

Contents



SECTION I

CELLULAR PHYSIOLOGY

Howard C. Kutchai

- 1 Cellular membranes and transmembrane transport of solutes and water, 3
- 2 Ionic equilibria and resting membrane potentials, 23
- 3 Generation and conduction of action potentials, 35
- 4 Synaptic transmission, 50

SECTION II

THE NERVOUS SYSTEM

David H. Cohen and S. Murray Sherman

- 5 The nervous system and its components, 69
- 6 Peripheral units of the nervous system, 77
- 7 General principles of sensory systems, 90
- 8 The visual system, 96
- 9 The somatosensory system, 145
- 10 The auditory system, 165
- 11 The vestibular system, 188
- 12 Chemical senses, 198
- 13 A functional neuroanatomical framework for motor systems, 207
- 14 Spinal organization of motor function, 211
- 15 Descending pathways involved in motor control, 233
- 16 The cerebellum, 247
- 17 The basal ganglia, 262
- 18 Control of movement and posture, 270
- 19 The cerebral cortex, 288
- 20 The autonomic nervous system and its central control, 314
- 21 Neural plasticity, 336

SECTION III**MUSCLE***Richard A. Murphy***22** Contraction of muscle cells, 359**23** Muscle as a tissue, 387**SECTION IV****BLOOD***Oscar D. Ratnoff***24** Blood components, 407**25** Hemostasis and blood coagulation, 411**SECTION V****THE CARDIOVASCULAR SYSTEM***Robert M. Berne and Matthew N. Levy***26** The circuitry, 439**27** Electrical activity of the heart, 442**28** Hemodynamics, 473**29** The cardiac pump, 485**30** The arterial system, 504**31** The microcirculation and lymphatics, 517**32** The peripheral circulation and its control, 531**33** Control of the heart, 550**34** Cardiac output and the venous system, 574**35** Special circulations, 596**36** Interplay of central and peripheral factors in the control of the circulation, 623**SECTION VI****THE RESPIRATORY SYSTEM***Neil S. Cherniack, Murray D. Altose, and Steven G. Kelsen***37** Respiratory system mechanics, 639**38** The pulmonary circulation, 672**39** Gas exchange and gas transport, 681**40** Control of respiration, 710**41** Environmental and developmental aspects of respiration, 727

SECTION VII**THE GASTROINTESTINAL SYSTEM***Howard C. Kutchai*

- 42** Gastrointestinal motility, 743
- 43** Gastrointestinal secretions, 770
- 44** Digestion and absorption, 795

SECTION VIII**THE KIDNEY***Brian R. Duling*

- 45** Components of renal function, 823
- 46** Tubular mechanisms, 836
- 47** Integrated nephron function, 861
- 48** Regulation of the composition of extracellular fluid, 877

SECTION IX**THE ENDOCRINE SYSTEM***Saul M. Genuth*

- 49** General principles of endocrine physiology, 895
- 50** Whole body metabolism and the hormones of the pancreatic islets, 915
- 51** Endocrine regulation of calcium and phosphate metabolism, 949
- 52** The hypothalamus and the pituitary gland, 971
- 53** The thyroid gland, 1013
- 54** The adrenal glands, 1033
- 55** The reproductive glands, 1069