs, Connecticut

Margaret A. McNurlan, PhD

Associate Professor
Department of Surgery
School of Medicine
State University of New York
Stony Brook, New York

Edward L. Melanson, PhD

Assistant Professor
Division of Endocrinology, Diabetes, and
Metabolism
Center for Human Nutrition
University of Colorado Health Sciences Center
Denver, Colorado

Buford L. Nichols, MD

Professor
Baylor College of Medicine
Texas Medical Center
Houston, Texas

Forrest H. Nielsen, PhD

Research Nutritionist
Grand Forks Human Nutrition Resource Center
Agricultural Research Service
U.S. Department of Agriculture
Grand Forks, North Dakota

Noa Noy, PhD

Professor
Division of Nutritional Sciences
Cornell University
Ithaca, New York

Sebastian J. Padayatty, MD, PhD, FFARCS, MRCP

Staff Clinician
National Institute of Diabetes & Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Robert S. Parker, PhD

Associate Professor
Division of Nutritional Sciences
Cornell University
Ithaca, New York

John C. Peters, PhD

Section Head
The Procter & Gamble Company
Cincinnati, Ohio

Roberto Quezada-Calvillo, MD

Visiting Professor
Baylor College of Medicine
USDA/ARS-Children's Nutrition Research
Center
Houston, Texas
Facultad de Ciencias Químicas
Universidad Autónoma de San Luis Potosí
San Luis Potosí, Mexico

Claudia C. Robayo, MD

Research Postdoctorate Fellow
Baylor College of Medicine
Children's Nutrition Research Center
Houston, Texas

Robert B. Rucker, PhD

Professor and Vice Chair
Department of Nutrition
University of California, Davis
Davis, California

Gavin L. Sacks, PhD

Research Associate
Division of Nutritional Sciences
Cornell University
Ithaca, New York

Karl-Peter Schlingmann, MD

University Children's Hospital
Philipps University
Marburg, Germany

Barry Shane, PhD

Professor
Department of Nutritional Sciences
University of California Berkeley
Berkeley, California

Hwai-Ping Sheng, PhD

Senior Lecturer and Associate Professor
Department of Physiology
The University of Hong Kong
Hong Kong

Arthur A. Spector, MD

University of Iowa Foundation Distinguished
Professor
Biochemistry Department
The University of Iowa
Iowa City, Iowa

Christina Stark, MS, RD, CDN

Extension Associate
Division of Nutritional Sciences
Cornell University
Ithaca, New York

Bruce R. Stevens, PhD

Professor
Department of Physiology and Functional
Genomics
College of Medicine
University of Florida
Gainesville, Florida

Judith Storch, PhD

Professor
Department of Nutritional Sciences
Cook College
Rutgers University
New Brunswick, New Jersey

Hei Sook Sul, PhD

Professor
Department of Nutritional Sciences and Toxicology
University of California Berkeley
Berkeley, California

Roger A. Sunde, PhD

Department Chairperson and Professor
Department of Nutritional Sciences
College of Agricultural and Life Sciences
University of Wisconsin–Madison
Madison, Wisconsin

Lawrence Sweetman, PhD

Professor, Institute of Biomedical Studies
Baylor University
Waco, Texas;
Director, Mass Spectrometry
Institute of Metabolic Disease
Baylor University Medical Center
Dallas, Texas

Patrick P. Tso, PhD

Professor
Department of Pathology and Laboratory Medicine
College of Medicine
University of Cincinnati
Cincinnati, Ohio

Nancy D. Turner, PhD

Associate Professor
Department of Animal Science
Texas A&M University
College Station, Texas

Reidar Wallin, PhD

Research Associate Professor
Section on Rheumatology
School of Medicine
Wake Forest University
Winston-Salem, North Carolina

Jin Wang, PhD, Research Fellow

National Institute of Diabetes & Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Yaohui Wang, MD

Biologist
National Institute of Diabetes & Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland

Malcolm Watford, DPhil

Associate Professor
Department of Nutritional Sciences
Cook College
Rutgers University
New Brunswick, New Jersey

Gary M. Whitford, PhD, DMD

Regents' Professor
Oral Biology and Maxillofacial Pathology
Associate Professor
Physiology and Graduate Studies
Medical College of Georgia
Augusta, Georgia

Richard J. Wood, PhD

Director, Minerals Bioavailability Laboratory
USDA Human Nutrition Research Center
Tufts University
Boston, Massachusetts

Liqun Zhang, MD, PhD, Research Fellow

National Institute of Diabetes & Digestive
& Kidney Diseases
National Institutes of Health
Bethesda, Maryland



Preface

Biochemical, Physiological, & Molecular Aspects of Human Nutrition in its second edition has been revised and updated in an effort to continue to provide a book that covers the biological bases of human nutrition at the molecular, cellular, tissue, and whole-body levels. The text focuses on information from studies of human metabolism to the extent possible, but also relies on information obtained for other mammalian species. This is a book that can be used equally well as either a textbook or a reference book by students and professionals in various areas of nutrition and other life and biomedical sciences.

The second edition of *Biochemical, Physiological, & Molecular Aspects of Human Nutrition* reflects the contributions of more than 50 researchers and teachers who represent a diverse range of expertise. Authors have included the most up-to-date information and also identified areas of active research and controversy. At the same time, efforts have been made to ensure the consistency of content and approach so that the individual chapters and units work together as a whole for those who use the text as an introduction to the science of nutrition.

