

BRIEF CONTENTS

Part I THE MOLECULAR DESIGN OF LIFE

- 1 Biochemistry: An Evolving Science 1
- 2 Protein Composition and Structure 25
- 3 Exploring Proteins and Proteomes 67
- 4 DNA, RNA, and the Flow of Genetic Information 113
- 5 Exploring Genes and Genomes 145
- 6 Exploring Evolution and Bioinformatics 181
- 7 Hemoglobin: Portrait of a Protein in Action 203
- 8 Enzymes: Basic Concepts and Kinetics 227
- 9 Catalytic Strategies 261
- 10 Regulatory Strategies 299
- 11 Carbohydrates 329
- 12 Lipids and Cell Membranes 357
- 13 Membrane Channels and Pumps 383
- 14 Signal-Transduction Pathways 415

Part II TRANSDUCING AND STORING ENERGY

- 15 Metabolism: Basic Concepts and Design 443
- 16 Glycolysis and Gluconeogenesis 469
- 17 The Citric Acid Cycle 515
- 18 Oxidative Phosphorylation 543
- 19 The Light Reactions of Photosynthesis 585
- 20 The Calvin Cycle and the Pentose Phosphate Pathway 609
- 21 Glycogen Metabolism 637
- 22 Fatty Acid Metabolism 663
- 23 Protein Turnover and Amino Acid Catabolism 697

Part III SYNTHESIZING THE MOLECULES OF LIFE

- 24 The Biosynthesis of Amino Acids 729
- 25 Nucleotide Biosynthesis 761
- 26 The Biosynthesis of Membrane Lipids and Steroids 787
- 27 The Integration of Metabolism 821
- 28 DNA Replication, Repair, and Recombination 849
- 29 RNA Synthesis and Processing 883
- 30 Protein Synthesis 921
- 31 The Control of Gene Expression in Prokaryotes 957
- 32 The Control of Gene Expression in Eukaryotes 973

Part IV RESPONDING TO ENVIRONMENTAL CHANGES

- 33 Sensory Systems 995
- 34 The Immune System 1017
- 35 Molecular Motors 1049
- 36 Drug Development 1073