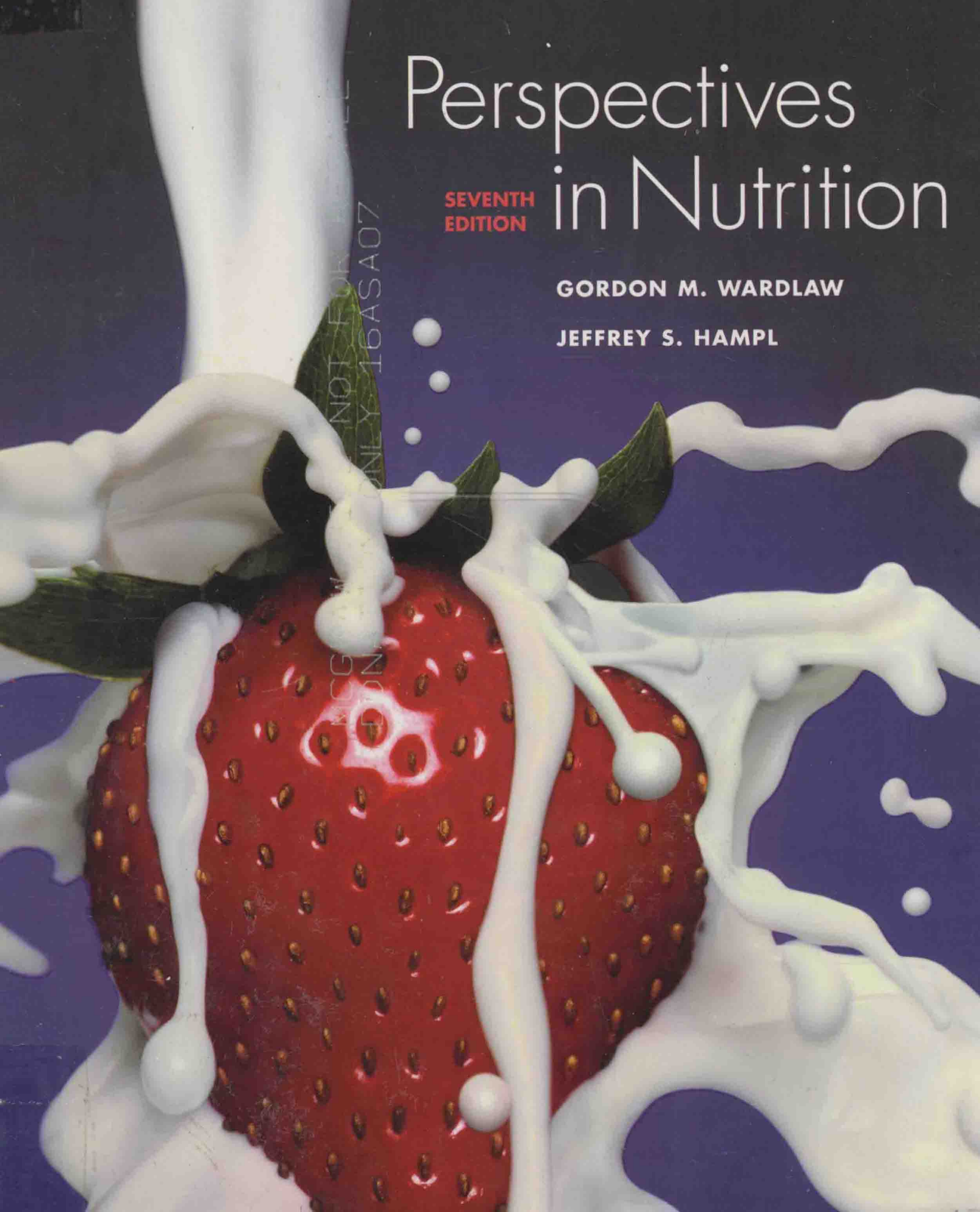


Perspectives in Nutrition

SEVENTH
EDITION

GORDON M. WARDLAW

JEFFREY S. HAMPL



SEVENTH EDITION

P E R S P E C T I V E S I N
N U T R I T I O N

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PERSPECTIVES IN NUTRITION, SEVENTH EDITION

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1 2 3 4 5 6 7 8 9 0 DOW/DOW 0 9 8 7 6

ISBN-13 978-0-07-282750-7

ISBN-10 0-07-282750-5

Publisher: *Colin H. Wheatley*

Senior Developmental Editor: *Lynne M. Meyers*

Marketing Manager: *Tami Petsche*

Lead Project Manager: *Peggy J. Selle*

Senior Production Supervisor: *Kara Kudronowicz*

Senior Media Project Manager: *Tammy Juran*

Media Producer: *Daniel M. Wallace*

Designer: *Rick D. Noel*

Cover Designer: *Ellen Pettengell*

(USE) Cover Image: ©Getty Images, *Strawberry with Cream Splash*, *Lew Robertson*

Senior Photo Researcher: *John C. Leland*

Photo Research: *Mary Reeg*

Supplement Producer: *Tracy L. Konrardy*

Compositor: *Carlisle Publishing Services*

Typeface: *10/12 Galliard*

Printer: *R.R. Donnelley Willard, OH*

The credits section for this book begins on page C-1 and is considered an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Wardlaw, Gordon M.

Perspectives in nutrition / Gordon M. Wardlaw, Jeffrey S. Hampl.—7th ed.

p. cm.

Includes bibliographical references and index.

ISBN 978-0-07-282750-7—ISBN 0-07-282750-5 (hard copy : alk. paper)

I. Nutrition. I. Hampl, Jeffrey S. II. Title.

QP141.W38 2007

612.3—dc22

2006009096

CIP

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preface

TO THE INSTRUCTOR

Because you teach nutrition, you undoubtedly find it a fascinating and challenging subject. You probably also find that teaching nutrition is a challenge in and of itself. Claims and counterclaims abound regarding the need for certain dietary components. For example, one group of researchers promotes a reduction in salt intake for the general population as a means of preventing hypertension. Other researchers assert that despite excess salt intakes, most North Americans maintain normal blood pressure values. This apparent dichotomy only adds to the challenge of teaching in a rapidly changing field.

