Contents

Contributors vii

Fatty Acid Desaturases, Chemistry of 1
Flavin-Mediated Hydroxylation Reactions 8
Flavoenzymes, Chemistry of 17
Fluorescence in Living Systems: Applications in Chemical Biology 28
Fluorescence Spectroscopy: Applications in Chemical Biology 39
Fluorescence Techniques for Proteins 61
Fluorescence to Study Nucleic Acids 72
Förster Resonance Energy Transfer (FRET) for Proteins 80
Forward Chemical Genetics 94
Glycan Biosynthesis in Mammals 112
Glycans: Array-Based Techniques 127
Glycan Synthesis: Key Strategies 139
Glycoconjugates: Structure and Biosynthesis 151
Glycosphingolipids, Chemistry of 164
Glycosylation of Proteins in the Golgi Apparatus 184
Glycosyltransferases, Chemistry of 198
G-Protein-Coupled Receptors: Drug Design Strategies 211
Group II Introns 232
Hemes in Biology 240
Hemozoin: A Paradigm for Biominerals in Disease 250
High Throughput Screening (HTS) Techniques: Applications in Chemical Biology 260
Histone Modifications: Chemistry and Structural Consequences 275
HIV: Small Molecule Approaches 284
Hormone Signaling 289
Human Hemoglobin: Identification of a Key Intermediate 298
Hydration Forces 306
Hypoxic Response and Associated Diseases 314
Informatics for Glycans 329
Inorganic Chemistry in Biology 340
Inositol Phosphates 349
Inositol Phospholipids: Biosynthesis and Biological Functions 360
Integrated and Organized Cellular Energetic Systems 366

Integrin Signaling 393
Intramembrane Proteolysis 406
Ion Channels 419
Ion Channels: Computational Analysis 437
Ion Channels in Medicine 448
Iron–Sulfur Clusters: Properties and Functions 458
Iron-Sulfur World 469
Isoprostanes 477
Kinases and Dephosphorylases: Chemistry and Roles 486
Lantibiotics: Biosynthesis and Modes of Action 494
Large G-Proteins 503
Lead Optimization in Drug Discovery 511
Lipidated Peptide Synthesis 520
Lipid Bilayers: Properties 531
Lipid Domains, Chemistry of 546
Lipid Homeostasis, Chemistry of 551
Lipid Signals: Extracellular 560
Lipidomics 566
Lipids: Chemical Diversity 575
Lipids: Organization and Aggregation 589
Lipids: Phase Transitions 601
Locked Nucleic Acids 616
Lysosomal Disorders 622
Marine Natural Products: Chemical Diversity 633
Mass Spectrometry: Applications in Phosphoproteomics 654
Mass Spectrometry of Lipid Analyses 661
Mass Spectrometry to Identify Posttranslational Modifications 670
Mathematical Modelling of Biological Signaling Networks 703
Mechanosensitive Channels 712
Membrane Compartments in Immune Cell Signaling and Trafficking 718
Membrane Fluidity 728
Membrane Potentials in Living Systems 742
Membrane Proteins: Properties 751
Membrane Protein Structure: Techniques 761
Metabolic Diseases: Biological Mechanisms 773