

The background of the entire cover is a close-up photograph of several watermelons. One watermelon in the center is cut in half, revealing its bright red, seed-filled interior. The other watermelons are whole, showing their characteristic green and dark green striped rinds. The lighting is bright, highlighting the textures of the watermelon skin and flesh.

Discovering

Nutrition

Sixth Edition

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Brief Contents

Chapter 1	Food Choices: Nutrients and Nourishment 2
Chapter 2	Nutrition Guidelines: Tools for a Healthful Diet 32
Chapter 3	The Human Body: From Food to Fuel 68
Chapter 4	Carbohydrates: Simple Sugars and Complex Chains 102 Spotlight on Alcohol 134
Chapter 5	Lipids: Not Just Fat 160
Chapter 6	Proteins and Amino Acids: Function Follows Form 198
Chapter 7	Vitamins: Vital Keys to Health 238 Spotlight on Dietary Supplements and Functional Foods 292
Chapter 8	Water and Minerals: The Ocean Within 324 Spotlight on Metabolism and Energy Balance 378
Chapter 9	Nutrition for Physical Performance 428 Spotlight on Eating Disorders 466
Chapter 10	Diet and Health 492 Spotlight on Obesity and Weight Management 538
Chapter 11	Life Cycle: Maternal and Infant Nutrition 582
Chapter 12	Life Cycle: From Childhood to Adulthood 628 Spotlight on World Nutrition: The Faces of Global Malnutrition 666
Chapter 13	Food Safety and Technology: Microbial Threats and Genetic Engineering 692



Contents

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Preface xv

About the Authors xxiv

Contributors xxv

Reviewers xxvii

Acknowledgments xxxi

Chapter 1

Food Choices: Nutrients and Nourishment 2

Why Do We Eat the Way We Do? 3

Personal Preferences 4
Sensory Influences: Taste, Smell, and Texture 5
Emotional and Cognitive Influences 5
Environment 8
Social-Ecological Model 9
The Standard American Diet 10

FYI: Food and Culture 12

Introducing the Nutrients 12

Definition of Nutrients 13
Carbohydrates 15
Lipids 15
Proteins 16
Vitamins 16
Minerals 16
Water 17
Nutrients and Energy 17
Energy in Foods 18
Diet and Health 19

Applying the Scientific Process to Nutrition 20

From Research Study to Headline 23

Publishing Experimental Results 23
From Journals to the Public 24
Sorting Facts and Fallacies in the Media 24

FYI: The Affordable Care Act and Nutrition 27

Learning Portfolio 28

Key Terms 28
Study Points 28
Study Questions 29
Try This 29

Getting Personal 29

References 30

Chapter 2

Nutrition Guidelines: Tools for a Healthful Diet 32

Linking Nutrients, Foods, and Health 34

Adequacy 34
Balance 35
Calorie Control 35
Nutrient Density 35
Moderation 36
Variety 37

Dietary Guidelines 38

Dietary Guidelines for Americans 38
Canada's Food Guide 43

FYI: MyPlate: Foods, Serving Sizes, and Tips 44

Using MyPlate or *Canada's Food Guide* in Diet Planning 48

FYI: Portion Distortion 51

Recommendations for Nutrient Intake: The DRIs 51

Understanding Dietary Standards 51
A Brief History of Dietary Standards 52
Dietary Reference Intakes 52
Use of Dietary Standards 54

Food Labels 55

Ingredients and Other Basic Information 56
Nutrition Facts Panel 57
Daily Values 59
Nutrient Content Claims 59
Health Claims 60
Structure/Function Claims 61

FYI: Definitions for Nutrient Content Claims on Food Labels 62

Using Labels to Make Healthful Food Choices 63

Learning Portfolio 65

Key Terms 65
Study Points 65
Study Questions 65
Try This 66

Getting Personal 66
References 67

Chapter 3

The Human Body: From Food to Fuel 68

The Gastrointestinal Tract 69

Organization of the GI Tract 71

Overview of Digestion: Physical and Chemical Processes 72

The Physical Movement and Breakdown of Food 72

The Chemical Breakdown of Food 72

Overview of Absorption 74

The Roads to Nutrient Absorption 74

Accessory Organs 76

Salivary Glands 76

Liver 76

Gallbladder 77

Pancreas 77

Putting It All Together: Digestion and Absorption 77

Mouth 77

Stomach 78

Small Intestine 80

Large Intestine 81

Gut Microbiota 83

FYI: Gut Microbiota Out of Whack? Pre- and Probiotics May Help 84

Circulation of Nutrients 84

Vascular System 84

Lymphatic System 85

Excretion and Elimination 86

Signaling Systems: Command, Control, and Defense 86

Nervous System 86

Hormonal System 87

Immune System 87

Influences on Digestion and Absorption 88

Psychological Influences 88

Chemical Influences 88

Bacterial Influences 88

Nutrition and GI Disorders 89

Constipation 89

Diarrhea 90

Diverticulosis 92

Heartburn and Gastroesophageal

Reflux Disease 93

Irritable Bowel Syndrome 93

Colorectal Cancer 94

Gas 94

Ulcers 95

Learning Portfolio 98

Key Terms 98

Study Points 99

Study Questions 99

Try This 99

Getting Personal 99

References 100

Chapter 4

Carbohydrates: Simple Sugars and Complex Chains 102

What Are Carbohydrates? 103

Simple Sugars 104

Monosaccharides: The Single Sugars 104

Disaccharides: The Double Sugars 105

Complex Carbohydrates 106

Oligosaccharides 106

Polysaccharides 106

Carbohydrate Digestion and Absorption 111

Digestion of Carbohydrates 111

Absorption 113

Carbohydrates in the Body 113

Roles of Glucose 114

Regulating Blood Glucose Levels 115

FYI: Is the Glycemic Index a Useful Tool for Constructing a Healthy Diet with Carbohydrates? 117

The Role of Carbohydrates in Our Diet 119

Recommended Intake of Carbohydrate 119

Current Consumption: How Much Carbohydrate Do You Eat? 120

Choosing Carbohydrates Wisely 120

Fiber in Our Diet 121

Moderating Added Sugar Intake 122

FYI: Excessive Sugar in the American Diet 123

Carbohydrates and Health 125

Fiber and Obesity 125

Fiber and Type 2 Diabetes 126

Fiber and Cardiovascular Disease	126
Negative Health Effects of Excess Fiber	126
Health Effects of Sugar: Causation or Correlation?	127
Sugar and Dental Caries	128
Health Effects of Artificial Sweeteners	129

Learning Portfolio 131

Key Terms	131
Study Points	131
Study Questions	132
Try This	132
References	132

Spotlight on Alcohol 134

Alcohol in Context 135

History of Alcohol Use	136
The Character of Alcohol	136
Is Alcohol a Nutrient?	136
Alcohol and Its Sources	138

Alcohol in the Body 139

Alcohol Absorption	139
Removing Alcohol from Circulation	140
Individual Differences in Alcohol Breakdown	142

When Alcohol Becomes a Problem 143

Alcohol in the Brain and the Nervous System	143
FYI: Changing the Culture of Campus Drinking	146
Alcohol's Effect on the Gastrointestinal System	147
Alcohol and the Liver	148
Fetal Alcohol Syndrome	148

Alcoholics and Malnutrition 150

Poor Diet	150
Vitamin Deficiency	150
Mineral Deficiency	150
Macronutrients	151

FYI: Myths About Alcohol 151

Body Weight	152
-------------	-----

Does Alcohol Have Benefits 152

Learning Portfolio 157

Key Terms	157
Study Points	157
Study Questions	157
Try This	157
References	157

Chapter 5

Lipids: Not Just Fat 160

What Are Lipids? 162

Fatty Acids Are Key Building Blocks 162

Chain Length	162
Saturation	162
Cis Versus Trans	165
Omega-3 and Omega-6 Fatty Acids	165

Triglycerides 166

Triglyceride Structure	166
Triglyceride Functions	167
Triglycerides in Food	169

FYI: Fats on the Health Food Store Shelf 170

Phospholipids 172

Phospholipid Structure	172
Phospholipid Functions	172
Phospholipids in Food	173

Sterols 174

Cholesterol Functions	174
Cholesterol Synthesis	174
Sterols in Food	174

FYI: Which Spread for Your Bread? 175

Lipid Digestion and Absorption 176

Lipid Digestion	177
Lipid Absorption	178
Digestion and Absorption of Sterols	180

Transportation of Lipids in the Body 180

Chylomicrons	181
Very-Low-Density Lipoproteins	181
Intermediate-Density Lipoproteins	181
Low-Density Lipoproteins	182
High-Density Lipoproteins	182

