

# CONTENTS

## VOLUME ONE

---

### PART I CELLULAR PHYSIOLOGY

- 1 Principles of cell homeostasis, 3  
ROBERT D. DeVOE
- 2 Excitation and conduction in nerve fibers, 34  
F. J. BRINLEY, Jr.
- 3 Mechanism of muscle contraction and its energetics, 77  
KENNETH L. ZIERLER
- 4 Vertebrate smooth muscle, 121  
JEAN M. MARSHALL

### PART II INTERACTIONS BETWEEN EXCITABLE TISSUES

- 5 Neuromuscular transmission, 151  
WILLIAM L. NASTUK
- 6 Synaptic transmission, 182  
VERNON B. MOUNTCASTLE and ROSS J. BALDESSARINI

### PART III GENERAL PHYSIOLOGY OF THE FOREBRAIN

- 7 Structural organization and general physiology of thalamotelencephalic systems, 227  
VERNON B. MOUNTCASTLE and GIAN F. POGGIO
- 8 Sleep, wakefulness, and the conscious state: intrinsic regulatory mechanisms of the brain, 254  
VERNON B. MOUNTCASTLE

## **PART IV CENTRAL NERVOUS MECHANISMS IN SENSATION**

- 9** Sensory receptors and neural encoding: introduction to sensory processes, 285  
VERNON B. MOUNTCASTLE
- 10** Neural mechanisms in somesthesia, 307  
VERNON B. MOUNTCASTLE
- 11** Pain and temperature sensibilities, 348  
VERNON B. MOUNTCASTLE
- 12** The auditory periphery, 382  
MOÏSE H. GOLDSTEIN, Jr.
- 13** Central neural mechanisms in hearing, 412  
VERNON B. MOUNTCASTLE
- 14** The eye, 440  
GERALD WESTHEIMER
- 15** Physiology of the retina, 458  
KENNETH T. BROWN
- 16** Central neural mechanisms in vision, 497  
GIAN F. POGGIO
- 17** The chemical senses: gustation and olfaction, 536  
LLOYD M. BEIDLER
- 18** The study of sensation in physiology: psychophysical and neurophysiologic correlations, 551  
GERHARD WERNER
- 19** Higher functions of the nervous system, 575  
GERHARD WERNER

## **PART V NEURAL CONTROL OF MOVEMENT AND POSTURE**

- 20** Organization of the motor systems—a preview, 603  
ELWOOD HENNEMAN
- 21** Feedback control of muscle: introductory concepts, 608  
JAMES HOUK and ELWOOD HENNEMAN
- 22** Peripheral mechanisms involved in the control of muscle, 617  
ELWOOD HENNEMAN
- 23** Organization of the spinal cord, 636  
ELWOOD HENNEMAN
- 24** Spinal reflexes and the control of movement, 651  
ELWOOD HENNEMAN
- 25** Feedback control of muscle: a synthesis of the peripheral mechanisms, 668  
JAMES HOUK
- 26** Motor functions of the brainstem and basal ganglia, 678  
ELWOOD HENNEMAN

- 27 Role of the vestibular system in posture and movement, 704  
LAURENCE R. YOUNG
- 28 The cerebellum, 722  
ELWOOD HENNEMAN
- 29 Motor functions of the cerebral cortex, 747  
ELWOOD HENNEMAN

## PART VI THE AUTONOMIC NERVOUS SYSTEM, HYPOTHALAMUS, AND INTEGRATION OF BODY FUNCTIONS

- 30 The autonomic nervous system and its role in controlling visceral activities, 783  
KIYOMI KOIZUMI and CHANDLER McC. BROOKS
- 31 The hypothalamus and control of integrative processes, 813  
CHANDLER McC. BROOKS and KIYOMI KOIZUMI

