Contents

Chapter 1: The Cell 1

- Plasma Membrane *1*
- Prokaryotic and Eukaryotic Cells *4*
- Transport Across Membrane *5*
- Cell Fractionation *8*

Chapter 2: Enzymes 13

- Chemical Nature of Enzymes *13*
- Energy of Activation of Catalyzed and Uncatalyzed Reactions *14*
- Mechanism of Enzyme Catalysis *16*
- Enzyme Inhibition *20*
- Isoenzymes *23*

Chapter 3: Chemistry of Carbohydrates 33

- Classification *33*
- Isomerism in Carbohydrates *35*

Chapter 4: Metabolism of Carbohydrates 43

- Digestion and Absorption of Carbohydrates *43*
- Metabolism of Carbohydrates *46*
- Glycolysis *47*

Chapter 5: Chemistry of Amino Acids and Proteins 90

- Definition of an α-Amino Acid *90*
- Classification of Amino Acids *93*
- Chromatography *104*

Chapter 6: Metabolism of Amino Acids 114

- Digestion and Absorption of Proteins *114*
- Catabolism of Amino Acids *115*
- Urea Cycle (Krebs–Henseleit Cycle) *117*
- Metabolism of Important Amino Acids *118*

Chapter 7: Chemistry of Lipids 133

- Definition *133*
- Functions of Lipids *133*
- Classification of Lipids *133*

Chapter 8: Metabolism of Lipids 148

- Digestion and Absorption of Lipids *148*
- Oxidation of Fatty Acids *151*
- Alcohol Metabolism *163*
- Risk Factors for Cardiovascular Disease *171*

Chapter 9: Integration of Metabolism and Homeostasis 181
- Pathways of Metabolism *182*
- Hormonal Regulation of Metabolism During Well-fed State *184*
- Hormonal Regulation of Metabolism During Fasting/Starvation *185*

Chapter 10: Hemoglobin Metabolism 194
- Structure of Hemoglobin *194*
- Compare Myoglobin and Hemoglobin *195*
- Thalassemia *198*
- Sickle Cell Hemoglobin *199*
- Detection of Abnormal Hemoglobin *200*
- Jaundice *205*

Chapter 11: Acid–Base Balance 209
- Buffers *209*
- Acid–Base Disorders *213*
- Mixed Acid–Base Disorders *216*

Chapter 12: Biological Oxidation 222
- Principles of Reduction–Oxidation Reactions *222*
- Structural Organization of Respiratory Chain and Electron Transport Structure of the Mitochondria *223*
- Organization of the Chain *223*

Chapter 13: Hormones 229
- Pituitary Hormones *231*
- Thyroid Hormones *233*
- Hyperthyroid Diseases *234*
- Parathyroid Hormones *234*
- Adrenal Gland *235*
- Glucocorticoids *235*
- Pancreas *240*
- Female Sex Hormones *240*
- Ovary *241*
- Testes *242*

Chapter 14: Immunochemistry 249
- Humoral and Cellular Immunity *249*
- Vaccine Development *250*
- Immunoglobulin *250*
- Mechanism of Antibody Production *252*
- Human Leukocyte Antigen *257*

Chapter 15: Free Radicals and Antioxidants 261
- Reactive Oxygen Species *262*
- Antioxidants *263*
- Oxidative Stress in Disease *266*

Chapter 16: Specialized Proteins 268
- Collagen *268*
- Elastin *269*
- Keratin *270*
- Actin *270*
- Myosin *270*
- Lens Protein *271*

Chapter 17: Vitamins 273
- Fat-soluble Vitamins *273*
- Water-soluble Vitamins *279*
- B-complex Vitamins *280*

Chapter 18: Minerals 294
- Calcium (Ca^{2+}) *294*
- Magnesium (Mg^{2+}) *298*
- Sodium (Na^{+}) *298*
- Osmolality *299*
- Atrial Natriuretic Peptide *300*
- Potassium (K^{+}) *302*
- Chloride (Cl^{-}) *306*
- Iron (Fe) *306*
- Copper (Cu^{2+}) *309*
- Zinc (Zn) *310*
- Manganese (Mn^{2+}) *310*
- Molybdenum (Mo) *311*
- Cobalt (Co) *311*
- Selenium (Se) *311*
- Fluoride (F) *311*
- Chromium (Cr) *312*
- Iodine (I_2) *312*

Chapter 19: Water and Electrolyte Balance 317
- Water Balance *317*
- Electrolyte Balance *321*

Chapter 20: Nutrition and Dietetics 329
- Dietary Fiber *332*
- Measurement of Metabolic Rate or Energy *334*
- Nutrition-related Diseases *337*
- Cookery Rules and Preservation of Nutrients *345*
- Balanced Diet *348*
- Supplementary/Complementary Foods *358*
- RDA *358*
- Types of Infant Feeding *359*
- Diet for Obesity *360*
- Diet for Liver Disease *360*

- Diet for Underweight *360*
- Diet for Renal Disease *361*
- Diet for Pre- and Postoperative Period *361*

Chapter 21: Organ Function Tests **364**

- Liver Function Tests *364*
- Renal Function Tests *368*
- Thyroid Function Tests *371*

Chapter 22: Laboratory Values **386**

- Blood *386*
- Urine *389*

Index *391*