Recommendations for Fat Intake 182

Recommendations for Omega Fatty Acid Intake	185
Current Dietary Intakes	186
Fat Replacers: What Are They? Are They Safe? Do They Save Calories?	187

FYI: Does Reduced Fat Reduce Calories? Don't Count on It! 188

Lipids and Health 189

Health Effects of Omega Fatty Acids	189
Heart Disease	190
Obesity	191
Metabolic Syndrome	192

Cancer 192
Putting It All Together 192

Learning Portfolio 194

Key Terms 194
Study Points 194
Study Questions 195
Try This 195
References 196

Chapter 6

Proteins and Amino Acids: Function Follows Form 198

Why Is Protein Important? 199

Amino Acids Are the Building Blocks of Proteins 200

Amino Acids Are Identified by
 Their Side Groups 201
Protein Structure: Unique Three-Dimensional
 Shapes and Functions 201
Protein Denaturation: Destabilizing a Protein's
 Shape 202

Functions of Body Proteins 203

FYI: Scrabble Anyone? 203

Structural and Mechanical Functions 204
Immune Function 204
Enzymes 205
Hormones 206
Acid–Base Balance 206
Transport Functions 207
Fluid Balance 207
Source of Energy and Glucose 208

Protein Digestion and Absorption 208

Protein Digestion 208
Undigested Protein 210
Amino Acid and Peptide Absorption 210

Proteins in the Body 211

Protein Synthesis 211

FYI: Celiac Disease and Gluten Sensitivity 211

The Amino Acid Pool and Protein Turnover 212
Synthesis of Nonprotein Molecules 212
Protein and Nitrogen Excretion 213
Nitrogen Balance 214

Proteins in the Diet 215

Recommended Intakes of Protein 215

FYI: Do Athletes Need More Protein? 217

Protein Consumption 218
Protein Quality 218
Proteins and Amino Acids as Additives and
 Supplements 220

FYI: High-Protein Plant Foods 221

Vegetarian Eating Patterns 223

Why People Become Vegetarians 223
Types of Vegetarian Diets 224
Health Benefits of Vegetarian Diets 224
Health Risks of Vegetarian Diets 225
Dietary Recommendations for Vegetarians 225

The Health Effects of Too Little or Too Much Protein 227

Protein–Energy Malnutrition 227

FYI: High-Protein Diets and Supplements 228

Health Effects of Excess Dietary Protein 230

Learning Portfolio 234

Key Terms 234
Study Points 234
Study Questions 234
Try This 235
Getting Personal 235
References 236

Chapter 7

Vitamins: Vital Keys to Health 238

Understanding Vitamins 239

Fat-Soluble Versus Water-Soluble Vitamins 240
Food Preparation Affects Vitamins in Foods 242

FYI: Fresh, Frozen, or Canned? Raw, Dried, or Cooked? 243

The Fat-Soluble Vitamins 244

Vitamin A and Carotenoids 244

Forms of Vitamin A 244
Functions of Vitamin A 245
Dietary Recommendations for Vitamin A 247
Sources of Vitamin A 248
Vitamin A Deficiency 249
Vitamin A Toxicity 250
The Carotenoids 250
Functions of Carotenoids 251
Food Sources and Absorption of Carotenoids 252
Carotenoid Supplementation 253

Vitamin D 253

Forms and Formation of Vitamin D 253
Functions of Vitamin D 254

Dietary Recommendations for Vitamin D 255

Sources of Vitamin D 255

Vitamin D Deficiency 256

Vitamin D and Other Conditions 257

Vitamin D Toxicity 257

Vitamin E 258

Forms of Vitamin E 258

Functions of Vitamin E 258

Dietary Recommendations for Vitamin E 258

Sources of Vitamin E 260

Vitamin E Deficiency 261

Vitamin E Toxicity 261

Vitamin K 261

Functions of Vitamin K 262

Dietary Recommendations for Vitamin K 262

Sources of Vitamin K 262

Vitamin K Deficiency 262

Vitamin K Toxicity 263

The Water-Soluble Vitamins: Eight Bs and a C 264

Thiamin 265

Functions of Thiamin 265

Dietary Recommendations and Sources of Thiamin 265

Thiamin Deficiency 266

Thiamin Toxicity 267

Riboflavin 267

Functions of Riboflavin 267

Dietary Recommendations and Sources of Riboflavin 267

Riboflavin Deficiency 268

Riboflavin Toxicity 268

Niacin 269

Functions of Niacin 269

Dietary Recommendations and Sources of Niacin 269

Niacin Deficiency 270

Niacin Toxicity and Medicinal Uses of Niacin 270

Vitamin B₆ 271

Functions of Vitamin B₆ 271

Dietary Recommendations and Sources of Vitamin B₆ 272

Vitamin B₆ Deficiency 272

Vitamin B₆ Toxicity and Medicinal Uses of Vitamin B₆ 273

Folate 273

Functions of Folate 273

Dietary Recommendations and Sources of Folate 273

Folate Deficiency 275

Folate Toxicity 276

Vitamin B₁₂ 276

Functions of Vitamin B₁₂ 276

Dietary Recommendations and Sources of Vitamin B₁₂ 276

Absorption of Vitamin B₁₂ 277

Vitamin B₁₂ Deficiency 277

Vitamin B₁₂ Toxicity 278

Pantothenic Acid 279

Functions of Pantothenic Acid 279

Dietary Recommendations and Sources of Pantothenic Acid 279

Pantothenic Acid Deficiency 279

Pantothenic Acid Toxicity 279

Biotin 279

Functions of Biotin 279

Dietary Recommendations and Sources of Biotin 279

Biotin Deficiency 280

Biotin Toxicity 280

Choline: A Vitamin-Like Substance 280

Vitamin C 281

Functions of Vitamin C 281

Dietary Recommendations and Sources of Vitamin C 282

Vitamin C Deficiency 282

Vitamin C Toxicity 283

Conditional Nutrients 285

Learning Portfolio 287

Key Terms 287

Study Points 287

Study Questions 288

Try This 288

Getting Personal 289

References 289

Spotlight on Dietary Supplements and Functional Foods 292

Dietary Supplements: Vitamins and Minerals 293

Moderate Supplementation 294

Megadoses in Conventional Medical Management 300

Megadosing Beyond Conventional Medicine: Orthomolecular Nutrition 300

Drawbacks of Megadoses 301

Dietary Supplements: Natural Health Products 302

Helpful Herbs, Harmful Herbs 302
Other Dietary Supplements 304

Dietary Supplements in the Marketplace 305

The FTC and Supplement Advertising 305
The FDA and Supplement Regulation 305
Supplement Labels 306
Canadian Regulations 306
Choosing Dietary Supplements 307
Fraudulent Products 308

FYI: Shopping for Supplements 309

Functional Foods 310

Phytochemicals Make Foods Functional 310
Foods Enhanced with Functional Ingredients and Additives 316
Regulatory Issues for Functional Foods 316
Health Claims for Functional Foods 317
Structure/Function Claims for Functional Foods 317
Strategies for Functional Food Use 318

FYI: Defining Complementary and Integrative Health: How Does Nutrition Fit? 319

Learning Portfolio 321

Key Terms 321
Study Points 321
Study Questions 321
Try This 322
Getting Personal 322
References 322

Chapter 8

Water and Minerals: The Ocean Within 324

Water: Crucial to Life 325

Electrolytes and Water: A Delicate Balance 325
Functions of Water 326

Intake Recommendations: How Much Water Is Enough? 327

Water Excretion: Where Does the Water Go? 328

Water Balance 328
Alcohol, Caffeine, and Common Medications Affect Fluid Balance 329
Dehydration 329

FYI: Tap, Filtered, or Bottled: Which Water Is Best? 330

Water Intoxication 331

Minerals 332

Minerals in Foods 333
Bioavailability 333

Major Minerals and Health 333

Sodium 333

Dietary Recommendations and Sources of Sodium 334
Dealing with Excess Sodium 334

Potassium 335

Dietary Recommendations and Sources of Potassium 336
When Potassium Balance Goes Awry 336

Chloride 337

Dietary Recommendations and Sources of Chloride 337
Who Risks Chloride Deficiency? 338

Calcium 338

Functions of Calcium 338
Regulation of Blood Calcium Levels 339
Dietary Recommendations for Calcium 339
Sources of Calcium 340
Calcium Absorption 340

