

# Contents

|                                                                  |              |
|------------------------------------------------------------------|--------------|
| <i>Foreword</i> .....                                            | iii          |
| <i>Contributor and Reviewers</i> .....                           | v            |
| <i>Preface</i> .....                                             | vii          |
| <i>Acknowledgments</i> .....                                     | viii         |
| <i>Special Features of the Book</i> .....                        | xi           |
| <i>SARS Coronavirus-2</i> .....                                  | xxi          |
| <i>Glossary</i> ....                                             | xxv          |
| <b>Chapter 1 Basics of Pathophysiology</b> .....                 | <b>1–10</b>  |
| Cell                                                             | 1            |
| Cellular Adaptation                                              | 4            |
| Repair of Cells                                                  | 6            |
| Homeostasis                                                      | 7            |
| Disease, Sickness and Illness                                    | 8            |
| Pathophysiology and Disease                                      | 9            |
| Importance of Pathophysiology in Nursing                         | 10           |
| <b>Chapter 2 Pathophysiology of Cardiovascular Disorders</b> ... | <b>11–40</b> |
| Introduction                                                     | 11           |
| Coronary Artery Disease                                          | 12           |
| Angina Pectoris                                                  | 13           |
| Myocardial Infarction                                            | 14           |
| Heart Failure                                                    | 15           |
| Mitral Valve Prolapse                                            | 19           |
| Mitral Regurgitation                                             | 20           |
| Mitral Stenosis                                                  | 20           |
| Aortic Stenosis                                                  | 21           |
| Aortic Regurgitation                                             | 21           |
| Rheumatic Heart Disease                                          | 21           |

## Understanding Pathophysiology of Diseases

|                               |    |
|-------------------------------|----|
| Pericarditis                  | 23 |
| Pericardial Effusion          | 24 |
| Myocarditis                   | 25 |
| Endocarditis                  | 25 |
| Cor Pulmonale                 | 27 |
| Pulmonary Edema               | 27 |
| Cardiogenic Shock             | 28 |
| Cardiac Tamponade             | 30 |
| Vascular System Disorders     | 30 |
| Peripheral Vascular Disorders | 32 |
| Raynaud's Disease             | 33 |
| Aneurysm                      | 35 |
| Varicose Veins                | 35 |
| Deep Venous Thrombosis        | 37 |
| Chronic Venous Insufficiency  | 39 |

### **Chapter 3 Pathophysiology of Blood Disorders .....41–50**

|                                        |    |
|----------------------------------------|----|
| Introduction                           | 41 |
| Anemia                                 | 42 |
| Thalassemia                            | 42 |
| Thrombocytopenia                       | 43 |
| Disseminated Intravascular Coagulation | 43 |
| Leukemias                              | 47 |
| Myelomas                               | 49 |
| Lymphomas                              | 49 |

### **Chapter 4 Pathophysiology of Respiratory Disorders.....51–77**

|                                       |    |
|---------------------------------------|----|
| Introduction                          | 51 |
| Chronic Obstructive Pulmonary Disease | 52 |
| Bronchitis                            | 54 |
| Emphysema                             | 55 |
| Asthma                                | 56 |

|                                                                |               |
|----------------------------------------------------------------|---------------|
| Pleural Effusion                                               | 59            |
| Pneumonia                                                      | 60            |
| Lung Abscess                                                   | 61            |
| Acute Respiratory Distress Syndrome                            | 62            |
| Respiratory Failure                                            | 64            |
| Pulmonary Embolism                                             | 67            |
| Chest Injuries                                                 | 69            |
| Tuberculosis                                                   | 70            |
| Atelectasis                                                    | 73            |
| Bronchiectasis                                                 | 74            |
| Empyema                                                        | 76            |
| <b>Chapter 5 Pathophysiology of Gastrointestinal Disorders</b> | <b>79–109</b> |
| Introduction                                                   | 79            |
| Gastritis                                                      | 81            |
| Typhoid Fever                                                  | 81            |
| Inflammatory Bowel Disease                                     | 82            |
| Intestinal Obstruction                                         | 84            |
| Ulcers                                                         | 86            |
| Malabsorption                                                  | 89            |
| Appendicitis                                                   | 89            |
| Hernias                                                        | 90            |
| Acute Pancreatitis                                             | 95            |
| Chronic Pancreatitis                                           | 97            |
| Liver Cirrhosis                                                | 97            |
| Cholelithiasis                                                 | 98            |
| Cholecystitis                                                  | 99            |
| Portal Hypertension                                            | 100           |
| Liver Abscess                                                  | 103           |
| Hepatic Failure                                                | 104           |
| Hepatitis                                                      | 105           |

