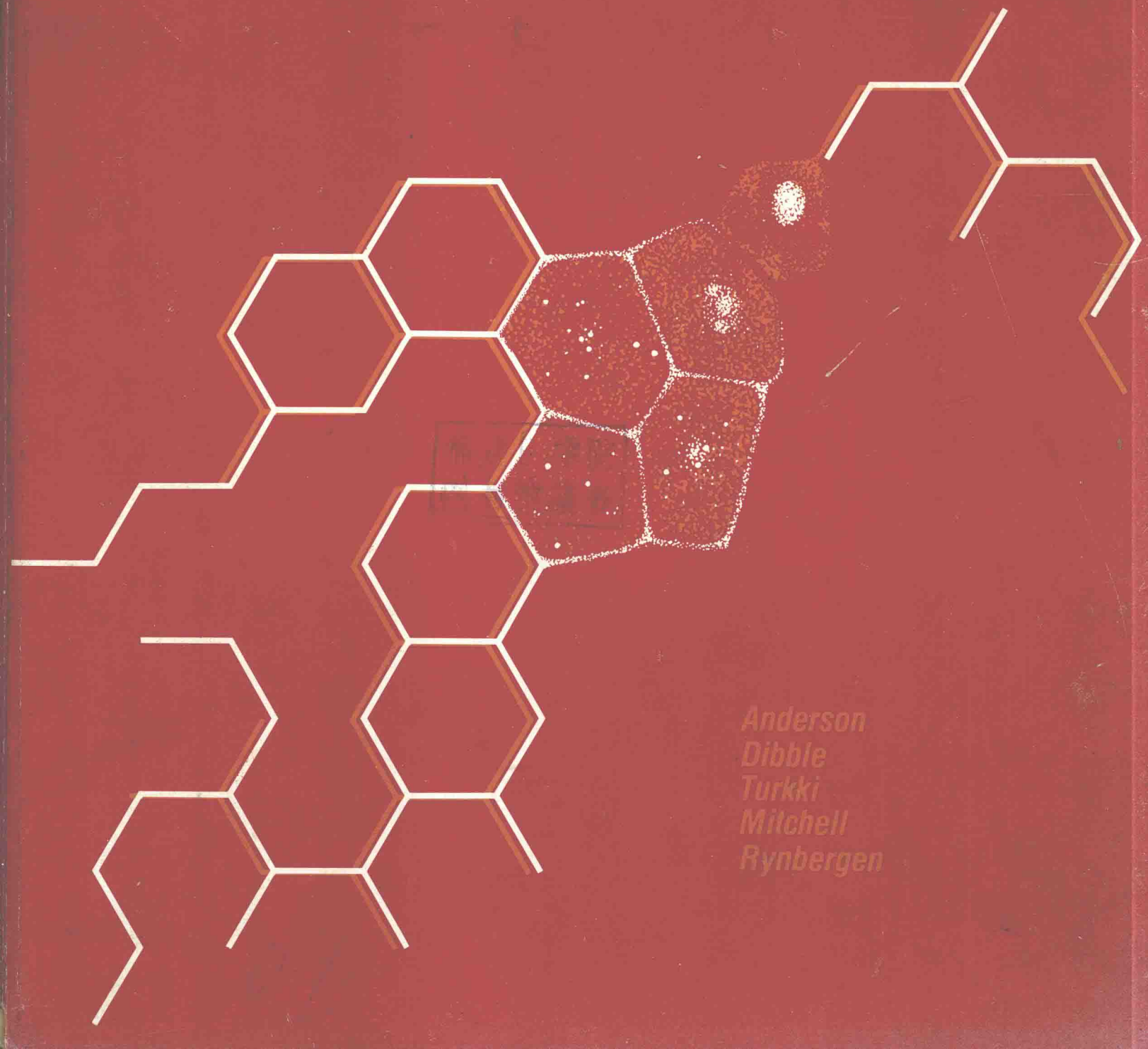


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Nutrition in Health and Disease

17th Edition

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Nutrition in Health and Disease

17th Edition

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The authors and publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new or infrequently employed drug.

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Preface

Medicine arose from dietetics: the Pythagoreans (including Hippocrates) used diet to prevent and cure diseases, and drugs only if these failed.

H.M. Sinclair*

The preface of the first edition of *Nutrition in Health and Disease*, written by Lenna F. Cooper, Edith M. Barber, and Helen S. Mitchell and published by J. B. Lippincott Company in 1928, states

This book presents the newer ideas in both the principles of nutrition and the practice of dietetics, based upon the most recent experimentation and study as well as upon the established knowledge of earlier research findings.

Over 50 years later, the authors and contributors of the 17th edition have worked to achieve the same purpose as the original authors. As in previous editions the text presents a comprehensive overview of the principles of nutrition as they apply to individuals and groups throughout the life span, as well as the dietary needs of individuals with metabolic aberrations due to pathological conditions.