FYI: Calcium Supplements: Are They Right for You? 341

When Calcium Balance Goes Awry 342

Phosphorus 342

Dietary Recommendations and Sources of Phosphorus 342
When Phosphate Balance Goes Awry 343

Magnesium 344

Dietary Recommendations and Sources of Magnesium 344
When Magnesium Balance Goes Awry 344

Sulfur 345

Trace Minerals 346

Iron 347

Functions of Iron 347
Regulation of Iron in the Body 348
Dietary Recommendations for Iron 350
Sources of Iron 350
Iron Deficiency 351
Iron Toxicity 352

Zinc 353

Functions of Zinc 353

FYI: Zinc and the Common Cold 354

Regulation of Zinc in the Body 355
 Dietary Recommendations for Zinc 355
 Sources of Zinc 355
 Zinc Deficiency 356
 Zinc Toxicity 356

Selenium 357

Functions of Selenium 357
 Absorption and Excretion of Selenium 357
 Dietary Recommendations and Sources of Selenium 357
 Selenium Deficiency and Toxicity 358

Iodine 359

Dietary Recommendations and Sources of Iodine 359
 Iodine Deficiency 360
 Iodine Toxicity 361

Copper 361

Copper Absorption and Storage 361
 Dietary Recommendations and Sources of Copper 361
 Copper Deficiency 362
 Copper Toxicity 362

Manganese 362

Dietary Recommendations and Sources of Manganese 363
 Manganese Deficiency and Toxicity 363

Fluoride 364

Functions of Fluoride 364
 Dietary Recommendations and Sources of Fluoride 364
 When Fluoride Balance Goes Awry 365
 The Fluoridation Debate 365

Chromium 366

Dietary Recommendations and Sources of Chromium 366
 Chromium Deficiency and Toxicity 366

Molybdenum 366

Other Trace Minerals and Ultratrace Minerals 367

Arsenic 367
 Boron 367
 Nickel 367
 Silicon 371
 Vanadium 371

Learning Portfolio 373

Key Terms 373
 Study Points 373
 Study Questions 374

Getting Personal 374
 Try This 375
 References 375

Spotlight on Metabolism and Energy Balance 378

Energy: Fuel for Work 379

Transferring Food Energy to Cellular Energy 380

What Is Metabolism? 380

The Cell Is the Metabolic Processing Center 382
 Who Are the Key Energy Players? 383

Breakdown and Release of Energy 385

Extracting Energy from Carbohydrate 385

FYI: Lactate Is Not a Metabolic Dead End 389

Extracting Energy from Fat 392
 Extracting Energy from Protein 394

Alcohol Metabolism 396

Metabolizing Small Amounts of Alcohol 396
 Metabolizing Large Amounts of Alcohol 397

Biosynthesis and Storage 398

Making Carbohydrate (Glucose) 398
 Making Fat (Fatty Acids) 400
 Making Ketone Bodies 401
 Making Protein (Amino Acids) 401

Special States 402

Feasting 402
 Fasting 403

Energy Balance: Finding Your Equilibrium 406

Energy In 407

Hunger, Satiety, and Satiety 408
 Appetite 408
 Control by Committee 408

Energy Out: Fuel Uses 412

Major Components of Energy Expenditure 412
 Estimating Total Energy Expenditure 415

FYI: What's Neat About NEAT? 416

DRIs for Energy: Estimated Energy Requirements 418

FYI: How Many Calories Do I Burn? 418

Body Composition: Understanding Fatness and Weight 419

Assessing Body Weight 419

Assessing Body Fatness 421

Body Fat Distribution 422

Learning Portfolio 424

Key Terms 424

Study Points 424

Study Questions 425

Try This 426

References 426

Chapter 9

Nutrition for Physical Performance 428

Nutrition and Physical Performance 429

Exercise Intensity 432

Muscle Strengthening Exercises 432

Flexibility and Neuromotor Exercises 432

Some Is Better Than None 432

Energy Systems, Muscles, and Physical Performance 434

ATP–CP Energy System 434

Lactic Acid Energy System 435

Oxygen Energy System 435

Teamwork in Energy Production 435

Glycogen Depletion 436

Endurance Training 437

Muscles and Muscle Fibers 438

Optimal Nutrition for Exercise Performance 439

Before: Fuel and Hydration 440

Before Exercising 440

During: Slowing Fluid and Energy Loss 440

After: Time to Replenish (the Sooner,
the Better) 440

After Exercising 440

Nutrition for the Competitive Athlete 441

Fluid Needs During Extensive Exercise 441

Hydration 442

Muscle Cramps 443

FYI: When Are Sports Drinks Recommended? 444

Energy Intake and Exercise 444

Carbohydrate and Exercise 445

Pre-exercise Carbohydrate Intake 447

Carbohydrate Intake During Exercise 448

Postexercise Carbohydrate Intake 448

Dietary Fat and Exercise 448

Fat Intake and the Athlete 449

Protein and Exercise 449

Protein Recommendations for Athletes 449

Timing Protein Intake with Exercise 450

Optimal Protein Sources for Athletes 450

Dangers of High Protein Intake 450

*FYI: Nutrition Periodization: Tailoring Nutrition
Intake to Exercise Goals* 451

Vitamins, Minerals, and Exercise Performance 452

B Vitamins 452

Calcium 452

Iron 452

Vitamin D 453

Other Trace Minerals 453

The Vegetarian Athlete 454

Nutrition Needs of Youth in Sport 455

Nutrition Supplements and Ergogenic Aids 455

Concerns About Supplements and
Ergogenic Aids 456

Weight and Body Composition 458

Weight Gain: Build Muscle, Lose Fat 459

Weight Loss: The Panacea for Optimal Performance? 459

Weight Loss: Negative Consequences for the
Competitive Athlete? 460

Learning Portfolio 463

Key Terms 463

Study Points 463

Study Questions 464

Try This 464

References 464

Spotlight on Eating Disorders 466

The Eating Disorder Continuum 468

Body Image 468

Eating Disorders Define 469

Health Consequences of Eating Disorders 471

*FYI: Night-Eating Syndrome: Not an Eating Disorder, but Sometimes
a Concern* 471

Prevalence of Eating Disorders 472

No Simple Causes 473

The Cultural-Psychological Interaction 473

Biological Factors 474

A Closer Look at Anorexia Nervosa 474

FYI: Exploring the Connection Between Negative Affect and Eating Disorders 474

Warning Signs of Anorexia Nervosa 475
Treatment for Anorexia Nervosa 476

A Closer Look at Bulimia Nervosa 478

Warning Signs of Bulimia Nervosa 478
Treatment for Bulimia Nervosa 479

A Closer Look at Binge-Eating Disorder 480

Warning Signs of Binge-Eating Disorder 480

FYI: Diary of an Eating Disorder 480

Treatment for Binge-Eating Disorder 481

Eating Disorders: Specific Populations 482

Males: An Overlooked Population 482
Athletes 483
The Female Athlete Triad 483

Combating Eating Disorders 485

Learning Portfolio 488

Key Terms 488
Study Points 488
Study Questions 488
Try This 488
Getting Personal 489
References 489

Chapter 10

Diet and Health 492

Nutrition and Chronic Disease 493

Nutrition Informatics 494
Healthy People 2020 494
Health Disparities 494
Obesity, Physical Inactivity, and Chronic Disease 495
Dietary Components and Cardiometabolic Disease 496

Genetics and Disease 497

The Workings of DNA and Genes 498

Cardiovascular Disease 499

The Cardiovascular System and Cardiovascular Disease 500
What Is Atherosclerosis? 500
Risk Factors for Atherosclerosis 501
Putting It All Together 507

Hypertension 508

What Is Blood Pressure? 508
What Is Hypertension? 509

Stress and Hypertension 509
Risk Factors for Hypertension 510
Dietary and Lifestyle Factors for Reducing Hypertension 510
Putting It All Together 512

Cancer 513

What Is Cancer? 513
Risk Factors for Cancer 514
Dietary and Lifestyle Factors for Reducing Cancer Risk 515
Putting It All Together 518

Diabetes Mellitus 519

What Is Diabetes? 519
Low Blood Glucose Levels: Hypoglycemia 523
Risk Factors for Diabetes 523
Dietary and Lifestyle Factors for Reducing Diabetes Risk 525

