

CONTENTS

SECTION I INTRODUCTION

- 1 Foundations of Physiology** 1
Emile L. Boulpaep and Walter F. Boron 3

SECTION II PHYSIOLOGY OF CELLS AND MOLECULES

- 2 Functional Organization of the Cell** 9
Michael J. Caplan
- 3 Signal Transduction** 48
Lloyd Cantley
- 4 Regulation of Gene Expression** 75
Peter Igarashi
- 5 Transport of Solutes and Water** 106
Peter S. Aronson, Walter F. Boron, and Emile L. Boulpaep
- 6 Electrophysiology of the Cell Membrane** 147
Edward G. Moczydlowski
- 7 Electrical Excitability and Action Potentials** 179
Edward G. Moczydlowski
- 8 Synaptic Transmission and the Neuromuscular Junction** 212
Edward G. Moczydlowski
- 9 Cellular Physiology of Skeletal, Cardiac, and Smooth Muscle** 237
Edward G. Moczydlowski and Michael Apkon

SECTION III THE NERVOUS SYSTEM

- 10 Organization of the Nervous System** 267
Bruce R. Ransom
- 11 The Neuronal Microenvironment** 289
Bruce R. Ransom
- 12 Physiology of Neurons** 310
Barry W. Connors

- 13 Synaptic Transmission in the Nervous System** 323
Barry W. Connors

- 14 The Autonomic Nervous System** 351
George B. Richerson

- 15 Sensory Transduction** 371
Barry W. Connors

- 16 Circuits of the Central Nervous System** 408
Barry W. Connors

SECTION IV THE CARDIOVASCULAR SYSTEM

- 17 Organization of the Cardiovascular System** 429
Emile L. Boulpaep

- 18 Blood** 448
Emile L. Boulpaep

- 19 Arteries and Veins** 467
Emile L. Boulpaep

- 20 The Microcirculation** 482
Emile L. Boulpaep

- 21 Cardiac Electrophysiology and the Electrocardiogram** 504
W. Jonathan Lederer

- 22 The Heart as a Pump** 529
Emile L. Boulpaep

- 23 Regulation of Arterial Pressure and Cardiac Output** 554
Emile L. Boulpaep

- 24 Special Circulations** 577
Steven S. Segal

- 25 Integrated Control of the Cardiovascular System** 593
Emile L. Boulpaep

SECTION V THE RESPIRATORY SYSTEM

- 26 Organization of the Respiratory System** 613
Walter F. Boron

27	Mechanics of Ventilation	630	46	Hepatobiliary Function	980
	<i>Walter F. Boron</i>			<i>Frederick J. Suchy</i>	
28	Acid-Base Physiology	652			
	<i>Walter F. Boron</i>				
29	Transport of Oxygen and Carbon Dioxide in the Blood	672			
	<i>Walter F. Boron</i>				
30	Gas Exchange in the Lungs	685			
	<i>Walter F. Boron</i>				
31	Ventilation and Perfusion of the Lungs	700			
	<i>Walter F. Boron</i>				
32	Control of Ventilation	725			
	<i>George B. Richerson and Walter F. Boron</i>				
SECTION VI			SECTION VIII		
THE URINARY SYSTEM			THE ENDOCRINE SYSTEM		
33	Organization of the Urinary System	747	47	Organization of Endocrine Control	1011
	<i>Gerhard Giebisch and Erich Windhager</i>	749		<i>Eugene J. Barrett</i>	
34	Glomerular Filtration and Renal Blood Flow	767	48	Endocrine Regulation of Growth and Body Mass	1028
	<i>Gerhard Giebisch and Erich Windhager</i>			<i>Eugene J. Barrett</i>	
35	Transport of Sodium and Chloride	782	49	The Thyroid Gland	1044
	<i>Gerhard Giebisch and Erich Windhager</i>			<i>Eugene J. Barrett</i>	
36	Transport of Urea, Glucose, Phosphate, Calcium, Magnesium, and Organic Solutes	797	50	The Adrenal Gland	1057
	<i>Gerhard Giebisch and Erich Windhager</i>			<i>Eugene J. Barrett</i>	
37	Transport of Potassium	821	51	The Endocrine Pancreas	1074
	<i>Gerhard Giebisch and Erich Windhager</i>			<i>Eugene J. Barrett</i>	
38	Urine Concentration and Dilution	835	52	The Parathyroid Glands and Vitamin D	1094
	<i>Gerhard Giebisch and Erich Windhager</i>			<i>Eugene J. Barrett and Paula Barrett</i>	
39	Transport of Acids and Bases	851			
	<i>Gerhard Giebisch and Erich Windhager</i>				
40	Integration of Salt and Water Balance	866	SECTION IX		
	<i>Gerhard Giebisch and Erich Windhager</i>		THE REPRODUCTIVE SYSTEM		
SECTION VII			53	Sexual Differentiation	1113
THE GASTROINTESTINAL SYSTEM				<i>Ervin E. Jones</i>	
41	Organization of the Gastrointestinal System	881	54	The Male Reproductive System	1128
	<i>Henry J. Binder</i>	883		<i>Ervin E. Jones</i>	
42	Gastric Function	895	55	The Female Reproductive System	1146
	<i>Henry J. Binder</i>			<i>Ervin E. Jones</i>	
43	Pancreatic and Salivary Glands	912	56	Fertilization, Pregnancy, and Lactation	1170
	<i>Christopher R. Marino and Fred S. Gorelick</i>			<i>Ervin E. Jones</i>	
44	Intestinal Fluid and Electrolyte Movement	933	57	Fetal and Neonatal Physiology	1193
	<i>Henry J. Binder</i>			<i>Ervin E. Jones</i>	
45	Nutrient Digestion and Absorption	949	SECTION X		
	<i>Henry J. Binder and Adrian Reuben</i>		PHYSIOLOGY OF EVERYDAY LIFE		
			58	Metabolism	1213
				<i>Gerald I. Shulman and Kitt Falk Petersen</i>	
			59	Regulation of Body Temperature	1237
				<i>John Stitt</i>	
			60	Exercise Physiology and Sports Science	1249
				<i>Steven S. Segal</i>	
			61	Environmental Physiology	1268
				<i>Arthur DuBois</i>	
			62	The Physiology of Aging	1281
				<i>Edward J. Masoro</i>	
			Index		1293