This book is a basic text for college students in normal and clinical nutrition courses who are planning to enter the health professions. It will also serve the members of the health professions—dietitians/nutritionists, nurses and physicians, and their assistants—who share responsibility for the nutritional care and counseling of individuals and their families. The central focus is on the client with emphasis on those knowledges, attitudes, and abilities required of the professional person to be an effective nutrition counselor.

When supplemented with current literature, this book can also serve as a reference for advanced courses in nutrition that focus primarily on vitamins, minerals, and metabolism. The reader is reminded that professional

*In Birch GG et al (eds): *Health and Food*, p 23. New York, John Wiley & Sons, 1972

practice in the late 20th century is related to basic biomedical and psychosocial principles and that the nutritional component of practice derives not only from physiology, anatomy, nutritional biochemistry, genetics, and food science, but as well from sociology, psychology, and anthropology. Pertinent principles from these disciplines are repeated only for clarity where these are essential for bridging the gap between theory and practice.

In Part One, Principles of Nutrition, there are major revisions and additions to Chapter 1, Introduction to Nutrition Counseling; Chapter 2, Carbohydrates; Chapter 3, Fats and Other Lipids; Chapter 5, Water and Electrolyte Metabolism; Chapter 6, Mineral Metabolism; Chapter 7, Fat-soluble Vitamins; Chapter 8, Water-soluble Vitamins; Chapter 9, Nutrient Utilization: Digestion, Absorption, and Metabolism; Chapter 10, Energy Metabolism; Chapter 11, Meeting Nutritional Norms; Chapter 14, Regional, Cultural, and Religious Food Patterns; and Chapter 15, Ecology of Food.

In Chapter 1, discussions of HANES and of the National Food Consumption Survey 1977–78 have been added. A section on U.S. dietary guidelines is also presented in the first chapter. Chapter 2 has an expanded section on dietary fiber, with tables on the components of dietary fiber by structure and possible physiologic function, and on dietary fiber in foods. The increased use of fructose as a sweetener is also discussed, and the information on alcohol metabolism has been brought up to date. In Chapter 3, “Essential Fatty Acids—Role of Lipids in Health” includes a discussion on prostaglandins and a figure of the simplified pathways of essential fatty acid metabolism as related to prostaglandin synthesis.

Chapter 5, Water and Mineral Metabolism, 16th edition, has been rewritten and expanded to two chapters: Chapter 5, Water and Electrolyte Metabolism; and Chapter 6, Mineral Metabolism. Chapter 5 includes a discussion of acidosis and alkalosis, and Chapter 6 presents in detail a discussion of the functions and utilization of the trace elements as well as of calcium, phosphorus, and iron. A method for estimating iron availability from different types of meals is also included in Chapter 6. Chapters 7 and 8 have expanded discussions on the functions and utilization of the fat- and water-soluble vitamins. Several new figures have been added to these four chapters which further enhance the usefulness of this book as a basic text in courses that emphasize these topics.

Chapter 8, Energy, 16th edition, has been moved to Chapter 10, thus following instead of preceding Chapter 9, Nutrient Utilization: Digestion, Absorption, and Metabolism. The section on biologic oxidation now is included in Chapter 9, and a discussion on energy balance has been added to Chapter 10.

The 1980 revised Recommended Dietary Allowances are included in Chapter 11. Dietary habits in Arab countries and in South and Southeast Asia and Islamic and

Hindu food patterns have been added to Chapter 14. Additions to Chapter 15 include vibrio infections, infant botulism, and *Bacillus cereus* foodborne illness.

In Part Two, Application of Nutrition to Critical Periods Throughout the Life Span, significant changes and additions of new material have been made in Chapter 16, Growth and Development; Chapter 17, Nutrition in Pregnancy and Lactation; Chapter 18, Nutrition During Infancy and Early Childhood—from Birth to 3 Years; Chapter 19, Nutrition for Children and Youth; and Chapter 20, Nutrition for Older Persons.

In Chapter 16, the section on nutrition in brain development and behavior has been revised, and information on neurotransmitters has been added. A discussion on alcohol and caffeine consumption and smoking during pregnancy has been included in Chapter 17. Expanded discussions on iron status during infancy and on breastfeeding, including the use of drugs during lactation, are to be found in Chapter 18. Also in this chapter the section on introduction of semisolid foods has been revised to conform with current practice. Sections on oral contraceptives, alcohol and drugs, and athletics have been added to Chapter 19. Chapter 20 has been extensively revised and includes discussions of the physiology of aging and the programs of preventive care and group care for the older person.