FYI: Nutrition, Health, and Wellness Coaching 525

Management of Diabetes 526
Nutrition 526
Putting It All Together 527

Metabolic Syndrome 527

Osteoporosis 528

What Is Osteoporosis? 528
Risk Factors for Osteoporosis 529
Dietary and Lifestyle Factors for Reducing Osteoporosis Risk 529
Putting It All Together 531

Learning Portfolio 533

Key Terms 533
Study Points 533
Study Questions 534
Try This 534
Getting Personal 534
References 534

Spotlight on Obesity and Weight Management 538

The Obesity Epidemic 539

Factors in the Development of Obesity 542

Biological Factors 542
Social and Environmental Factors 544

FYI: U.S. Obesity Trends: 1985 to 2015 547

FYI: Does Our Environment Make Us Fat? 549

Lifestyle and Behavior Factors 550

FYI: Is Food Addiction Real? 551

Childhood Overweight 553

FYI: *Childhood and Teenage Obesity: “The First Generation That Does Not Outlive Its Parents”* 554

Health Risks of Overweight and Obesity 556

Weight Cycling 558

Obesity Is a Preventable National Crisis 558**Weight Management 559**

FYI: *Can Medicines Lead to Obesity?* 560

The Perception of Weight 560

What Goals Should I Set? 561

Adopting a Healthy Weight-Management Lifestyle 562

Diet and Eating Habits 563

Physical Activity 565

FYI: *Learning Weight Management from Some of the “Biggest” Weight Experts: Sumo Wrestlers* 565

Thinking and Emotions 566

Weight-Management Approaches 568

FYI: *Behaviors That Will Help You Manage Your Weight* 570

Underweight 575

Causes and Assessment 575

Weight-Gain Strategies 576

Learning Portfolio 578

Key Terms 578

Study Points 578

Study Questions 578

Try This 579

References 579

Chapter 11**Life Cycle: Maternal and Infant Nutrition 582****Nutrition Before Conception 583**

Weight 584

Vitamins 585

Substance Use 587

Physiology of Pregnancy 587

Stages of Human Fetal Growth 587

Maternal Physiological Changes and Nutrition 588

Maternal Weight Gain 590

Energy and Nutrition During Pregnancy 592

Nutrients to Support Pregnancy 592

FYI: *Vegetarianism and Pregnancy* 594

Food Choices for Pregnant Women 596

Substance Use and Pregnancy Outcome 598

Special Situations During Pregnancy 598

Lactation 601

Breastfeeding Trends 601

Physiology of Lactation 602

Nutrition for Breastfeeding Women 603

Practices to Avoid During Lactation 605

Benefits of Breastfeeding 605

Contraindications to Breastfeeding 607

Resources for Pregnant and Lactating Women and Their Children 607

Infancy 608

Infant Growth and Development 608

Energy and Nutrient Needs During Infancy 610

Newborn Breastfeeding 613

Alternative Feeding: Infant Formula 613

Breast Milk or Formula: How Much Is Enough? 615

Feeding Technique 615

Introduction of Solid Foods into the Infant’s Diet 615

FYI: *New Guidelines for Introducing Peanut Products* 616

Developmental Readiness for Solid Foods 616

Feeding Problems During Infancy 619

FYI: *Fruit Juices* 621

Learning Portfolio 623

Key Terms 623

Study Points 623

Study Questions 624

Try This 624

References 625

Chapter 12**Life Cycle: From Childhood to Adulthood 628****Childhood 629**

Energy and Nutrient Needs During Childhood 630

Influences on Childhood Food Habits and Intake 632

FYI: *Food Hypersensitivities and Allergies* 633

Nutritional Concerns of Childhood 634

Adolescence 637

FYI: *Farmers’ Markets* 637

Physical Growth and Development 638

Emotional Maturity: Developmental Tasks 638

Nutrient Needs of Adolescents 638

Nutrition-Related Concerns for Adolescents 641

FYI: *School Vending Machines and the Teen Diet* 641

Staying Young While Growing Older 643

Weight and Body Composition 645

Physical Activity 645

Immunity 646

Taste and Smell 647
 Gastrointestinal Changes 647
 Nutrient Needs of the Mature Adult 648
 Vitamins and Minerals 651
 To Supplement or Not to Supplement 653
 Nutrition-Related Concerns of Mature Adults 653
 Meal Management for Mature Adults 659

Learning Portfolio 662

Key Terms 662
 Study Points 662
 Study Questions 662
 Try This 663
 Getting Personal 663
 References 663

Spotlight on World Nutrition: The Faces of Global Malnutrition 666

Malnutrition in the United States 668

The Face of American Malnutrition 668
 Prevalence and Distribution 669
 Attacking Hunger in the United States 672

FYI: Hungry and Homeless 673

Malnutrition in the Developing World 675

The World Food Equation 676
 The Fight Against Global Hunger 676
 Social and Economic Factors 678
 Infection and Disease 679
 Political Disruptions 680

FYI: AIDS and Malnutrition 680

Agriculture and the Environment: A Tricky Balance 681

FYI: Tough Choices 682

Malnutrition: Its Nature, Its Victims, and Its Eradication 683

Learning Portfolio 688

Key Terms 688
 Study Points 688
 Study Questions 689
 Try This 689
 Getting Personal 689
 References 690

Chapter 13

Food Safety and Technology: Microbial Threats and Genetic Engineering 692

Food Safety 694

Harmful Substances in Foods 694

FYI: Seafood Safety 699

Food Additives 706

Regulation by the FDA 706

Delaney Clause 708

Keeping Food Safe 708

Government Agencies 709

Hazard Analysis Critical Control Point 710

FYI: At War with Bioterrorism 711

FYI: Safe Food Practices 713

Who Is at Increased Risk for Foodborne Illness? 714

A Final Word on Food Safety 714

Food Technology 714

Food Preservation 714

Genetically Engineered Foods 716

Learning Portfolio 722

Key Terms 722

Study Points 722

Study Questions 723

Try This 723

Organic Foods 723

Getting Personal 723

References 724

Appendix A Dietary Reference Intakes A-2

Appendix B USDA Food Intake Patterns B-2

Appendix C Nutrition Assessment Methods C-2

Appendix D Vitamin and Mineral Summary Tables D-1

Appendix E The Gastrointestinal Tract E-1

Appendix F ATP Produced from Macronutrients F-2

Appendix G Major Metabolic Pathways G-2

Appendix H Food Safety Tables H-1

Appendix I Information Resources I-2

Appendix J Calculations and Conversions J-1

Glossary G-1

Index IX-2



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Preface

Welcome to the sixth edition of *Discovering Nutrition*.

With changes in nutrition-related information having never been more exciting or important than they are today, learning about nutrition should be stimulating and engaging. With that in mind, *Discovering Nutrition* takes students on a fascinating journey beginning with curiosity and ending with solid knowledge and a healthy dose of skepticism. Knowledge is power, and our mission is to offer students the tools to logically interpret nutrition information provided by the news media, popular entertainment, food labels, and government agencies. Our goal is to create sophisticated consumers of nutritional science as well as nutrition information.

Discovering Nutrition is unique in its behavioral approach, challenging students not just to memorize material, but to act on it. Familiar experiences and choices beckon students into each chapter. Analogies illuminate difficult concepts. We address important topics that students are curious about, ranging from functional foods and supplements to vegetarianism, athlete diets, and linkages between diet and chronic disease. In special spotlights, we focus attention on topics like alcohol, eating disorders, obesity, and complementary nutrition. For those instructors wishing to cover metabolism, we also include a “Spotlight on Metabolism and Energy Balance” that provides a friendly tour of the metabolic pathways. For this edition, we have significantly revised two areas that are of especially high interest, Chapter 9 “Nutrition for Physical Performance” and the “Spotlight on Eating Disorders,” to reflect the current state of knowledge.

Accessible Science

Discovering Nutrition makes use of the latest in learning theory and balances the behavioral aspects of nutrition with an accessible approach to scientific concepts. This text is intended to be a comprehensive resource that communicates nutrition both graphically and personally. We present technical concepts in an engaging and friendly way with an appealing, stepwise, and parallel development of text and annotated illustrations. Illustrations in all chapters use consistent representations. Each

type of nutrient, for example, has a distinct color and shape. Icons of an amino acid, a protein, a triglyceride, and a glucose molecule represent “characters” in the nutrition story and are instantly recognizable as they appear throughout the text.

This text leads the way in depicting important biological and physiological phenomena, such as emulsification, glucose regulation, digestion and absorption, and fetal development. Extensive graphic presentations make nutrition and physiological principles come alive.