As textbook authors, we understand the importance of providing accurate, balanced, and up-to-date coverage of nutrition topics, particularly those that are controversial. To provide students with a sound introduction to the study of nutrition, we draw on as many reliable sources as possible. This seventh edition of *Perspectives in Nutrition* reflects new material from the recently published Dietary Reference Intakes by the Food and Nutrition Board, articles in major nutrition and medical journals and leading nutrition and health newsletters, and chapters in *Modern Nutrition in Health and Disease*, edited by Maurice Shils and his colleagues. We constantly scour the literature with the goal of providing clear and balanced perspectives on recent research so that you and your students can better understand and participate in the debates of current nutrition issues.

■ Personalized Approach to Nutrition

A prominent theme in nutrition today is *individuality*. Nutrition advice is not a one-size-fits-all proposition. For example, not all people find that saturated fat in their diet raises their blood cholesterol values above recommended standards. Individuals respond differently, often idiosyncratically, to certain nutrients. The goal of understanding how nutrients affect people as individuals is a key objective of this text.

Moreover, even at this introductory level, we do not assume that all nutrition students are alike. We incorporate opportunities, such as the Take Action activities, for students to learn more about their own health and nutrition. In this way, stu-

dents can apply the knowledge they gain to improve their health. Throughout the chapters, we strive for the same objective as many of our colleagues, to educate students to become judicious consumers of both food and nutrition information. We seek to help students sort through the wealth of nutrition information and misinformation available to them. This text is designed to help them better understand and evaluate the nutrition information they encounter on cereal box labels, articles in popular magazines, nutrition- and diet-related websites, guidelines issued by government agencies, and more.

Once students have achieved a solid working knowledge of nutrition, our goal is to assist them in assessing their personal nutrition needs rather than strictly adhering to every guideline issued for an entire population. After all, a population by definition includes a scope of varying genetic and cultural backgrounds along with varying responses to diet.

As a final note, we know that students often come to this course with many preconceptions and questions about nutrition “hot topics.” To address students’ concerns, we have included coverage of topics that touch their lives: eating disorders, nutritional supplements, phytochemicals, vegetarianism, diets for athletes, popular (fad) diets, and complementary and alternative medical practices. (See the Chapter Highlights section of this preface for examples.) Regardless of the topic, the overall emphasis remains the same—the importance of understanding one’s food choices and diet practices to best meet personal needs.

■ Intended Audience

We have developed this book with nutrition and science majors in mind. The chemistry, biochemistry, and physiology presented in the text assume that students have had at least some college-level science. Because this course often attracts students from a fairly broad range of majors, we have been careful to include examples and explanations that are relevant to nutrition, health education, human ecology, human performance, nursing, and other health-related majors. For students who wish to learn more or need assistance with the science involved

in metabolism and body systems, additional information can be found in Appendix A, Chemistry: A Tool for Understanding Nutrition and Appendix C, Human Physiology: A Tool for Understanding Nutrition.

Key Revisions to the Seventh Edition

Creating a textbook is a dynamic process. Rather than simply updating facts and numbers with each new edition, we seek to be responsive to changing instructor and student needs. We challenge ourselves to take a fresh look at each new edition to find ways to refine and improve the book and make it a better teaching tool all around. Many of the new features in the seventh edition are a direct result of feedback we have received from instructors. Their advice on the level and presentation of science has been invaluable. We have also learned a great deal from the students in the courses we teach. Their feedback can be seen in improved illustrations and clearer discussions of difficult concepts.

Up-to-Date Nutrient Guidelines

A major component of this revision involves the continual updating of data and discussions related to the latest Dietary Reference Intakes. Chapter content has also been rewritten throughout to reflect advice provided by MyPyramid and the 2005 Dietary Guidelines for Americans.

Improved Science Coverage

Throughout the book are many dynamic new illustrations that will help students grasp important scientific concepts with greater clarity. Chapters 3 and 4 contain many new digestion and metabolism diagrams. Complex subjects such as glycolysis and the citric acid cycle have been reinterpreted with color and number sequencing to help students comprehend the steps involved in these processes.

Content Reorganization

Take Action activities are no longer specifically tied to a detailed diet analysis early in the course. Not having students create a detailed diet analysis in Chapter 2 allows you to assign a diet analysis project at any time in the course.

The Nutrition Perspective boxes at the end of the chapters have been moved into the main chapter discussion. They have been shortened and renamed Nutrition Focus to indicate the change. Some older essays have been replaced or relocated (see Contents for details).

Chapter Highlights

The following is a list of some of the key changes, updates, and enhancements that have been incorporated into the seventh edition chapters.

Chapter 1 What Nourishes You?

New Figure 1-1 on two views of macronutrients and new Figure 1-2 on the proportion of nutrients in the human body more clearly convey these important concepts. Previous table on the benefits and risks of diet habits has been converted into Figure 1-5. New Figure 1-6 on the scientific method now uses as an example the efficacy of the Atkins diet. New Expert Opinion by Dr. Robert DiSilvestro discusses the use of research methods to answer the question of whether calcium intake influences weight regulation. New Figure 1-8 shows an herbal supplement label to illustrate the FDA disclaimer on such products.

Chapter 2 The Basis of a Healthy Diet

New Expert Opinion by Dr. Barbara Rolls discusses energy density. Figure 2-1 on nutrient density has been revised to include equal volume comparisons. Chapter content on the MyPyramid and the 2005 Dietary Guidelines for Americans was totally rewritten to reflect the latest government advice. MyPyramid is introduced and all its components are discussed, including discretionary calories. The 2005 Dietary Guidelines for Americans have been summarized into three major points in the chapter content. The full list of 41 guidelines is detailed in new Figure 2-8. New Figure 2-9 represents a summary of the key information contained on a Nutrition Facts panel. This figure is part of the new Nutrition Focus feature on food labeling.