### VOLUME TWO

---

## PART VII THE CIRCULATION

- 32 Cardiovascular system, 839  
WILLIAM R. MILNOR
- 33 The heart, 849  
JEAN M. MARSHALL
- 34 The electrocardiogram, 883  
WILLIAM R. MILNOR
- 35 The heart as a pump, 892  
WILLIAM R. MILNOR
- 36 Principles of hemodynamics, 914  
WILLIAM R. MILNOR
- 37 Normal circulatory function, 930  
WILLIAM R. MILNOR
- 38 Autonomic and peripheral control mechanisms, 944  
WILLIAM R. MILNOR
- 39 The cardiovascular control system, 958  
WILLIAM R. MILNOR
- 40 Capillaries and lymphatic vessels, 984  
WILLIAM R. MILNOR

- 41 Regional circulations, 993  
WILLIAM R. MILNOR
- 42 Pulmonary circulation, 1008  
WILLIAM R. MILNOR
- 43 Blood volume, 1019  
WILLIAM R. MILNOR
- 44 The blood, 1027  
C. LOCKARD CONLEY
- 45 Hemostasis, 1038  
C. LOCKARD CONLEY

## PART VIII THE KIDNEY AND BODY FLUIDS

- 46 Volume and composition of the body fluids, 1049  
WILLIAM E. LASSITER and CARL W. GOTTSCHALK
- 47 Mechanisms of urine formation, 1065  
CARL W. GOTTSCHALK and WILLIAM E. LASSITER
- 48 Urine formation in the diseased kidney, 1106  
CARL W. GOTTSCHALK and WILLIAM E. LASSITER
- 49 The cerebrospinal fluid, with notes on aqueous humor and endolymph, 1116  
THOMAS H. MAREN

## PART IX PHYSIOLOGY OF THE DIGESTIVE SYSTEM

- 50 The absorptive function of the alimentary canal, 1145  
THOMAS R. HENDRIX
- 51 The secretory function of the alimentary canal, 1178  
THOMAS R. HENDRIX
- 52 The motility of the alimentary canal, 1208  
THOMAS R. HENDRIX

## PART X METABOLISM

- 53 Energy exchange, 1237  
JOHN R. BROBECK
- 54 Energy balance and food intake, 1253  
JOHN R. BROBECK
- 55 Physiology of muscular exercise, 1273  
SID ROBINSON
- 56 Body temperature regulation, 1305  
JAMES D. HARDY and PHILIP BARD
- 57 Regulation and control in physiology, 1343  
J. A. J. STOLWIJK and JAMES D. HARDY

## PART XI RESPIRATION

- 58 Physical and mechanical aspects of respiration, 1361  
CHRISTIAN J. LAMBERTSEN
- 59 The atmosphere and gas exchanges with the lungs and blood, 1372  
CHRISTIAN J. LAMBERTSEN
- 60 Transport of oxygen and carbon dioxide by the blood, 1399  
CHRISTIAN J. LAMBERTSEN
- 61 Neurogenic factors in control of respiration, 1423  
CHRISTIAN J. LAMBERTSEN
- 62 Chemical control of respiration at rest, 1447  
CHRISTIAN J. LAMBERTSEN
- 63 Interactions of physical, chemical, and nervous factors in respiratory control, 1496  
CHRISTIAN J. LAMBERTSEN
- 64 Abnormal types of respiration, 1522  
CHRISTIAN J. LAMBERTSEN
- 65 Anoxia, altitude, and acclimatization, 1538  
CHRISTIAN J. LAMBERTSEN
- 66 Effects of excessive pressures of oxygen, nitrogen, carbon dioxide, and carbon monoxide: implications in aerospace, undersea, and industrial environments, 1563  
CHRISTIAN J. LAMBERTSEN

## PART XII ENDOCRINE GLANDS

- 67 Introduction to endocrinology, 1601  
H. MAURICE GOODMAN
- 68 The pituitary gland, 1609  
H. MAURICE GOODMAN
- 69 The thyroid, 1632  
H. MAURICE GOODMAN and LESTER VAN MIDDLESWORTH
- 70 Vitamin D, parathyroid hormone, and calcitonin, 1655  
G. D. AURBACH and JAMES M. PHANG
- 71 The adrenal cortex, 1696  
F. EUGENE YATES, DONALD J. MARSH, and JANICE W. MARAN
- 72 Reproduction, 1741  
H. MAURICE GOODMAN
- 73 The pancreas and regulation of metabolism, 1776  
H. MAURICE GOODMAN