The chapter titles in Part Three, Diet in Disease, continue to reflect disease processes rather than metabolic problems. However, the sequence of the chapters continues to reflect related metabolic problems. Numerous changes and additions have been made in this section. Chapter 22, Nutritional Care and Diet Therapy for the Hospitalized Patient, includes a section on quality assurance and standards of practice. Chapter 23, Assessment of Patient Needs, has a section on the methodology for assessment of nutritional status used to identify the hospitalized patient malnourished at the time of admission or at risk for developing malnutrition. The 1976 revision of the Exchange System used to calculate energy-controlled diets is in Chapter 24, Food Composition—A Basic Tool of Diet Therapy. The original Exchange System Food Lists published in 1950 are reproduced in Part 4, Tabular Material and Bibliography, for the convenience of the counselor who is working with clients who are familiar with these lists and do not wish, or need, to change to the newer lists. A section on parenteral and enteral alimentation has been added to Chapter 27, Nutrition Care—Surgery and Burn Therapy.

In Chapter 30, Atherosclerosis, the Exchange System has been revised to reflect newer information available on the polyunsaturated fatty acid composition of foods. Chapter 32, Renal Disease: Nephrolithiasis, has been extensively revised. The Exchange System reflects the need to calculate phosphorus as well as the protein, sodium, and potassium content of diet plans for patients with chronic

renal failure. Chapter 34, Cancer and Special Problems, presents the feeding problems encountered by patients receiving various cancer therapies.

Chapter 35, Nutrition in Diseases of Infancy and Childhood, and Chapter 36, Inborn Errors of Metabolism in Infancy and Childhood, have been extensively revised. Chapter 35 includes a section on the nutritional care of the infant, the newborn intensive care unit, and the role of the nutrition counselor on the child abuse team. In Chapter 36, the nutrient values of foods used to calculate diet plans for infants with phenylketonuria or maple syrup urine disease have been updated.

The tables in Part Four, Tabular Material and Bibliography, have also been revised. The nutrient values in Table 1, Nutritive Values of the Edible Part of Foods, are those in the USDA Home and Garden Bulletin No. 72. Table 2, Cholesterol in Common Foods, has been revised where new figures are available. It is strongly advised that, as the USDA Handbook 8 series becomes available, the values of the amino acid content of foods used to calculate diet plans be derived from these publications, not Table 3, Amino Acid Content of Foods per 100 Grams—Edible Portion. Table 6, Vitamin E Content of

Food; Table 12, Dietary Standard for Canada; and Table 13, Canada's Food Guide, are new additions to this section.

Special attention is drawn to the Bibliography and Glossary. The Bibliography has been included to assist the student who wishes to pursue a subject in more depth than the space in this book allows. However, the student is cautioned that the Bibliography contains citations only through mid-1981. The Glossary has been revised and expanded, although many readers may require a standard medical dictionary for those medical terms found in Part Three.

For the convenience of both students and instructors, a complete list of abbreviations used in this edition is to be found on page 777.

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The authors and contributors wish to express their sincere appreciation to their colleagues and friends for the generous help given during the preparation of the 17th edition of *Nutrition in Health and Disease* and to various investigators and authors for permission to use material from their research and work. Special commendation goes to the graduate and undergraduate students whose diligent literature searches to document term papers or modes of clinical intervention have been of inestimable value to the authors and contributors. Without their assistance no basic textbook would ever be written.

In this edition the authors and contributors are indebted to many persons: Jean Bowering, Ph.D., R.D., Associate Professor of Human Nutrition, College for Human Development, Syracuse University, for her critical review of the section on iron in Chapter 6, Mineral Metabolism; Anne L. Babic, M.S.W., Lecturer, Community Services, and E. Helen Howard, M.S., R.D., Lecturer, Human Nutrition, College for Human Development, Syracuse University, for their contribution to and critical review of Chapter 20, Nutrition for Older Persons; Marian F. Chase, M.A., L.P.T., Chief, Physical Therapy, and Patricia A. Lubas, M.S., R.D., Nutritionist, Nisonger Center, The Ohio State University, for revising sections of Chapter 25, Handicapping Problems—Self-Feeding, Chewing, Swallowing; and Debra Wright, M.S., R.D., Assistant Director of Dietetics, and Melody Thompson, R.D., Neonatal Nutritionist, Columbus Children's Hospital, for their assistance with the revision of Chapter 35, Nutrition in Diseases of Infancy and Childhood, and Chapter 36, Inborn Errors of Metabolism. James A. Schoenberger, M.D., Professor and Chairman, Department of Preventive Medicine, Rush-Presbyterian-St. Luke's Medical Center, Chicago, assisted Therese Dolecek, R.D., with the revision of Chapter 30, Atherosclerosis, and E.T. Schroeder, M.D., Chief, Nephrology Section, SUNY, Upstate Medical Center at Syracuse, assisted Lois Schroeder, Ph.D., with the revision of Chapter 32, Renal Disease: Nephrolithiasis.

Lastly, the authors and contributors wish to acknowledge the patience and skill of their editor, Bernice Heller, in converting the manuscript into a book.

To these persons, as well as to others who have

assisted in the preparation of this textbook, the authors and contributors express gratitude and recognize that factual errors which may appear in the text are solely their own responsibility.

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Principles of Nutrition

Part 1