2015–2020 Dietary Guidelines for Americans

The eighth edition of the *Dietary Guidelines for Americans* emphasizes following a healthy and varied eating pattern that limits calories from added sugars and saturated fats, reduces sodium intake, and incorporates more vegetables and whole grains. On the whole, this edition reflects advances in the scientific understanding of the importance of improving diets and increasing physical activity, two of the most important factors in reducing obesity and preventing chronic diseases in Americans. Focused on science-based recommendations on food and nutrition, the *Dietary Guidelines* empowers the American public to make shifts in what they eat and drink in favor of good health. As you read this text, look for key recommendations of the *Dietary Guidelines* highlighted in the margins.

Food Labeling

The Food and Drug Administration announced a new and redesigned Nutrition Facts label that will be required on most packaged food by January 2020. In an effort to encourage consumers to make more informed decisions, changes on the new label include such things as highlighting calories per serving and serving sizes more prominently, featuring a separate line showing how much sugar has been added to the food, and including updated Dietary Value information. The new label is discussed in Chapter 2 and has been incorporated into all Label to Table features found throughout the text.

New to This Edition

For this edition, the latest scientific evidence, recommendations, and national standards have been incorporated throughout the text.

Key Highlights

- Updated content reflects the *2015–2020 Dietary Guidelines for Americans*, as well as the redesigned Nutrition Facts label.
- The new “Why Is This Important?” feature, tied to the majority of major headings in the text, breaks down the practical importance and value of the key concepts students are learning.
- The new “Getting Personal” feature, found in most of the end-of-chapter Learning Portfolios, encourages students to apply their nutritional knowledge to understanding their own diets.
- Revised statistics and data incorporated throughout the text reflect the current state of nutrition in the United States and the world.
- Revised food source charts in Chapters 7 and 8 more clearly convey common sources for vitamins and minerals.
- Updated Position Statements from the Academy of Nutrition and Dietetics, the American Heart Association, and other organizations appear throughout the text.
- Updated references utilize the latest science in the field.
- New and updated FYI and Quick Bite features provide in-depth discussions of controversial issues and topics for classroom discussion.
- The redesigned Nutrition Facts label has been incorporated into the Label to Table features found throughout the text.

Chapter 1—Food Choices: Nutrients and Nourishment

- Updated discussion of the effects TV advertisements have on childhood nutrition
- Updated coverage of the impact of eating away from home
- Updated section comparing the “healthfulness” of the American diet versus the recommendations of the *2015–2020 Dietary Guidelines for Americans*
- New comparison of phytochemicals and zoochemicals
- New comparison of the terms *kilocalorie* and *calorie*

- New features presenting excerpts from the Academy of Nutrition and Dietetics’ practice papers on social media and communicating accurate food and nutrition information
- New Quick Bite feature “Correlation or Causation?”

Chapter 2—Nutrition Guidelines: Tools for a Healthful Diet

- Inclusion of the key recommendations and overarching guidelines of the *2015–2020 Dietary Guidelines for Americans*
- Revised description and discussion of the Nutrition Facts label, reflecting changes announced in 2016
- New Quick Bites features “Early ‘Laws’ of Health,” “SuperTracker: My Foods, My Fitness, My Health” and “Underconsumption of Nutrients”
- Revised FYI feature “Portion Distortion”

Chapter 3—The Human Body: From Food to Fuel

- New section on gut microbiota
- Heavily revised FYI feature “Microbiota Out of Whack? Pre- and Probiotics May Help”
- Expanded description of passive diffusion

Chapter 4—Carbohydrates: Simple Sugars and Complex Chains

- New coverage of agave sweeteners
- New figure summarizing types of carbohydrates
- New table recapping common nonnutritive sweeteners
- New table summarizing the health benefits of fiber, as well as its effects in the gastrointestinal tract
- Heavily revised FYI feature “Is the Glycemic Index a Useful Tool for Constructing a Healthy Diet with Carbohydrates?”
- Expanded discussion of glycemic load
- New Quick Bite feature “Low-Carb Diets”

Spotlight on Alcohol

- Updated description and statistics about college drinking behaviors
- Expanded Quick Bite feature “Energy Drinks + Alcohol = A Recipe for Disaster”

Chapter 5—Lipids: Not Just Fat

- Updated sections providing recommendations for omega fatty acid intake and summarizing the health effects of omega-3 fatty acids
- New table listing good food sources of omega-3 fatty acids
- Updated consideration of seafood consumption guidelines, along with a new figure illustrating healthy and safe fish options for pregnant and breastfeeding women
- Revised FYI feature “Fats on the Health Food Store Shelf” that includes a new section on coconut and grapeseed oil
- New description of fat’s structural role in the brain
- New discussion of the lack of a UL for fat, trans fat, or cholesterol

Chapter 6—Proteins and Amino Acids: Function Follows Form

- New FYI feature “Celiac Disease and Gluten Sensitivity”
- New discussion about the lack of evidence for gluten-free diets impacting weight loss
- Updated consideration of protein recommendations for athletes
- Updated discussion of the health benefits and risks of vegetarian diets, including a new table providing healthy tips for vegetarians
- New Position Statement from the Academy of Nutrition and Dietetics on vegetarian diets

Chapter 7—Vitamins: Vital Keys to Health

- Expanded presentation of the impact of vitamin A deficiency on skin and other epithelial cells
- Expanded discussion of vitamin B₁₂ deficiency, including atrophic gastritis
- New Quick Bite features “Help the Vitamins Go Down” and “A Yellowish-Orange Hue”

Spotlight on Dietary Supplements and Functional Foods

- Significantly revised FYI feature “Defining Complementary and Integrative Health: How Does Nutrition Fit In?”
- Expanded discussion of fad diets and critical appraisal of diets, foods, and supplements

Chapter 8—Water and Minerals: The Ocean Within

- Revised FYI feature “Tap, Filtered, or Bottled: Which Water Is Best?” that considers current statistics surrounding bottled water use and things to keep in mind when selecting vitamin waters, supplements, or bottled waters
- New table summarizing macronutrients and micronutrients
- New discussion about the controversy surrounding the American Heart Association’s suggestion and the *Dietary Guidelines*’ recommendation to reduce sodium
- New Quick Bite feature “Processed Foods and Salt”

Spotlight on Metabolism and Energy Balance

- Updated section on portion size based on recent studies
- Revised FYI feature “What’s Neat About NEAT?” that expands on sedentary behavior in the workplace
- New Quick Bite feature “Is Tom Brady Too Fat?”

Chapter 9—Nutrition for Physical Performance

- Incorporates new suggestions for eating and drinking before, during, and after exercise
- Expanded discussion of dehydration, including ways to check your hydration status
- New consideration of energy availability
- New section describing how vitamin D may support athletic performance
- New section on the vegetarian athlete
- New table presenting the Physical Activity Guidelines for Americans
- New table summarizing the American College of Sports Medicine’s position on the amount and type of fluid to consume before, during, and after activity
- New table presenting a summary of generalized carbohydrate intake by athletes
- Added clarification regarding the distinction between lactic acid and lactate
- New FYI feature “When Are Sports Drinks Recommended?”

- New Position Statement from the Academy of Nutrition and Dietetics on nutrition and athletic performance
- New Quick Bite feature “Alligator Water?”

Spotlight on Eating Disorders

- Reflects the diagnostic criteria presented in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)*
- Incorporates current theories of causes of eating disorders
- Added background on binge-eating disorder
- New section on the prevalence of eating disorders
- New section elaborating on the consequences of eating disorders
- New FYI features “Exploring the Connection Between Negative Affect and Eating Disorders” and “Night-Eating Syndrome: Not an Eating Disorder, But Sometimes a Concern”
- New Quick Bite features “Body Dysmorphic Disorder,” “A Matter of Degree,” “Estimates for Prevalence of Binge-Eating Disorder May Soon Rise,” and “Changing the Perception of Exercise to Help Combat an Eating Disorder”

Chapter 10—Diet and Health

- New section on the link between diet and cardiometabolic disease, including a table outlining the top five dietary factors associated with cardiometabolic deaths
- Enhanced description of personalized nutrition
- Updated section on the possible link between diet and cancer, including a new table summarizing dietary components and cancer risk

Spotlight on Obesity and Weight Management

- Updated statistics about obesity and overweight rates in the United States
- Expanded discussion of the role of social networks in obesity
- New section on smartphone-based interventions
- New section on weight-loss devices
- Revised FYI feature “Childhood and Teenage Obesity” that includes a discussion of taxes on sugary beverages

- New Position Statement from the Academy of Nutrition and Dietetics on interventions for the treatment of overweight and obesity in adults
- New Quick Bite feature “Dangerous Caloric Restriction”

Chapter 11—Life Cycle: Maternal and Infant Nutrition

- New FYI feature “New Guidelines for Introducing Peanut Products”
- New Quick Bite feature “Would It Be Healthier to Menstruate Less Often?”