The study of human nutrition integrates many disciplines, and knowledge and understanding of each of these basic disciplines are essential to the understanding of nutrition. This book is intended largely for upper-level undergraduate students, graduate students, and professionals who have completed studies in organic

chemistry, biochemistry, molecular biology, and physiology. Hence, topics are covered at an advanced level. Nevertheless, an effort has been made to present material in a manner that allows a reader who is unfamiliar with a particular topic to obtain a clear, concise, and thorough understanding of the essential concepts. Particular attention has been given to the design of figures and choice of tabular material to ensure that illustrations and tables clarify, extend, and enrich the text.

The text consists of six units that encompass a traditional coverage of nutrients by classification (carbohydrates, proteins, lipids, vitamins, and minerals) but that also allow for discussion of the integrated metabolism and utilization of these nutrients. In addition, in recognition of new paradigms in thinking about nutrition, a seventh unit begins the second edition, providing a discussion of the historical foundations of nutrition, the changes in how nutrients are being defined and in how dietary recommendations are being made, and of a wide variety of potentially beneficial food components. The macronutrients or energy-yielding nutrients (carbohydrates, proteins, and lipids) are discussed in Units II through V. Unit II provides an overview of the structure and properties of the macronutrients. The digestion and absorption of the macronutrients are discussed in Unit III, and the metabolism of the macronutrients is the topic of Unit IV. Finally, the relation of these macronutrients to energy is discussed in Unit V.

The vitamins are discussed in Unit VI. B vitamins have been grouped and discussed in three chapters in a manner that facilitates an understanding of their functions in macronutrient metabolism. The unique functions of vitamins C, K, E, A, and D are described in individual chapters. The minerals and water are the subjects of Unit VII; those with well-characterized nutritional or health-related roles are discussed in detail. Significant disease-related aspects of nutrition are incorporated into the individual chapters and are also highlighted in many of the feature boxes scattered throughout the book.

The text is designed so that it can easily be used for a comprehensive advanced nutrition and metabolism course in which all nutrients are covered. Alternatively, sections of the text could easily be used for courses that focus specifically on the macronutrients, energy, vitamins, or minerals. The depth and breadth of coverage given to the macronutrients make this text somewhat unique among advanced nutrition texts and make it an especially good choice for courses on macronutrient metabolism.

Each chapter begins with an outline and, when appropriate, a listing of common abbreviations. The text includes many figures drawn specifically for this book. Illustrations have been carefully selected to enhance the text and designed to provide insight and to facilitate

understanding. References to the research literature and recommended readings, as well as related websites, are provided for each chapter. Also included within the text are a number of feature boxes—*Nutrition Insights*, *Clinical Correlations*, *Food Sources*, *RDAs/AIs Across the Life Cycle*, and *Life Cycle Considerations*—to highlight particular aspects of basic science and everyday nutrition, help readers make connections between abnormalities and their effects on normal metabolism, summarize cumbersome data pertinent to that discussion, or highlight particular nutritional processes or concepts applicable to various stages of the life span. In addition, “Thinking Critically” sections included in the *Nutrition Insight* and *Clinical Correlation* boxes encourage readers to apply the content to clinical situations.

For Instructors

An Evolve website has been created to accompany this book (<http://evolve.elsevier.com/Stipanuk/nutrition/>). Included within this resource are a Test Bank with approximately 850 multiple-choice examination questions and an Image Collection with nearly 400 illustrations from the textbook. Access to these materials is available free to adopting instructors through their Elsevier sales representative.

Martha H. Stipanuk



Acknowledgments

My deep appreciation goes to each of the contributors to *Biochemical, Physiological, & Molecular Aspects of Human Nutrition*. The target, as for the first edition, was “to obtain the best possible author” for each chapter, and the text is much enriched by the contributions of so many talented researchers and teachers. The commitment of the chapter contributors to education and sharing of knowledge is clear from the willingness of these busy individuals to accept the challenge and commit the time and effort required to see their chapters through the entire process. Their willingness to respond to queries, to discuss and resolve apparent differences of opinion among authors, and to allow the editorial flexibility needed to turn individual chapters into a coherent and integrated text was superb.

It has been a delight to work with the superb staff at Elsevier who handled the publication process. Senior Editor Yvonne Alexopoulos and Developmental Editor Kristin Heberd kept the process running smoothly and efficiently and made my job much easier in so many ways. The support and efforts of Senior Project Manager Beth Hayes, who capably handled the book’s production process, are greatly appreciated as well.

During the time I worked on this book, my colleagues in the Division of Nutritional Sciences at Cornell University supported my efforts in many ways, especially by serving as sources of expertise and in contributing several of the chapters. A special thanks to Charles McCormick, who assumed some of my teaching load during this past year so that I could take a semester of sabbatical leave to devote to getting the copy ready for publication. I also wish to especially acknowledge the superb efforts of Lawrence Hirschberger, Chad Simmons, John Dominy, Jr., Jeong-In Lee, and Relicardo Coloso in keeping my research program moving forward full-force during the course of my work on this book.

Finally, a special note of appreciation goes to my family and friends, who enrich each day of my life and who challenge me to a life of faith and purpose.

Working on the second edition of *Biochemical, Physiological, & Molecular Aspects of Human Nutrition* has been fun and educational. Those with whom I have worked on this project contributed to my enjoyment of this work. My thanks to each of you for your many contributions and support.



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