

Principles of Medical Physiology

Table of Contents

Preface	vii	19. Smooth Muscles	122
		20. Cardiac Muscle	127
Section 1 General Physiology			
1. Principles of Physics in Physiology	1	Section 3 Blood and Immune System	
2. Principles of Physical Chemistry in Physiology	18	21. Body Fluids and Blood	132
3. Principles of Control Systems in Physiology	24	22. Red Blood Cells	136
4. The Cell	28	23. Hemoglobin	142
5. Cell Membrane	35	24. Hematinic Factors	151
6. Cell Cycle	44	25. Blood Grouping and Transfusion	158
7. Applied Genetics	49	26. Blood Platelets and Hemostasis	163
Section 2 Nerve and Muscle			
8. Functional Anatomy of Nerve and Muscle	54	27. Hemostatic Balance	170
9. Degeneration and Regeneration of Nerve and Muscle	63	28. Granulocytes	176
10. Resting Membrane Potential	69	29. Agranulocytes and Lymphoid Organs	182
11. Membrane Excitation and Action Potential	76	30. Immunity, Tolerance, and Hypersensitivity	187
12. Electrophysiology of Ion Channels	81	31. Immune Mechanisms	193
13. Conduction of Nerve Impulses	86	32. Hemopoiesis	200
14. Neuromuscular Transmission	93	Section 4 Cardiovascular System	
15. Mechanism of Striated Muscle Contraction	97	33. Cardiac Excitation and the Electrocardiogram	205
16. Characteristics of Skeletal Muscle Contraction	101	34. Abnormalities of Cardiac Excitation	217
17. Electromyography and Electroneurography	111	35. Cardiac Cycle	224
18. Muscle Mechanics	117	36. Cardiac Output	231
		37. Circulatory Pathway	245
		38. Hemodynamics	252
		39. Capillary Circulation and Lymphatic Circulation	262
		40. Chemical Control of the Cardiovascular System	268

41. Neural Control of the Cardiovascular System	273	67. Urine Analysis and Renal Function Tests	423
42. Blood Pressure Regulation	280	68. Renal Syndromes	427
43. Circulatory Shock	286	69. Urinary Bladder and Micturition	431
44. Coronary Circulation	291		
45. Cerebral Circulation	295	Section 7 Gastrointestinal System	
46. Pulmonary and Pleural Circulation	303	70. Events in the Mouth and Esophagus	437
47. Cutaneous, Muscle, and Splanchnic Circulation	307	71. Events in the Stomach	442
		72. Events in the Duodenum	448
Section 5 Respiratory System		73. Events in the Small Intestine	454
48. Functional Anatomy of the Respiratory System	313	74. Events in the Colon	458
49. Mechanics of Pulmonary Ventilation	318	75. Gastrointestinal Hormones	462
50. Measurement of Pulmonary Ventilation	332	76. Gastrointestinal Disorders	466
51. Alveolar Ventilation, Perfusion, and Gas Exchange	340	Section 8 Nutrition and Metabolism	
52. Transport of Gases	347	77. Dietary Nutrients and Fibers	473
53. Control of Respiratory Rhythm	352	78. Nutritional Assessment and Dietary Planning	481
54. Control of Pulmonary Ventilation	358	79. Metabolic Pathways	485
55. High- and Low-Pressure Breathing	364	80. Metabolic States and the Liver	494
56. Pulmonary Function Tests and Respiratory Disorders	368	Section 9 Endocrine System	
Section 6 Renal System		81. Mechanism of Hormonal Action	504
57. Functional Anatomy of the Kidney	376	82. Hypothalamic and Pituitary Hormones	510
58. Glomerular Filtration and Tubular Reabsorption	382	83. Thyroid Hormones	517
59. Renal Handling of Sodium	387	84. Calcitropic Hormones	525
60. Renal Regulation of Urine Volume and Osmolarity	392	85. Adrenocortical Hormones	534
61. Body Fluid and Electrolyte Balance	396	86. Adrenomedullary Hormones	544
62. Renal Regulation of Acid–Base Balance	402	87. Pancreatic Hormones	547
63. Renal Regulation of Potassium Balance	408	Section 10 Reproductive System	
64. Renal Handling of Miscellaneous Substances	411	88. Testicular and Ovarian Hormones	554
65. Hormones Acting on the Kidney	414	89. Puberty and Gametogenesis	560
66. Quantitation of Renal Functions	418	90. Menstrual Cycle	566
		91. Sperm Transport and Fertilization	570
		92. Sexual Differentiation of the Fetus	580
		93. Pregnancy	585
		94. Parturition and Lactation	591

Section 11 Central Nervous System

95. Anatomy of the Central Nervous System	595
96. Spinal Cord and Brain Stem	606
97. Cerebellum	615
98. Diencephalon	622
99. Basal Ganglia	626
100. Cerebral Cortex	632
101. Autonomic Nervous System	642
102. Synaptic Mechanisms and Neurotransmitters	648
103. Sensory Mechanisms	660
104. Regulation of Muscle Length and Tone	677
105. Motor Planning, Programming, and Execution	685
106. Thought, Emotion, and Conation	699
107. Electroencephalogram and Epilepsies	706

108. Sleep	715
109. Regulation of Body Temperature	720
110. Regulation of Food Intake	727
111. Memory and Learning	731
112. Language and Speech	740

Section 12 Special Senses

113. Functional Anatomy of the Eye	744
114. Visual Optics	749
115. The Retina and Phototransduction	760
116. Visual Pathways and Image Processing	766
117. Oculomotor Mechanisms	776
118. Auditory Mechanisms	783
119. Vestibular Mechanisms	794
120. Olfactory and Gustatory Mechanisms	799

Index	803
--------------	-----