Chapter 12—Life Cycle: From Childhood Through Adulthood

- New FYI features “Farmers’ Markets” and “School Vending Machines and the Teen Diet”
- Updated American Heart Association recommendations for fiber consumption
- Updated figures showing MyPlate meal and snack patterns for preschoolers and the modified MyPlate for older adults

Spotlight on World Nutrition: The Faces of Global Malnutrition

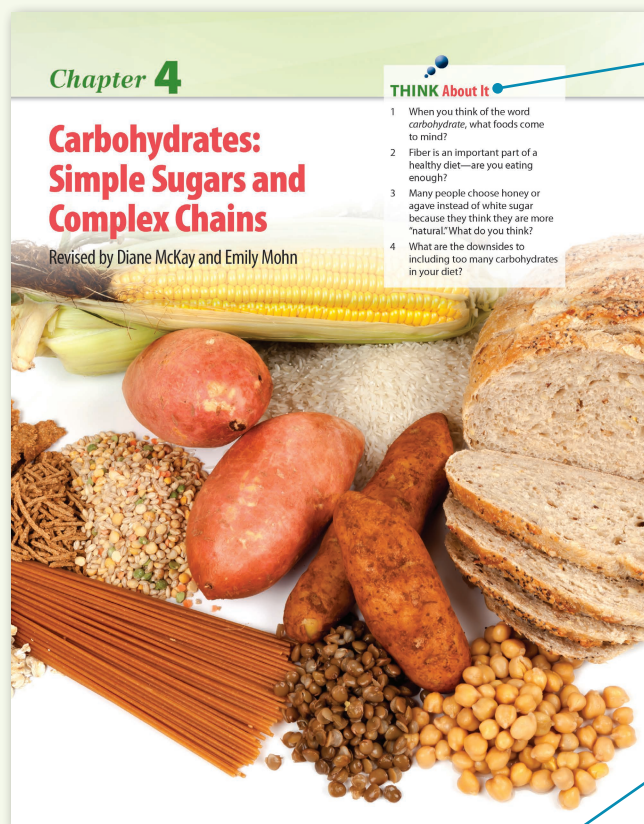
- Updated statistics regarding world hunger, homelessness in the United States, and malnutrition in the United States
- Updated U.S. poverty guidelines
- Expanded description of food deserts
- New Quick Bite features “Is There a Food Desert Near You?” and “To Breastfeed or Not?”

Chapter 13—Food Safety and Technology: Microbial Threats and Genetic Engineering

- Expanded coverage of natural toxins and food allergies
- Expanded coverage of the benefits and risks of genetic engineering
- New Quick Bite features “Flesh-Eating Bacteria?” and “Is It Stomach Flu or Food Poisoning?”

The Pedagogy

Discovering Nutrition focuses on teaching behavioral change, personal decision making, and up-to-date scientific concepts in a number of novel ways. This interactive approach addresses different learning styles, making it the ideal text to ensure mastery of key concepts. Beginning with Chapter 1, the material engages students in considering their own behavior in light of the knowledge they are gaining. The pedagogical aids that appear in most chapters include the following:



The **Think About It** questions at the beginning of each chapter present realistic nutrition-related situations and ask students to consider how they would behave in such circumstances.

The **Chapter Menu** at the beginning of each chapter gives students a preview of topics that will be covered.

Learning Objectives focus students on the key concepts of each chapter and the material they will learn.



Does sugar cause diabetes? Will too much sugar make a child hyperactive? Does excess sugar contribute to criminal behavior? What about starch? Does it really make you fat? These and other questions have been raised about sugar and starch—dietary carbohydrates—over the years. But, where do these ideas come from? What is myth, and what is fact? Are carbohydrates important in the diet? Or, as some popular diets suggest, should we eat only small amounts of carbohydrates? What links, if any, are there between carbohydrates in your diet and health?

Most of the world's people depend on carbohydrate-rich plant foods for daily sustenance. In some countries, they supply 80 percent or more of daily caloric intake. Rice provides the bulk of the diet in Southeast Asia, as does corn in South America, cassava in certain parts of Africa, and wheat in Europe and North America.

(See **FIGURE 4.1**.) Besides providing energy, foods rich in carbohydrates, such as whole grains, legumes, fruits, and vegetables, also are good sources of vitamins, minerals, dietary fiber, and phytochemicals that can help lower the risk of chronic diseases.

Generous carbohydrate intake from whole, minimally processed foods should provide the foundation for any healthful diet. Carbohydrates contain only 4 kilocalories per gram, compared with 9 kilocalories per gram from fat. Thus, a diet rich in carbohydrates can provide fewer calories and a greater volume of food than the typical fat-laden American diet. As you explore the topic of carbohydrates, think about some claims you have heard for and against eating a lot of carbohydrates. As you read this chapter, you will learn to distinguish between carbohydrates that are important as the basis of a healthy diet and those that add calories with little additional nutritional value.

What Are Carbohydrates?

Plants use carbon dioxide from the air, water from the soil, and energy from the sun to produce carbohydrates and oxygen through a process called photosynthesis. Carbohydrates are organic compounds that contain carbon (C), hydrogen (H), and oxygen (O) in the ratio of two hydrogen atoms and one oxygen atom for every one carbon atom (CH₂O). Two

© Photo Credits: Bridget MacKenzie/Shutterstock

obese older adults.⁹² The presence of nutritional deficiencies in overweight and obese older adults can be a consequence of the long-term consumption of a high-calorie, poor-nutrient diet and a physically inactive lifestyle.⁹³

Key Concepts Oral health, vision, and bone health all decline with aging. Tooth loss and oral pain can reduce food intake and nutrient quality. Loss of vision can make food shopping and preparation difficult. Osteoporosis, most common in postmenopausal women, can cause debilitating fractures. Alzheimer's disease eventually destroys the ability to obtain, prepare, and consume an optimal diet. Overweight and obesity are increasingly common and significantly affect the quality of life and health of older adults. Management of these conditions depends first on their identification by healthcare professionals.

Meal Management for Mature Adults

Many older adults are at nutritional risk because of economics, social isolation, physical restrictions, inability to shop for or prepare food, and medical conditions. Fortunately, there are a number of ways that older adults can remain independent and have access to an adequate diet.

Managing Independently

Independent and assisted-living programs allow people to live relatively carefree yet independent lives. Senior citizen apartment buildings and retirement villages offer a variety of services, including balanced meals. Programs such as **Meals on Wheels** and the **Older Americans Act Nutrition Program** (formerly known as the Elderly Nutrition Program) provide meals to home-bound people as well as those in congregate (group) settings. Most programs provide meals at least five times per week. The Older Americans Act Nutrition Program is supported primarily with federal funds; volunteer time, in-kind donations, and participant contributions make up the remainder. The **Supplemental Nutrition Assistance Program (SNAP)**, formerly the Food Stamp Program, is another option that provides low-income older adults with the means to purchase food. Unfortunately, because SNAP carries a "welfare" stigma, some older adults are reluctant to participate. In addition, many people who need some help buying food do not meet the eligibility requirements.

An evaluation of the Older Americans Act Nutrition Program showed that program participants had higher nutrient intake levels than nonparticipants and had a higher number of regular social contacts—another important factor in eating well.⁹⁴ Participation in food assistance programs can reduce the incidence of depression and overweight associated with food insecurity.⁹⁵

Wise Eating for One or Two

Preparing meals that are healthful and tasty is a challenge for those living alone or in small households. As discussed earlier in this chapter, our nutrition needs—with the exception of calories—do not decrease as we age, but our ability to meet them does. Reliance on convenience foods, fast foods, and eating out can adversely affect the nutritional status of older adults. Men who live alone are especially likely to eat out or skip meals rather than prepare food for themselves. For both men and women, physical disability or illness can diminish the desire to prepare and eat meals.