Chapter 3 Human Digestion and Absorption

Figure 3-4 has been redrawn to be a more realistic and thorough representation of the oral cavity and salivary glands. Figure 3-5, process of swallowing; Figure 3-7, anatomy of the stomach; Figure 3-11, peristalsis; and Figure 3-13, small intestine, have all been redrawn for realism and clarity. New Figure 3-10 illustrates the location of sphincters in the GI tract. New Figure 3-15 shows blood circulation in the body. New photo shows close-up of villi. New Figure 3-18 tracks fluid intake and fluid loss in the body. Nutrition Focus box now includes discussion and photos of gallstones, ulcers, and reflux disease damage.

Chapter 4 Metabolism

New chapter opening scenario presents a familiar situation that college students can more easily identify with. First half of the chapter has been rewritten with the help of Dr. Eugene J. Fenster. His input simplified and clarified the challenging nature of this content. Every figure in this chapter is either new or completely redrawn in order to help students better understand metabolism. (More detailed views of metabolic pathways can still be found in Appendix B.)

New figures more clearly show anabolism and catabolism (Figure 4-1); the stages of metabolism (Figure 4-2); end result of citric acid cycle metabolism (Figure 4-8); anaerobic metabolism (Figure 4-12); lipolysis (Figure 4-13); beta-oxidation of fatty acids (Figure 4-14); ketosis (Figure 4-15); metabolism during feasting (Figure 4-21); and metabolism during fasting (Figure 4-22).

New Expert Opinion by Dr. Andrea Buchholtz and Dr. Dale Schoeller explores the concept of metabolic advantage for certain dietary patterns.

Chapter 5 Carbohydrates

New Expert Opinion on the health effects of fiber written by Dr. Joanne Slavin.

The latest diabetes medications and polycystic ovary syndrome are discussed in the Nutrition Focus feature on blood glucose regulation.

Tagatose is mentioned as a new alternative sweetener and is added to Figure 5-13, which shows the chemical structures of alternative sweeteners.

Recommendations for carbohydrate intake from the 2005 Dietary Guidelines for Americans are highlighted in a margin note.

Chapter 6 Lipids

Figure 6-3 on the fatty acid content of various foods has been redrawn in an easier-to-understand format. The same is true for Figure 6-8 on emulsifiers.

New Figure 6-6 on the classes of eicosanoids has been added.

Figure 6-10, fat absorption, and Figure 6-12, lipoprotein interactions, have been redrawn to include numbered sequences to assist students in navigating the steps in each process.

New Table 6-3 summarizes the roles of the various lipoproteins in the body.

New Expert Opinion by Dr. Bernhard Hennig explores the etiology of atherosclerosis.

Recommendations for fat intake from the 2005 Dietary Guidelines for Americans are featured in a margin note.

New Table 6-5 shows the *trans* fat content of common foods.

Chapter 7 Proteins

The discussion of protein turnover was moved to a more relevant position in the middle of the chapter.

Improved Figure 7-2 more clearly provides an overview of protein synthesis.

Recent findings of the ability of protein to lead to a state of satiety are mentioned.

The discussion of soy has been rewritten to reflect the generally negative results of recent intervention trials regarding soy and bone health, cholesterol-lowering ability, and treatment of menopausal symptoms.

The discussion of the evaluation of protein quality has been simplified.

Chapter 8 Alcohol

Improved Figure 8-1 more clearly demonstrates blood alcohol concentrations.

Redesigned Figure 8-3 summarizes the effects of alcohol abuse on the body.

Photo of a liver affected by cirrhosis has been added.

Recommendations for alcohol intake from the 2005 Dietary Guidelines for Americans are listed in a margin note.

Brief mention of the new medication acamprosate (Campral) has been added.

Chapter 9 The Fat-Soluble Vitamins

Figure 9-3 has been revised to better show the metabolism of vitamin A.

New Figure 9-5 demonstrates the effects of macular degeneration on vision.

Figure 9-6 now provides a clearer representation of vitamin D metabolism.

New Expert Opinion by Dr. Michael Holick on the importance of vitamin D has been added.

New Figure 9-12 summarizes the various antioxidant systems and compounds in the body.

Figure 9-13 on vitamin K metabolism has been simplified.

New Figure 9-14 explores a logical approach to supplement use.

Chapter 10 The Water-Soluble Vitamins

Homocysteine discussion has been simplified throughout the chapter. (Appendix B now contains the complete homocysteine pathway.)

Improved Figure 10-7 now shows a more realistic case of spina bifida.

Food sources of choline are featured in a margin table.

New Expert Opinion by Dr. Mark Levine and Dr. Sebastian Padayatty delves into the functions of vitamin C.

New Figure 10-11 summarizes the roles of vitamins in the body based on specific cell functions.

Chapter 11 Water and the Major Minerals

Improved Figure 11-1 provides a better visual comparison of water compartments in the body.

The osmosis discussion has been simplified and is accompanied by improved Figure 11-2.

New Figure 11-3 walks students through the steps involved in sodium flux across the cell membrane.

Water content of various foods is featured in a new margin table.

Figure 11-4 has been updated to reflect the new DRIs for water.

The hormonal regulation of blood pressure has been split into two figures to make the content easier to grasp (now Figure 11-5 and Figure 11-6).

DRIs for sodium, potassium, and chloride throughout chapter discussions have been updated.

New Expert Opinion by Dr. Marlene Most provides insights into the DASH diet.

New Figure 11-9 shows the various sites of influence on calcium balance in the body.

Latest methods for diagnosing osteoporosis and latest medications used to treat the disease are discussed.

New Figure 11-5 shows how bone density differs during a person's lifetime and why preventing severe bone loss is important.

Chapter 12 Trace Minerals

Figure 12-1 on iron metabolism has been improved.

New Table 12-2 on the factors that affect zinc absorption has been added.

Redrawn Figure 12-5 better guides students through selenium metabolism.

New photo shows mottling of teeth from excess fluoride exposure.

New Figure 12-7 summarizes the roles of minerals in the body based on specific cell functions.

The Nutrition Focus feature that looks at cancer has been moved to this chapter (previously in Chapter 10).

Chapter 13 Energy Balance and Imbalance

New statistics on the growing problem of overweight in society are added as a margin note.

