

# Brief Contents

## Volume One

### Energy, Proteins, and Catalysis

#### Part 1

#### An Overview of Biochemical Structures and Reactions That Occur in Living Systems 1

**Chapter 1** Cells, Biomolecules, and Water 3

**Chapter 2** Thermodynamics in Biochemistry 29

**Chapter 5** Functional Diversity of Proteins 101

**Chapter 6** Methods for Characterization and Purification of Proteins 118

#### Part 2

#### Protein Structure and Function 47

**Chapter 3** The Building Blocks of Proteins: Amino Acids, Peptides, and Polypeptides 49

**Chapter 4** The Three-Dimensional Structures of Proteins 77

#### Part 3

#### Catalysis 133

**Chapter 7** Enzyme Kinetics 135

**Chapter 8** How Enzymes Work 154

**Chapter 9** Regulation of Enzyme Activities 175

**Chapter 10** Vitamins and Coenzymes 198

## Volume Two

### Metabolism

#### Part 4

#### Metabolism of Carbohydrates 225

**Chapter 11** Metabolic Strategies 227

**Chapter 12** Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathway 242

**Chapter 13** The Tricarboxylic Acid Cycle 282

**Chapter 14** Electron Transport and Oxidative Phosphorylation 305

**Chapter 15** Photosynthesis 330

**Chapter 16** Structures and Metabolism of Oligosaccharides and Polysaccharides 356

**Part 5****Metabolism of Lipids 379**

- Chapter 17** Structure and Functions of Biological Membranes 381
- Chapter 18** Metabolism of Fatty Acids 411
- Chapter 19** Biosynthesis of Membrane Lipids 436
- Chapter 20** Metabolism of Cholesterol 459

**Part 6****Metabolism of Nitrogen-Containing Compounds 485**

- Chapter 21** Amino Acid Biosynthesis and Nitrogen Fixation in Plants and Microorganisms 436
- Chapter 22** Amino Acid Metabolism in Vertebrates 511
- Chapter 23** Nucleotides 533
- Chapter 24** Integration of Metabolism and Hormone Action 562
- Supplement 1** Principles of Physiology and Biochemistry: Neurotransmission 602
- Supplement 2** Principles of Physiology and Biochemistry: Vision 614

**V o l u m e T h r e e****Molecular Genetics****Part 7****Storage and Utilization of Genetic Information 625**

- Chapter 25** Structures of Nucleic Acids and Nucleoproteins 627
- Chapter 26** DNA Replication, Repair, and Recombination 650
- Chapter 27** DNA Manipulation and Its Applications 678
- Chapter 28** RNA Synthesis and Processing 700
- Chapter 29** Protein Synthesis, Targeting, and Turnover 730

- Chapter 30** Regulation of Gene Expression in Prokaryotes 768
- Chapter 31** Regulation of Gene Expression in Eukaryotes 800
- Supplement 3** Principles of Physiology and Biochemistry: Immunobiology 830
- Supplement 4** Principles of Physiology and Biochemistry: Carcinogenesis and Oncogenes 848