

Section One: Basic Cell Physiology

1. Cell Components and Function
2. Physiology of Excitable Cells
3. Neurotransmitters and Receptors, Ion Channels, G Proteins and Second Messengers

Section Two: Physiology of the Nervous System

4. Neuronal Function
5. Blood–Brain Barrier and Cerebrospinal Fluid (CSF)
6. Cerebral Circulation
7. Spinal Cord: Anatomical and Physiological Features
8. Sensory System
9. Motor Function and Control: Descending Tracts

10. Autonomic Nervous System

11. Consciousness, EEG, Sleep and Emotions

Section Three: Muscle Physiology

12. Striated Muscles: Skeletal and Cardiac Muscles
13. Muscle Spindles, Golgi Tendon Organs and Spinal Reflexes
14. Smooth Muscle

Section Four: Respiratory Physiology

15. Functions of the Respiratory System
16. Mechanical Properties of the Lungs
17. Gas Exchange in the Lungs
18. Carriage of Oxygen in Blood
19. Carbon Dioxide Carriage in Blood
20. Pulmonary Circulation
21. Control of Ventilation
22. Applied Respiratory Physiology

Section Five: Cardiovascular Physiology

23. Functions of the Cardiovascular System
24. Electrical Properties of the Heart

- 25. Mechanical Events of the Cardiac Cycle
- 26. Pressure–Volume Loop of the Left Ventricle
- 27. Physical Factors Governing Blood Flow Through Vessels
- 28. The Systemic Circulation
- 29. Microcirculation
- 30. Venous Return and Vascular Function
- 31. Regulation of Arterial Blood Pressure
- 32. Integrated Cardiovascular Responses

Section Six: Gastrointestinal Physiology

- 33. Saliva, Swallowing, and Lower Oesophageal Sphincter
- 34. Stomach: Gastric Secretions, Motility, Digestion and Vomiting
- 35. The Small Intestine: Secretions, Digestion and Motility
- 36. The Large Intestine

Section Seven: Liver Physiology

- 37. Functions of the Liver
- 38. Liver Blood Flow
- 39. Liver Function Tests and Physiological Features of Liver Failure

Section Eight: Renal Physiology

- 40. Functions of the Kidneys and Functional Anatomy
- 41. Renal Blood Flow
- 42. Glomerular Filtration
- 43. Tubular Function
- 44. The Loop of Henle and Production of Concentrated Urine: Counter-Current Mechanisms of the Kidney
- 45. Overview of Renal Control of Acid–Base Balance
- 46. Applied Physiology: Renal Failure

Section Nine: Acid–Base Physiology

- 47. Basic Concepts of Acid–Base Physiology
- 48. Compensatory Mechanisms in Acid–Base Disorders

49. Clinical Aspects of Acid–Base Control

50. Anion Gap and Stewart’s Strong Ion Difference

Section Ten: Physiology of Blood

51. Cellular Components of Blood

52. Plasma: The Non-Cellular Components of Blood

53. Haemostasis

54. Blood Transfusion

Section Eleven: Physiology of the Immune System

55. Immune System and Innate Immunity

56. Acquired Immunity

57. Cytokines

58. Hypersensitivity

Section Twelve: Endocrine Physiology

59. General Aspects of Endocrine Physiology

60. Pituitary Gland

61. Hormones of the Pancreas

62. Thyroid Hormones and Calcium Metabolism

63. Hormones of the Adrenal Gland

64. Erythropoietin, Atrial Natriuretic Peptide and Sex Hormones

Section Thirteen: Metabolism, Nutrition, Exercise and Temperature Regulation

65. Metabolism

66. Nutrition

67. Exercise Physiology

68. Temperature Regulation

Section Fourteen: Physiology of Pain

69. Peripheral Mechanisms of Pain

70. Central Modulation of Pain

71. Pain Sensitization

Section Fifteen: Physiology of Pregnancy, Placenta, Neonate, Ageing and Obesity

72. Physiology of Pregnancy

73. Physiology of the Placenta

74. Physiology of the Neonate

75. Physiology of Ageing

76. Physiology of Obesity

Section Sixteen: Special Environments

77. Physiology Related to Special Environments

Further reading

Index