- **Meals on Wheels** A voluntary, not-for-profit organization established to provide nutritious meals to homebound people (regardless of age) so they can maintain their independence and quality of life.
- **Older Americans Act Nutrition Program** A federally funded program (formerly known as the Elderly Nutrition Program) that provides older persons with nutritionally sound meals through home-delivered nutrition services, congregate nutrition services, and the nutrition services incentive.
- **Supplemental Nutrition Assistance Program (SNAP)** A USDA program that helps single people and families with little or no income to buy food. Formerly known as the Food Stamp Program.

Position Statement: Academy of Nutrition and Dietetics

Food and Nutrition for Older Adults: Promoting Health and Wellness

It is the position of the Academy of Nutrition and Dietetics that all Americans aged 60 years and older receive appropriate nutrition care; have access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies.

Source: Reprinted from *Journal of the Academy of Nutrition and Dietetics*, 17(10), Melissa Benveniste, Barry Haines, Position of the Academy of Nutrition and Dietetics: Food and Nutrition for Older Adults: Promoting Health and Wellness, Page no. 1355-1377, 2016, with permission from Elsevier.

Key Concepts summarize previous text and highlight important information.

Position Statements from distinguished organizations such as the Academy of Nutrition and Dietetics, the American College of Sports Medicine, and the American Heart Association relate to the chapter topics and bolster the assertions made by the authors by showcasing concurrent opinions held by some of the leading organizations in nutrition and health.

New to this edition, **Why Is This Important?** provides students with a brief overview of the practical importance and value of the information they're learning.

Key Terms are in boldface type the first time they are mentioned. Their definitions also appear in the margins near the relevant textual discussion, making it easy for students to review material.

Quick Bites sprinkled throughout the text offer fun facts about nutrition-related topics such as unique foods, social customs, origins of phrases, folk remedies, medical history, and so on.

Genetics and Disease

Why Is This Important? Nutritionists are combining genetic data with behavioral data, such as personal dietary practices, to find new connections to health and disease. Understanding the basics of genetics will help you appreciate the latest research findings.

In the last several years, knowledge has exploded regarding the relationship between our genetic makeup and disease. We now recognize that nearly all diseases have some genetic component. Most human illnesses occur because of the interaction of many genetic, environmental, nutritional, and lifestyle factors. (See **FIGURE 16.2**) As the number one killer in the United States, cardiovascular disease is a good example of how genetic influences affect the development of disease.¹² A family history of heart disease indicates genetic vulnerability and is an important risk factor for developing the disease. Although some cancers, for example, breast cancer, have a genetic basis and affect many members of a given family, most cancers seem to be caused by a **variety** of factors.

Understanding how our **genes** influence our risk for disease has been a major goal of the **Human Genome Project**, an international effort spearheaded by the U.S. National Institutes of Health (NIH). The Human Genome Project is providing scientists with clues to the genetic variations that are responsible for common illnesses. Understanding the genetics of diseases will allow researchers to develop more effective medications and may lead to routine gene-based treatments.¹³

genes Sections of DNA that contain hereditary information. Most genes contain information for making proteins.

Human Genome Project An effort coordinated by the Department of Energy and the National Institutes of Health to map the genes in human DNA.

Quick Bite

Biological Blueprint
Nearly all 100 trillion cells in the human body contain a copy of the entire human genome, the complete set of genetic instructions necessary to build a human being.



FIGURE 16.2 Risk factors for chronic diseases. Diet, lifestyle choices, and genetics interact to shape a person's risk profile.

FYI
For Your Information

Is the Glycemic Index a Useful Tool for Constructing a Healthy Diet with Carbohydrates?

The glycemic index is a valuable tool and easy-to-use concept that may be important for individuals with diabetes to help fine tune their blood glucose control.¹ Several popular weight-loss diets use the glycemic index to guide food choices.

How Is the Glycemic Index Measured?

The glycemic index compares the change in blood glucose after eating a sample food to the change expected from eating an equal amount of available carbohydrate from a standard food, such as white bread, or from pure glucose. Therefore, the glycemic index is expressed as a percentage, ranging from 1–100, with 100 being the standard food.²

Foods with a high glycemic index trigger a sharp rise in blood glucose, followed by a dramatic fall, often to levels that are below normal. This explains why these foods could be undesirable for a person with diabetes. In contrast, low-glycemic-index foods trigger slower and more modest changes in blood glucose levels, thereby making blood glucose easier to manage. However, the effects of high or low glycemic index foods on people without diabetes are questionable, especially when eating a mixed diet.

What Factors Affect the Glycemic Index of a Food or Meal?

The glycemic index of a food is not always easy to predict. Would you expect a sweet food such as ice cream to have a high glycemic index? Ice cream actually has a low glycemic value because its fat slows sugar absorption. On the other hand, wouldn't you expect complex carbohydrates such as bread or potatoes to have a low glycemic index? In fact, the starch in white bread and cooked potatoes is readily absorbed, so each has a high value.³ The glycemic indices of some common foods are listed in TABLE A, and lower glycemic index substitutions are provided in TABLE B.

The type of carbohydrate, the cooking process, and the presence of fat, dietary fiber, and other food components in a meal or snack all affect the glycemic response.^{4,5} In a person's diet, it is the glycemic index of mixed meals, referred to as the glycemic load, that is more important than the effect of individual foods on blood glucose.⁶ Specifically, the glycemic load takes into account the amount of carbohydrate consumed. Glycemic load is calculated by multiplying the glycemic index of a food by the amount of carbohydrate in a serving. Because the glycemic index is a percentage, the resulting value is divided by 100. High-glycemic-index foods do not necessarily have high glycemic loads if there is a relatively small amount of carbohydrate in one serving. For example, watermelon has a high glycemic index (72), but it mostly consists of water, and there is only a small amount of carbohydrate per serving.

Why Do Some Researchers Believe the Glycemic Index Is Useful?

Health benefits of following a low-glycemic-index diet can be significant. Diets that emphasize low-glycemic-index foods decrease the risk of developing type 2 diabetes and improve blood glucose control in people who are already afflicted.^{4,6} Epidemiological studies suggest that such diets also reduce the risk of colon and other cancers and may help reduce the risk of heart disease.⁷ Diets with a low glycemic load are associated with favorable blood lipid profiles.⁸ Also, studies indicate that the effectiveness of low-fat, high-carbohydrate diets for weight loss can be improved by reducing the glycemic load.

TABLE A
Glycemic Index of Some Foods Compared to Pure Glucose*

Food	Glycemic Index	Food	Glycemic Index
Bakery Products			
Vanilla cake	42 ± 4	Apples	39 ± 3
Doughnut	75 ± 7	Watermelon	72 ± 13
Bread/Breakfast Foods			
Bagel	69	Dates	42 ± 4
Wheat and rye bread	40	Legumes	
Pita bread	68 ± 5	Baked beans	40 ± 3
All-Bran®	44 ± 6	Black-eyed peas	38
Fruit Loops®	69 ± 9	Pinto beans	33
Cereal Grains			
Porridge	55 ± 2	Pasta	
Couscous	65 ± 7	Lasagna	53
Sweet corn	52 ± 5	Spaghetti	49 ± 3
Japanica short-grain brown rice	62 ± 5	Vegetables	
Instant white rice	87 ± 2	Pumpkin	64
Dairy Foods			
Ice cream	57	Carrots	39 ± 4
Full-fat milk	41 ± 2	Baked potato	86 ± 6
		Candy	
		Marshmallow	62 ± 6
		M&M's®, peanut	33 ± 3

* Glycemic response to pure glucose is 100.

Data from Atkinson FS, Foster-Powell K, Brand-Miller. International Tables of Glycemic Index Values. 2008. 2008 Diab Care. 31(12).

Why Do Some Researchers Believe the Glycemic Index Is Useless?

Whether a person is diabetic trying to control blood glucose levels, attempting weight loss, or reducing risk for heart disease, there is no "best" way to improve your diet. Some researchers question the usefulness of conclusions drawn primarily from epidemiological studies, given that these studies can show an association but cannot prove the cause. Additionally, results on the effectiveness of low glycemic index/load diets on health outcomes have been mixed.^{9,10}

FYI (For Your Information) offers more in-depth discussions of controversial and timely topics, such as claims about the effects of sugar, the protein needs of athletes, and the usefulness of the glycemic index.

Label to Table helps students apply their new decision-making skills at the supermarket. It walks students through the various types of information that appear on food labels, including government-mandated terminology, misleading advertising phrases, and amounts of ingredients. This feature has been updated for this edition to reflect the new labeling guidelines released by the FDA in May 2016.