Clearer discussion of basal metabolism has been provided.

Latest estimates for energy needs from MyPyramid are listed.

New Expert Opinion by Dr. Peter Havel discusses hormones and other factors that affect satiety.

Figure 13-18 has been redrawn and expanded to include the new Lap-Band procedure.

Chapter 14 Nutrition for Fitness and Sports

New Figure 14-1 highlights the benefits of physical activity.

New Figure 14-5 illustrates glycolysis.

New Figure 14-6 on metabolism during exercise has been redrawn and greatly simplified.

New Table 14-3 lists fuel use by muscles based on $VO_{2\text{ max}}$.

New Expert Opinion by Dr. Priscilla Clarkson addresses the need for antioxidant supplementation by athletes.

New Table 14-8 shows the nutrient content of various energy bars.

Table 14-10 has been shortened to include only the major ergogenic aids commonly used today.

New Take Action box has a tool to assess physical fitness.

Chapter 15 Eating Disorders: Anorexia Nervosa, Bulimia Nervosa, Binge-Eating Disorders, and Other Conditions

New Nutrition Focus feature contains essays on the personal side of anorexia nervosa and bulimia nervosa.

Figure 15-1 summarizes the physical effects of anorexia nervosa and bulimia nervosa.

The list of medications used in the treatment of various eating disorders has been updated.

Chapter 16 Pregnancy and Breastfeeding

In Figure 16-1, a close-up of placental circulation has been added.

New Nutrition Focus feature looks at the many factors that influence pregnancy outcome.

New Expert Opinion by Dr. Lynne Bailey explains the importance of meeting folate needs before and during pregnancy.

Food plan for pregnant and lactating women has been revised to reflect the advice provided in MyPyramid.

New margin note shows the stark difference in nutrient composition between cow's milk and human milk.

Chapter 17 Nutrition from Infancy through Adolescence

Food plans for children and teenagers have been revised to reflect the advice provided in MyPyramid.

New MyPyramid for Kids has been added (Fig. 17-6).

New Expert Opinion by Dr. Carol Byrd-Bredbenner discusses social trends that are contributing to the epidemic of obesity in children today.

Chapter 18 Nutrition during Adulthood

Introductory text material has been updated to reflect the 2005 Dietary Guidelines for Americans.

New Expert Opinion by Dr. Katherine Tucker explores the importance of meeting adult nutrient needs.

New Table 18-3 provides strength training recommendations for older adults.

Chapter 19 Food and Water Safety

Figure 19-2 has been updated to reflect the latest recommendations on safe food-holding temperatures.

Statistics on mad cow disease in North America have been updated.

New discussion on the safety of our water supply, a growing concern in North America (and worldwide), has been included.

List of alternative sweeteners now includes tagatose.

Short discussion on cadmium in foods has been added.

Chapter 20 Undernutrition throughout the World

Updated content includes the pledge by industrialized nations to forgive the foreign debt of some developing countries and the devastating impact of the ongoing war in Darfur.

New Expert Opinion by Dr. Hugo Melgar-Quinonez and Dr. Ana Claudia Zubieta discusses the effects of food insecurity worldwide.

Statistics regarding the worldwide AIDS epidemic have been updated.

New Figure 20-5 summarizes the general approaches to solving the problem of undernutrition worldwide.

Special Acknowledgments

We would like to thank Tom Hudgens for his help with this revision. Our editor, Lynne Meyers, supported and assisted us through every step of the revision and facilitated decisions that arose as we planned and produced the seventh edition. Jodi Rhomberg and Peggy Selle diligently monitored the copyediting and production tasks. All these individuals contributed key expertise to the project.

Thank You to Reviewers and Contributors

With each edition, our goal remains the same: to produce the most accurate, up-to-date, and useful textbook possible. These ambitious goals would not be achieved without the meticulous, professional assistance of colleagues who have assisted us in so many ways. Their advice and suggestions have greatly helped refine the content of this edition. We owe our sincere thanks to the following individuals:

Becky Alejandre, *American River College*
 Nancy Amy, *University of California—Berkeley*
 Janet B. Anderson, *Utah State University*
 Kim Archer, *University of Kansas*
 James Bailey, *University of Tennessee—Knoxville*
 Diane Beaudry, *Shoreline Community College*
 Jacqueline Berning, *University of Colorado at Colorado Springs*
 Donna Beshgetoor, *San Diego State University*
 Jacqueline Buell, *The Ohio State University*
 Carol Byrd-Bredbenner, *Rutgers University*
 Nancy L. Canolty, *University of Georgia*
 Lakshmi N. Chilukrui, *University of California—San Diego*
 Tina Crook, *University of Central Arkansas*
 Ruth C. Davies, *Edison College*
 Christine DuPraw, *San Diego Mesa College*
 Eugene J. Fenster, *Longview Community College*
 Cindy W. Fitch, *West Virginia University*
 Betty J. Forbes, *West Virginia University*
 Erin Francfort, *Idaho State University*
 Leonard E. Gerber, *University of Rhode Island*
 Jill Golden, *Orange Coast College*
 Nanci Grayson, *University of Colorado*
 Guy E. Groblewski, *University of Wisconsin—Madison*
 Donna V. Handley, *University of Rhode Island*
 Roschelle Heuberger, *Central Michigan University*
 Beckee Hobson, *College of the Sequoias*
 Kevin Huggins, *Auburn University*

Catherine Jen, *Wayne State University*
 Connie Jones, *Northwestern State University of Louisiana*
 Younghee Kim, *Bowling Green State University*
 Allen W. Knehans, *University of Oklahoma Health Sciences Center*

Mindy Kurzer, *University of Minnesota*
 Elizabeth Konz, *Lexington Community College*
 Robert D. Lee, *Central Michigan University*
 Linda J. Lolkus, *Indiana University Purdue University—Fort Worth*

Mary Mead, *University of California Berkeley*
 Juliet Mevi-Shiflett, *Diablo Valley College*
 Gaile Moe, *Seattle Pacific University*
 Mohey Mowafy, *Northern Michigan University*
 Kathy Munoz, *Humboldt State University*
 Judy Myhand, *Louisiana State University*
 Jill Patterson, *Penn State University*
 Roman Paulak, *East Carolina University*
 Debra Pearce, *Northern Kentucky University*
 Erwina Peterson, *Yakima Valley Community College*
 Nirmala V. Prabhu, *Edison College*

William R. Proulx, *State University of New York College at Oneonta*

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A Request to Professors Who Use This Book

As you might imagine, it is difficult to stay abreast of the vast range of nutrition science, following all the various controversies and new developments. We try our best but realize that sometimes we miss an element that deserves attention. If you find content that you question or believe warrants further consideration, feel free to contact us.