## Understanding Pathophysiology of Diseases

Hemorrhoids 108

Anal Fissures 109

Anal Fistula 109

### **Chapter 6 Pathophysiology of Renal System ..... 111–123**

Introduction 111

Urinary Tract Infections 111

Cystitis 112

Glomerulonephritis 113

Nephrotic Syndrome 114

Renal Calculi 115

Acute Renal Failure 117

Chronic Renal Failure 119

Urethral Stricture 120

Benign Prostate Hyperplasia/Hypertrophy 121

Prostatitis 122

### **Chapter 7 Pathophysiology of Endocrine Disorders ..... 125–142**

Introduction 125

Pituitary Disorders 127

Cushing's Syndrome 128

Addison's Syndrome 128

Syndrome of Inappropriate Antidiuretic Hormone 130

Hyperthyroidism 131

Hypothyroidism 134

Hyperparathyroidism 135

Hypoparathyroidism 136

Diabetes Mellitus 137

### **Chapter 8 Pathophysiology of Nervous System Disorders .. 143–169**

Introduction 143

Headache 144

Head Injuries 145

|                                                               |                |
|---------------------------------------------------------------|----------------|
| Spinal Injuries—Paraplegia, Hemiplegia                        | 146            |
| Herniation of Intervertebral Disc                             | 147            |
| Cerebral Aneurysm                                             | 149            |
| Meningitis                                                    | 150            |
| Brain Abscess                                                 | 151            |
| Encephalitis                                                  | 152            |
| Neurocysticercosis                                            | 153            |
| Movement Disorders—Chorea                                     | 153            |
| Seizures and Epilepsies                                       | 154            |
| Cerebrovascular Disease                                       | 156            |
| Hemorrhagic Stroke                                            | 158            |
| Bell's Palsy                                                  | 159            |
| Trigeminal Neuralgia                                          | 159            |
| Peripheral Neuropathies                                       | 162            |
| Carpal Tunnel Syndrome                                        | 162            |
| Alzheimer's Disease                                           | 163            |
| Parkinson's Disease                                           | 165            |
| Guillain-Barré Syndrome                                       | 165            |
| Myasthenia Gravis                                             | 166            |
| Multiple Sclerosis                                            | 167            |
| <b>Chapter 9 Pathophysiology of Musculoskeletal Disorders</b> | <b>171–188</b> |
| Introduction                                                  | 171            |
| Soft-tissue Injuries                                          | 172            |
| Fracture                                                      | 173            |
| Osteomyelitis                                                 | 175            |
| Osteoarthritis                                                | 176            |
| Rheumatoid Arthritis                                          | 178            |
| Osteoporosis                                                  | 182            |
| Osteomalacia                                                  | 183            |
| Paget's Disease                                               | 185            |

## Understanding Pathophysiology of Diseases

Prolapse of Intervertebral Disc 186

Pott's Spine/Disease 187

### **Chapter 10 Pathophysiology of Eye Disorders ..... 189–199**

Introduction 189

Vision 189

Refractive Errors 190

Blepharitis 191

Conjunctivitis 191

Corneal Ulcer/Keratitis 193

Cataract 194

Glaucoma 196

Retinal Detachment 198

### **Chapter 11 Pathophysiology of Ear, Nose and Throat Disorders..... 201–213**

Ear 201

Nose 201

Throat 202

Disorders of External Ear 203

Disorders of Middle Ear 203

Disorders of Internal Ear 206

Upper Respiratory Tract Infections 208

Tonsillitis 210

Laryngitis 211

Epistaxis 212

Nasal Obstruction 212

Laryngeal Obstruction 213

### **Chapter 12 Pathophysiology of Integumentary System ..... 215–224**

Introduction 215

Systemic Lupus Erythematosus 216

Acne Vulgaris 217

Psoriasis 218

|                   |                                                                      |                |
|-------------------|----------------------------------------------------------------------|----------------|
|                   | Malignant Melanoma                                                   | 219            |
|                   | Burns                                                                | 220            |
|                   | Burn Edema                                                           | 222            |
| <b>Chapter 13</b> | <b>Disorders of Female Reproductive System .....</b>                 | <b>225–232</b> |
|                   | Introduction                                                         | 225            |
|                   | Menstrual Disorders                                                  | 226            |
|                   | Pelvic Inflammatory Disease                                          | 228            |
|                   | Polycystic Ovarian Syndrome                                          | 228            |
|                   | Uterine and Cervical Disorders                                       | 229            |
|                   | Vaginal Disorders                                                    | 231            |
|                   | Mastitis                                                             | 232            |
|                   | Toxic Shock Syndrome                                                 | 232            |
| <b>Chapter 14</b> | <b>Disorders of Male Reproductive System .....</b>                   | <b>233–239</b> |
|                   | Introduction                                                         | 233            |
|                   | Congenital Malformation                                              | 234            |
|                   | Cryptorchidism                                                       | 235            |
|                   | Orchitis                                                             | 235            |
|                   | Epididymitis                                                         | 236            |
|                   | Phimosis                                                             | 236            |
|                   | Sexual Dysfunction                                                   | 237            |
|                   | Gynecomastia                                                         | 238            |
|                   | Male Menopause                                                       | 239            |
| <b>Chapter 15</b> | <b>Pathophysiology of Immune System Disorders .....</b>              | <b>241–245</b> |
|                   | Introduction—Immune System                                           | 241            |
|                   | Lymphatic System                                                     | 241            |
|                   | Types of Immunity                                                    | 242            |
|                   | Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome | 243            |
|                   | Anaphylaxis                                                          | 245            |

**Chapter 16 Pathophysiology of Cancer ..... 247–256**

|                   |     |
|-------------------|-----|
| Introduction      | 247 |
| Cancer of the Eye | 249 |
| Oral Cancer       | 249 |
| Laryngeal Cancer  | 249 |
| Breast Cancer     | 250 |
| Lung Cancer       | 250 |
| Gastric Cancer    | 251 |
| Colorectal Cancer | 251 |
| Bladder Cancer    | 251 |
| Liver Cancer      | 252 |
| Prostate Cancer   | 253 |
| Cervical Cancer   | 254 |
| Ovarian Cancer    | 254 |
| Brain Tumor       | 255 |

**Chapter 17 Pathophysiology of Genetic Disorders ..... 257–265**

|                       |     |
|-----------------------|-----|
| Introduction          | 257 |
| Single-gene Disorders | 257 |
| Chromosomal Disorders | 263 |
| Complex Disorders     | 265 |

|             |         |
|-------------|---------|
| Index ..... | 267–273 |
|-------------|---------|