Sodium is found naturally in many foods, but processed foods account for most of the salt and sodium Americans consume. Processed foods with high amounts of salt include regular canned vegetables and soups, frozen dinners, lunch meats, instant and ready-to-eat cereals, and salty chips and other snacks. You can use food labels to choose products lower in sodium.

Compare Labels

Which of these two items is lower in sodium? To tell, check the Percent Daily Value.

The frozen peas are lower in sodium, with just 5 percent of the DV per 1/2 cup serving. The canned peas have three times more sodium than the frozen peas: 16 percent of the DV in one serving. Sodium is found in many foods that might surprise you, such as baking soda, soy sauce, and monosodium glutamate (MSG). Sodium is even found in some antacids—the range is wide. Before trying salt substitutes, check with your doctor, especially if you have high blood pressure. Many salt substitutes contain potassium chloride and can be harmful for individuals who have certain medical conditions or who take diuretic medications.

Nutrition Facts	
3 servings per container	1/2 cup
Serving size	
Amount per serving	
Calories	60
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 380mg	16%
Total Carbohydrate 12g	4%
Dietary Fiber 3g	14%
Total Sugars 4g	
Includes 5g Added Sugars	8%
Protein 4g	
Vitamin D 0mcg	0%
Calcium 30mg	2%
Iron 1.1mg	8%
Potassium 124mg	4%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Nutrition Facts	
3 servings per container	1/2 cup
Serving size	
Amount per serving	
Calories	60
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 125mg	5%
Total Carbohydrate 11g	4%
Dietary Fiber 6g	22%
Total Sugars 5g	
Includes 5g Added Sugars	10%
Protein 5g	
Vitamin D 0mcg	0%
Calcium 30mg	30%
Iron 1.1mg	6%
Potassium 87mg	2%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.


The **Learning Portfolio** at the end of each chapter condenses all aspects of nutrition information that students need to solidify their understanding of the material. The various formats will appeal to students according to their individual learning and studying styles.

Key Terms list all new vocabulary alphabetically with the page number of the first appearance. This arrangement allows students to review any term they do not recall and turn immediately to the definition and discussion of it in the chapter. This approach also promotes the acquisition of knowledge, not simply memorization.

Study Points summarize the content of each chapter with a synopsis of each major topic. The points are in the order in which they appear in the chapter, so related concepts flow together.

Study Questions encourage students to probe deeper into the chapter content, making connections and gaining new insights. Although these questions can be used for pop quizzes, they will also help students to review, especially students who study by writing out material.

662
CHAPTER 12
LIFE CYCLE: FROM CHILDHOOD TO ADULTHOOD



Learning Portfolio

Key Terms

	page
acne	641
adolescence	629
Alzheimer's disease (AD)	658
anorexia of aging	656
childhood	629
epiphyses	638
hyperactivity	634
hypervitaminosis	653
macular degeneration	657
Meals on Wheels	659
menarche	638
Older Americans Act Nutrition Program	659
puberty	637
Supplemental Nutrition Assistance Program (SNAP)	659
taste threshold	647
urinary tract infection (UTI)	646

Study Points

- For children and adolescents, growth is the key determinant of nutrient needs. If diets are planned carefully, children do not need vitamin/mineral supplementation.
- Federally funded nutrition and feeding programs reduce malnutrition and hunger among U.S. children.
- Adoption of adult food plans to reduce risk of chronic disease should begin gradually after the age of 2.
- The prevalence of obesity and eating disorders is rising among U.S. children and teens; treatment programs should address food choices and activity levels rather than impose strict calorie limits. Vegetarian diets for children need to be planned carefully to avoid nutrient deficiencies.
- The total energy and nutrient needs of adolescents are high to support growth and maturation. Girls need more iron than boys do to compensate for losses after the onset of menstruation. Active teens need more calories and nutrients than sedentary teens; fluid intake is also a priority.
- Nutrition and physical activity are two important controllable components of a healthy life and healthful aging. Moreover, numerous physiological and psychological aspects of the aging process affect food intake and nutritional status.
- Energy needs decline with age, reflecting loss of lean body mass and reduced physical activity.

The protein RDA and the recommended balance of carbohydrate and fat calories in the diet are similar for young and older adults. Fluid intake needs special attention because of the reduced thirst response that occurs with age.

- Because of reduced intake, synthesis, and activation, vitamin D status declines with age; recommended intake levels are therefore raised. Vitamin B₁₂ status might be compromised by inadequate absorption. Antioxidants can help in the protection against degenerative diseases.
- Calcium and zinc intakes are likely to be marginal in the diets of older adults. Iron also remains important.
- Dietary supplements, both vitamin/mineral and herbal/botanical, should be used with caution, preferably with professional advice.
- Because many older adults take multiple medications, they are at risk for drug–nutrient, food–drug, and drug–drug interactions. Anorexia of aging is also a major public health problem.
- Arthritis is a prevalent chronic health problem in this age group. Weight management is a key element of arthritis treatment.
- Chronic constipation is a common complaint among older adults. Fluids, fiber, and regular exercise can reduce the likelihood of constipation.
- Poor oral and visual health both can compromise the ability of older adults to consume a nutritionally adequate diet.
- Osteoporosis is a major health problem that can be addressed through adequate calcium and vitamin D, regular weight-bearing exercise, and medication if needed.
- Adults can maintain independence while aging but may require special assistance to obtain and prepare food. Community resources can help respond to the needs of older adults and those of their caretakers and family.

Study Questions

- Which vitamins and minerals are most likely to be deficient in a child's diet?
- Identify several chronic nutrition problems that can affect children. How can these problems be avoided?

3. What are typical nutritional concerns for adolescents?
4. What are some consequences of decreased immunity among older adults?
5. Compared with a younger adult, does a person older than 65 years need more, less, or about the same amount of protein?
6. Why are older adults at risk of vitamin D deficiency?
7. Discuss minerals that may need special attention in assessment of an older adult's nutrition status.
8. What problems might older adults encounter with dietary supplements?
9. What is the role of physical activity in osteoporosis prevention? What nutritional factors are important?

Try This

Eat Like a Kid

Children, especially toddlers, tend to be exploratory and take in the sensory nature of food—the textures, smells, and tastes. In fact, you were probably once this way. The purpose of this exercise is to eat a meal like a kid and gain an appreciation of food's textures and taste. Make some mashed potatoes, macaroni and cheese, buttered peas, or spaghetti (favorite "kid food") and eat it with your fingers. Explore your food and play with it. Try mixing foods. How does this experience make you feel?

Aging Simulation

The purpose of this exercise is to simulate what it can be like to age and experience age-related declines in health. Have you ever thought of how difficult it is to be an older person with health problems and do routine tasks? Invite a few friends over and do the following:

- Put gloves on to simulate the difficulty of losing sensitivity in your hands.
- Use cotton balls in your ears to decrease your hearing ability.
- Apply some petroleum jelly to a pair of glasses or sunglasses to give yourself poor vision.

Now try a simple activity. Make a salad, send a text message, or play a video. After completing the activity, switch disabilities with your friends so that everyone has experienced each of the limitations. What is it like to do these activities with your impairment?

Getting Personal

You have just graduated. Revisit your eating habits as a child, teenager, and college student, and assign the most appropriate descriptor to each item. Consider how your past nutritional behavior has helped determine your current health status.

0 = seldom or never true

1 = sometimes true

2 = frequently true

As a child,

1. I was a picky eater, rejecting the food usually offered.
2. I was not permitted to decide how much to eat.
3. I rarely drank milk.
4. I ate candy every day.
5. I let peer pressure influence my nutrition choices.
6. I ate in front of the TV.
7. I worried about my weight.
- As a college student,
8. I didn't think about healthy food choices.
9. I resisted changing my eating habits.
10. I was influenced by food fads.

Add up your score. Scores over 12 should signal that your healthy nutrition behavior can be improved. Highlight the items you feel can be affected by behavior change.

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Getting Personal encourages students to consider their newly gained knowledge in the context of their own diets.

Try This activities provide suggestions for hands-on activities that encourage students to put theory into practice. It will especially help students whose major learning style is experimental.

The Integrated Learning and Teaching Package

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- Test Bank, including more than 850 questions
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- Image Bank, supplying key figures from the text
- Sample Syllabus, showing how a course can be structured around this text
- Transition Guide, providing guidance in switching from the previous edition

In addition, *Discovering Nutrition* is available in a variety of eBook formats, including as a Navigate 2 Advantage eBook containing 36 scientifically based animations that give students an accurate, accessible explanation of the major scientific concepts and physiological principles presented in this text.



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