

- **1 The cellular basis of biochemistry** (p. 1)
- **Types of living cells** (p. 2)
- **The structure of prokaryotic and eukaryotic cells** (p. 2)
- **Endocytosis and exocytosis through the plasma membrane** (p. 2)
- **The nucleus** (p. 2)
- **Mitochondria** (p. 3)
- **Lysosomes** (p. 3)
- **Peroxisomes** (p. 3)
- **The endoplasmic reticulum** (p. 3)
- **The cytoskeleton** (p. 3)
- **Subcellular fractionation** (p. 4)
- **The microsome fraction** (p. 5)
- **Marker enzymes** (p. 5)
- **Metabolic functions of organelles** (p. 6)
- **2 An introduction to proteins and peptides** (p. 7)
- **The role of amino acids in the cell** (p. 8)
- **Structure of amino acids** (p. 8)
- **Asymmetry in biochemistry** (p. 9)
- **Ionic properties of amino acids** (p. 9)
- **Peptide structure and the peptide bond** (p. 11)
- **Ionic properties of peptides** (p. 11)
- **Purification of proteins and determination of relative molecular mass** (p. 12)
- **The determination of the amino acid sequence of proteins** (p. 14)
- **Protein structural hierarchies** (p. 14)
- **Protein denaturation and renaturation** (p. 14)
- **Peptides, structure and biological activity** (p. 15)
- **3 Nucleic acids and protein synthesis** (p. 17)
- **Introduction: Replication, transcription and translation** (p. 18)
- **Nucleic acid structure and synthesis** (p. 18)
- **Other enzymes with DNA synthetic activity** (p. 24)
- **Biosynthesis of proteins: translation** (p. 31)
- **Molecular cell biology** (p. 44)
- **Recombinant DNA (genetic engineering)** (p. 49)
- **4 Protein structure and function with hemoglobin as an example** (p. 55)
- **The properties of proteins** (p. 56)
- **The folding of globular proteins** (p. 56)
- **General principles of protein folding** (p. 57)
- **Structure and properties of myoglobin and hemoglobin** (p. 61)
- **5 Proteins: specialized functions** (p. 67)
- **Plasma proteins** (p. 68)
- **The immune system and the immunoglobulins** (p. 73)
- **Proteins of molecular motors** (p. 78)
- **6 The structure and function of enzymes** (p. 83)
- **The properties of enzymes** (p. 84)
- **Enzyme kinetics** (p. 85)
- **Metabolic regulation and control** (p. 89)

- **Enzyme phosphorylation and dephosphorylation** (p. 91)
- **Second messengers** (p. 93)
- **Allosteric properties of enzymes** (p. 94)
- **Metabolic control analysis** (p. 96)
- **Genetic diversity of enzymes** (p. 96)
- **Coenzymes and water-soluble vitamins** (p. 100)
- **7 Carbohydrates: structures and interconversions** (p. 109)
- **Monosaccharides and disaccharides** (p. 110)
- **Polysaccharides** (p. 111)
- **Interconversions of monosaccharides** (p. 112)
- **Detoxification mechanisms** (p. 114)
- **8 Nitrogen metabolism** (p. 117)
- **Protein breakdown and excretion of nitrogen** (p. 118)
- **The supply of amino acids** (p. 120)
- **Catabolism of essential amino acids and the formation of adrenaline, histamine, thyroxine and serotonin** (p. 122)
- **The biosynthesis and metabolism of heme** (p. 126)
- **9 Oxidative catabolism of glucose and fatty acids** (p. 131)
- **[beta]-Oxidation and glycolysis** (p. 132)
- **The citric acid cycle** (p. 136)
- **The electron transport chain** (p. 137)
- **Oxidative phosphorylation** (p. 139)
- **Other mitochondrial topics** (p. 141)
- **10 Carbohydrate and lipid metabolism in the fasting state** (p. 145)
- **Metabolism in the fasting state** (p. 146)
- **Glycogen and its degradation** (p. 146)
- **Gluconeogenesis** (p. 148)
- **Ketone body formation and utilization** (p. 149)
- **Control of the blood glucose in health and disease** (p. 150)
- **11 Carbohydrate and lipid metabolism in the absorptive state** (p. 153)
- **The process of absorption** (p. 154)
- **Glycogenesis** (p. 156)
- **Lipogenesis** (p. 157)
- **12 Plasma lipoproteins, cholesterol metabolism and atherosclerosis** (p. 163)
- **Plasma lipoproteins and cholesterol metabolism** (p. 164)
- **13 The action of hormones and other effectors in regulating glycogen and glucose metabolism, ketogenesis and lipogenesis** (p. 175)
- **Whole-body interactions** (p. 176)
- **The regulation of glycogen metabolism** (p. 176)
- **Regulation of glycolysis and gluconeogenesis** (p. 178)
- **Regulation of lipid metabolism** (p. 181)
- **14 Phospholipids, other lipid substances and complex carbohydrates** (p. 185)
- **Phospholipids** (p. 186)
- **Lipid-soluble vitamins** (p. 188)
- **Other lipid compounds** (p. 191)
- **Complex carbohydrates** (p. 194)

- **15 Biomembranes, receptors and signal transduction** (p. 199)
- **G proteins** (p. 204)
- **The basis of membrane structure** (p. 200)
- **Structure of the phospholipid bilayer** (p. 200)
- **Membrane receptors** (p. 201)
- **Cell signalling systems** (p. 206)
- **Receptor traffic** (p. 209)
- **The cytoskeleton** (p. 211)
- **Membrane transport** (p. 212)
- **Cell adhesion** (p. 212)
- **16 The post-genomic era and its impact on the future of biochemistry and molecular biology** (p. 217)
- **Introduction** (p. 218)
- **Bioinformatics** (p. 218)
- **Apoptosis** (p. 219)
- **Telomeres and telomerases** (p. 220)
- **Growth control and cancer** (p. 221)
- **Index** (p. 227)
- **Further Reading** (p. 225)