We extend our best wishes for success to you and your students.

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TO THE STUDENT

Cholesterol, sports drinks, food labeling, bulimia nervosa, alternative sweeteners, vegetarianism, *Salmonella* foodborne illness, and genetically engineered foods—we suspect you have heard about these topics. Which topics are important enough to be a consideration in your life or in the life of someone you know?

Americans pride themselves on their individuality. Nutritional advice should be given accordingly. For example, not all of us have high blood cholesterol and other significant risk factors for developing premature cardiovascular disease. The need to tailor dietary advice to each person's individual nature is the basic approach of this book. First, you are given a brief introduction to the study of nutrition; second, you are told how to be a knowledgeable consumer. With so much information available—both accurate and inaccurate—you should know how to make informed decisions about your nutritional well-being. Third, you are encouraged to learn the basic principles of nutrition and how to apply the concepts in this book that pertain specifically to you.

The text discusses some of the most interesting and important elements of nutrition and food consumption to help you understand both how your body works and how your food choices affect your health.

Features

Planning a New Way of Eating

Early in the text, we present many of the basic guidelines for planning a healthy diet, including a description of the USDA MyPyramid in Chapter 2. Later, in Chapter 13, we review steps involved in setting nutritional goals and designing a diet plan to attain those goals.

Understanding the World Around You

In a college environment, it is often difficult to envision how real the problem of world hunger is. Chapter 20 examines the tragedy of undernutrition and the conditions that create it. The chapter allows you to explore possible solutions that offer hope for the future of this world.

Pedagogy

The seventh edition of *Perspectives in Nutrition* incorporates some important tools to help you learn the nutrition concepts in this text. Following is a guide to those tools:

1. Each chapter begins with a Refresh Your Memory box reminding you of previous chapter content (or coursework) that will be helpful to know for understanding the current chapter. Also at the beginning of each chapter is a case scenario that allows you to apply knowledge gained from the chapter in a real-life setting. A follow-up to each case scenario is provided in the chapter at the point at which the specific content needed to answer the case scenario is covered.
2. **Chapter Objectives** help you focus your attention on key ideas in the chapter.
3. Throughout each chapter are **boldfaced key terms**, which are defined in the margin. All boldfaced terms appear with their definitions and pronunciations in the glossary at the end of the text.
4. Also throughout each chapter are **margin notes**, which further explain ideas or provide references to other chapters. Some margin notes, as well as the text itself contain URLs to nutrition-related websites.
5. The numerous **tables** throughout the text present major points.
6. The **Concept Checks**, which follow the major sections within each chapter, summarize key points. If you are having trouble understanding the material in the Concept Check, you should reread the preceding section.
7. **Critical Thinking** questions ask you to apply information as you learn it. This fosters understanding of the material.
8. **Nutrition Focus** essays within each chapter develop current topics in nutrition in greater detail.
9. Each chapter ends with a **summary**, which conveys the main ideas in the chapter, and **study questions**—both provide a review of chapter material.
10. **Annotated References** are provided to back up material presented in the chapter. If you are preparing a research paper for your class or would just like more information on specific topics, consult these sources.

11. Also at the end of each chapter are **Take Action** boxes, which relate the chapter's major concepts to your daily life. For example, you may be asked to look more carefully at your own diet, examine your family history, or apply information you've learned to friends or family.
12. A variety of supplements to this text, including dietary analysis software, are available to you. These instructional aids are designed to help you learn the major concepts developed in the text and prepare for class examinations.
13. The ARIS website www.mhhe.com/wardlawpers7 contains an online learning center with quizzes, flash cards, other activities, and web links designed to further help you learn about nutrition. This website is organized according to each chapter in the book.

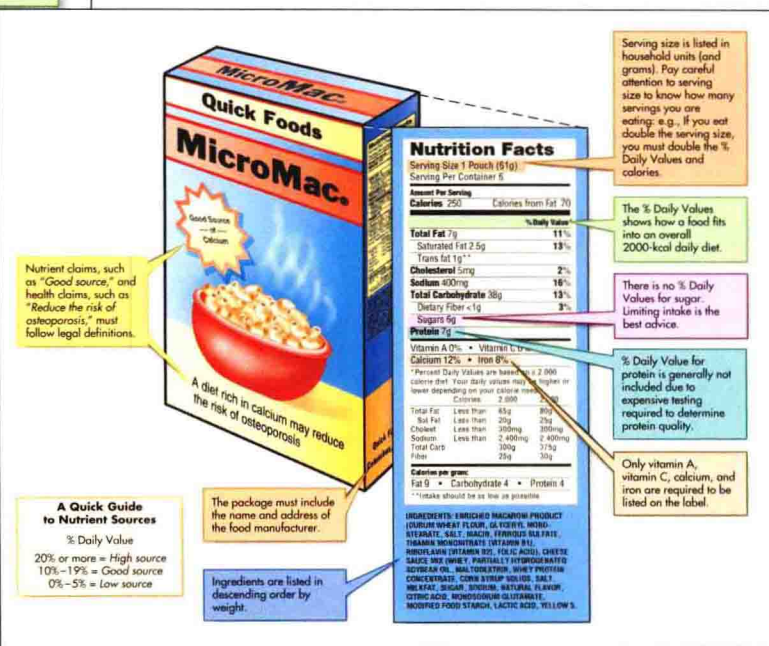
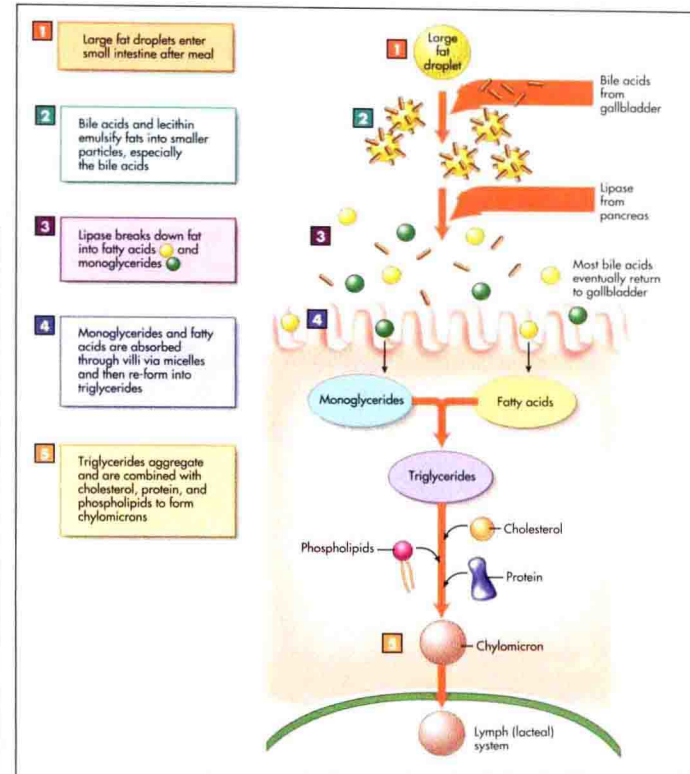
■ A Request to Students Who Use This Book

We try our best but realize that sometimes we miss a side of an argument that deserves attention or do not make something perfectly clear. If you find content that you question or believe warrants more detail or a clearer explanation, feel free to contact us.

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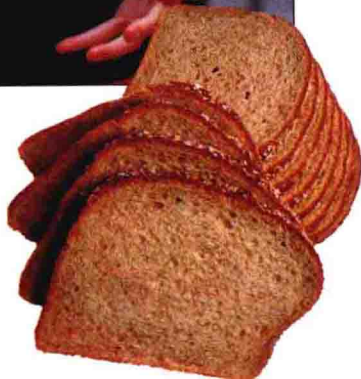
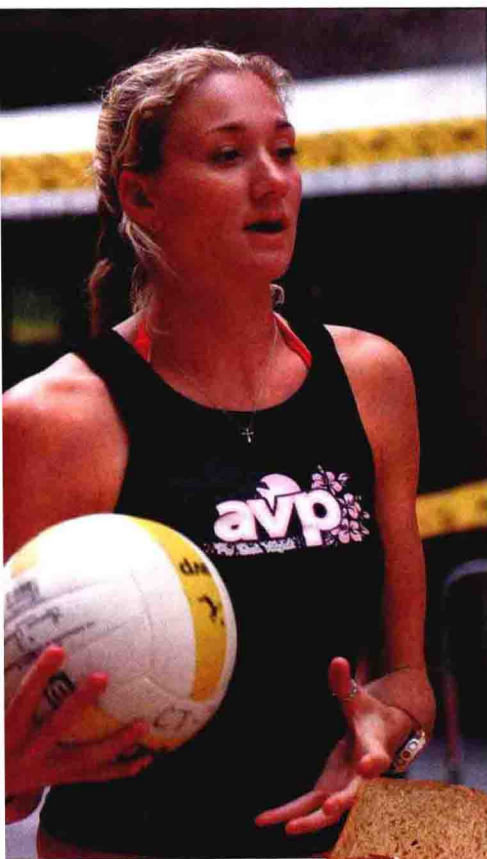
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The presentation of scientific concepts has been enhanced by dynamic new illustrations. Realistic renderings and careful color-coding and numbering of processes assist students in grasping difficult concepts.



Dynamic Photographs

Over 100 new photographs of people in real-life situations help enliven and bring relevance to the text.



Activity

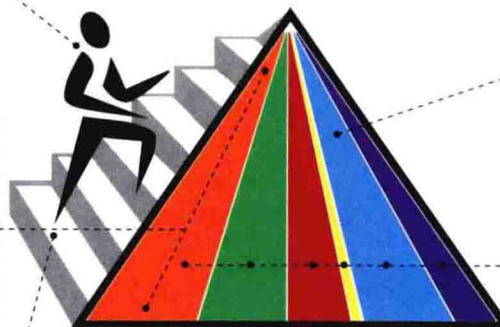
Activity is represented by the steps and the person climbing them, as a reminder of the importance of daily physical activity.

Moderation

Moderation is represented by the narrowing of each food group from bottom to top. The wider base stands for foods with little or no solid fats or added sugars. These should be selected more often. The narrower top area stands for foods containing more added sugars and solid fats. The more active you are, the more of these foods can fit into your diet.

Personalization

Personalization is shown by the person on the steps, the slogan, and the website. Find the kinds and amounts of food to eat each day at MyPyramid.gov.



MyPyramid.gov
STEPS TO A HEALTHIER YOU

Proportionality

Proportionality is shown by the different widths of the food group bands. The widths suggest how much food a person should choose from each group. The widths are just a general guide, not exact proportions. Check the website for how much is right for you.

Variety

Variety is symbolized by the 6 color bands representing the 5 food groups of the Pyramid and oils. This illustrates that foods from all groups are needed each day for good health.

Gradual Improvement

Gradual improvement is encouraged by the slogan. It suggests that individuals can benefit from taking small steps to improve their diet and lifestyle each day.





Expert Opinion

Vitamin C: Antioxidant and Pro-Ox and the Keystone of Tight Control

Mark Levine, M. D., and Sebastian J. Padayatty, M.R.C.P., Ph.D.

Is vitamin C (ascorbic acid, ascorbate) an antioxidant in humans, as popularly believed? Should vitamin C be obtained from supplements? In these questions, this section presents some essential background on vitamin C physiology, biology, and chemistry.

Designing Diets That Reduce Hunger and Enhance Health

Current Topics of Note

The latest nutrition issues reported in the media are explained in clear, scientific terms. Students learn how to read beyond the headlines to make sound nutrition judgments.

Expert Opinion

The Importance of Energy Density in the Diet

Barbara J. Rolls, Ph.D.

With the surge in the incidence of overweight and obesity, effective dietary strategies for weight management are needed. On the surface the issue is clear-cut: simply reduce energy intake below energy expenditure. There is much debate and controversy, however, over the optimal way this goal should be achieved. Although it is unlikely that a single dietary strategy will ever fit everyone's preferences, health professionals have a responsibility to communicate to the public which strategies are considered both safe and effective.

he diet, no matter how healthy, is shifted away from carbohydrate)

Why Focusing on Macronutrient Composition Is Not As Helpful

Both the scientific community and proponents of popular diets for weight loss have emphasized the importance of the proportions of the macronutrients in

Take

II. Are You Putting the Dietary Guidelines into Practice?

As noted in this chapter, the advice provided by the 2005 Dietary Guidelines for Americans can be summarized in a number of related activities. Fill out the following inventory to see to what extent you are following the Guidelines.

Food Intake

Do you:

☐ Y ☐ N

Consume a variety of nutrient-dense foods and beverages within and among the major food groups.

Choose foods that limit the intake of:

☐ Y ☐ N Saturated fat
☐ Y ☐ N Trans fats
☐ Y ☐ N Cholesterol
☐ Y ☐ N Added sugars
☐ Y ☐ N Salt
☐ Y ☐ N Alcohol (if used).
 Emphasize in your food choices:
☐ Y ☐ N Vegetables

Latest Dietary Guidelines

Throughout the text, content has been updated to reflect MyPyramid, 2005 Dietary Guidelines for Americans, and the latest Dietary Reference Intakes.



MyPyramid.gov
STEPS TO A HEALTHIER YOU

A Personalized Approach to Nutrition

The authors provide ample opportunities for students to apply nutrition concepts and guidelines to their own lives. Real-life examples and individualized activities make the material relevant and help students learn to assess the validity of nutrition claims.

CHAPTER ELEVEN

WATER AND THE MAJOR MINERALS

CHAPTER OUTLINE

Water
 Water in the Body—Intracellular and Extracellular Fluid • Functions of Water • Water in Foods • Water Needs • Water-Deficiency Diseases • Water Toxicity
 Minerals
 Absorption, Transport, and Excretion of Minerals • Functions of Minerals • Food Sources of Minerals • North Americans at Risk for Mineral Deficiencies • Toxicity of Minerals
 Sodium (Na)
 Absorption, Transport, Storage, and Excretion of Sodium • Functions of Sodium • Sodium in Foods • Sodium Needs • Sodium-Deficiency Diseases • Upper Level for Sodium
 Potassium (K)
 Absorption, Transport, Storage, and Excretion of Potassium • Functions of Potassium • Food Sources of Potassium • Potassium Needs • Potassium-Deficiency Diseases • Upper Level for Potassium

CASE SCENARIO:

Jana, a sophomore in high school, recently gave up drinking milk. She thought she could stay slim by avoiding all the calories in milk. Her mother is concerned about her diet change, especially Jana's future risk of osteoporosis. Jana needs an adequate source of calcium in her diet to allow for continued bone development and maintenance of the bone mass she already has. Jana also recently started smoking and her only physical activity is practice for the Women's Glee Club.

Jana's diet on a recent day consisted of the following items. For breakfast, she had oatmeal made with water, a banana, and a cup of fruit juice. At midmorning, she bought a snack cake from the vending machine. At lunch, she had vegetable pasta, bread with olive oil, a side salad, 1 ounce of mixed nuts, and a soft drink. For dinner, she had a hamburger along with mixed vegetables and another soft drink. As an evening snack, she had some cookies and hot tea.

FATS

- Consume less than 10 percent of energy intake from saturated fatty acids and less than 300 mg per day of cholesterol, and keep trans fatty acid consumption as low as possible.
- Keep total fat intake between 20 to 35% of energy intake, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.
- When selecting and preparing meat, poultry, dry beans, and milk or milk products, make choices that are lean, low-fat, or fat-free.
- Limit intake of fats and oils high in saturated and/or trans fatty acids, and choose products low in such fats and oils.

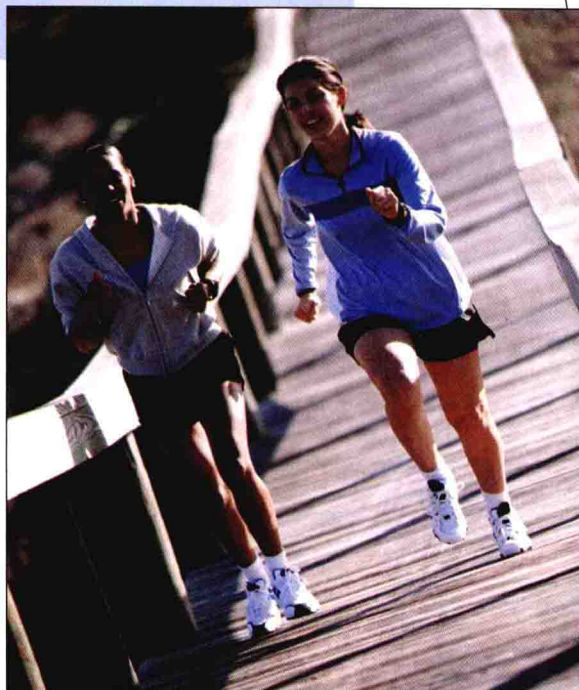
Key Recommendations for Specific Population Groups

- Children and adolescents. Keep total fat intake between 30 to 35% of energy intake for children 2 to 3 years of age and between 25 to 35% of energy intake for children and adolescents 4 to 18 years of age, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.



Digital Content Manager CD-ROM

If you're looking for illustrations, photographs, tables, and animations to incorporate into your lecture presentations, handouts, or quizzes, this easy-to-use CD contains hundreds of digital assets from *Perspectives in Nutrition*, 7th edition. Simply click on the chapter folder, select an image, and you're ready to import the image into the application of your choice. It's that simple!



PowerPoint Lecture Outlines

A complete PowerPoint lecture outline with illustrations from the textbook is available for every chapter. Use the outline as is or modify it to match your specific course needs.

Carbohydrates

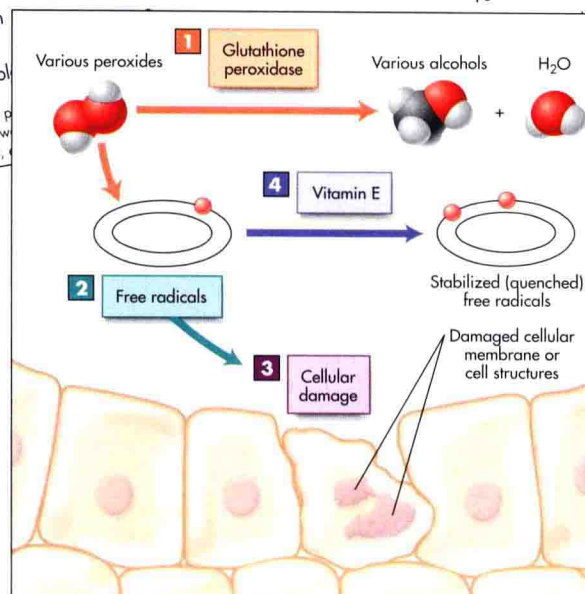
- ✱ Composed of C, H, O
- ✱ Provide a major source of fuel for the body
- ✱ Basic unit is glucose
- ✱ Simple and Complex CHO
- ✱ Energy yielding (4 kcal /gm)



Table 14-8 | Energy and Macronutrient Contents of Popular Energy Bars and Gels

Product	Energy (kcal)	Carbohydrates (g)	Protein (g)	Fat (g)
PowerBar Performance (chocolate)	230	45	10	2
PowerBar ProteinPlus (cookies & cream)	230	38	24	5
PowerBar PowerGel (lemon lime)	110	28	0	0
Luna Bar (cherry-covered chocolate)	180	28	10	4
Clif Bar (chocolate chip)	250	45	10	5
Clif Shot (viva vanilla)	100	24	0	0
Balance Bar (chocolate)	200	22	14	6
Balance Satisfaction (chocolate crisp)		47	12	6
Boulder Bar (chocolate)			10	4

Choosing energy bars is a handy choice. Better yet, how a less expensive choice,

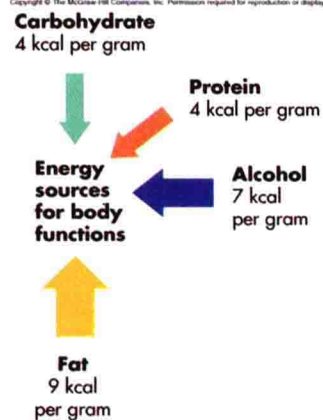


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pg 11

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Animations

Animations found on the Digital Content Manager CD-ROM allow you to harness the visual impact of processes in motion. You can import the animations into presentations or online course materials.

Enzyme Action and the Hydrolysis of Sucrose

Hydrolysis is accomplished because when the sucrose molecule binds to the active site of the enzyme, the enzyme's configuration is changed so that the oxygen bridge between the two monosaccharides is exposed to water molecules in the solvent.

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Protein Denaturation

Protein denaturation changes the solubility of individual protein molecules, entrapping solvent water into a semisolid gel structure.

This familiar gelatin dessert actually is a good example of the process of coagulation of proteins into a three dimensional latticework that entraps water molecules to produce a semisolid gel.

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Text-Edit Art

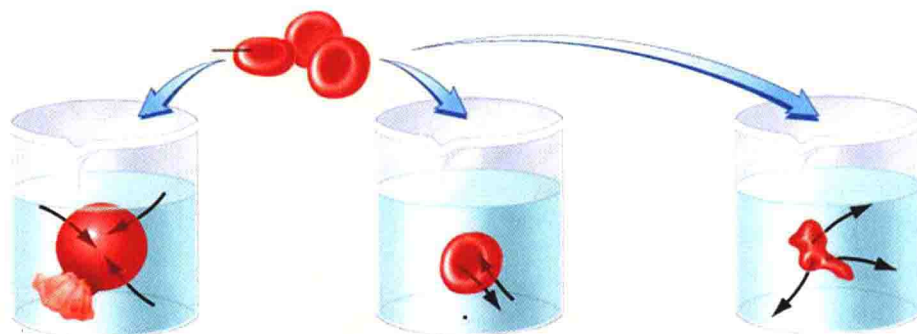
Have you ever wished you could customize illustrations to meet your course needs? With Text-Edit Art, you can change the size, color, and labels. You can even resize or delete portions of figures.

(a) Dilute solution
A dilute solution with a low ion concentration results in swelling (black arrows) and subsequent rupture (puff of red in the lower left part of the cell) of a red blood cell placed into the solution.

(b) Normal concentration
A normal concentration (a concentration of ions outside the cell equal to that inside the cell) results in a typically shaped red blood cell. Water moves into and out of the cell in equilibrium (black arrows), but there is no net water movement.

(c) Concentrated solution
A concentrated solution, with a high ion concentration, causes shrinkage of the red blood cell as water moves out of the cell and into the concentrated solution (black arrows).

Dilute solution
Normal concentration
Concentrated solution



NBC News Nutrition Video Clips

Enliven your lectures with the nutrition topics that are on your students' minds. McGraw-Hill is pleased to announce that we have licensed a series of videos from NBC News. These brief clips on important nutrition issues are perfect for introducing lecture topics or class discussions. Ask your local representative about this valuable presentation CD. You and your students can also access the videos on the textbook website.

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■ Mercury, Fish and Pregnancy	4:00
■ Cholesterol Lowering Drugs	2:07
■ Fighting Childhood Obesity	4:55
■ Osteoporosis	1:09
■ Guidelines for Breastfeeding Mothers	4:29



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