

FIFTEENTH EDITION

VANDER'S

Human Physiology

The Mechanisms of Body Function



With compliments from
McGRAW-HILL EDUCATION

Date : 24-6-2019

To :

From: Winata H. Wijaya

HP : 0811945937

ERIC P. WIDMAIER

BOSTON UNIVERSITY

HERSHEL RAFF

MEDICAL COLLEGE OF WISCONSIN
AURORA ST. LUKE'S MEDICAL CENTER

KEVIN T. STRANG

UNIVERSITY OF WISCONSIN-MADISON

TODD C. SHOEPE, DIGITAL AUTHOR

LOYOLA MARYMOUNT UNIVERSITY



Brief Contents

■ 1 Homeostasis: A Framework for Human Physiology 1

■ 2 Chemical Composition of the Body and Its Relation to Physiology 20

■ 3 Cellular Structure, Proteins, and Metabolic Pathways 44

SECTION A Cell Structure 45

SECTION B Protein Synthesis, Degradation, and Secretion 57

SECTION C Interactions Between Proteins and Ligands 66

SECTION D Chemical Reactions and Enzymes 71

SECTION E Metabolic Pathways 77

■ 4 Movement of Solutes and Water Across Cell Membranes 95

■ 5 Cell Signaling in Physiology 118

■ 6 Neuronal Signaling and the Structure of the Nervous System 136

SECTION A Cells of the Nervous System 137

SECTION B Membrane Potentials 143

SECTION C Synapses 158

SECTION D Structure of the Nervous System 172

■ 7 Sensory Physiology 189

SECTION A General Principles 190

SECTION B Specific Sensory Systems 200

■ 8 Consciousness, the Brain, and Behavior 234

■ 9 Muscle 257

SECTION A Skeletal Muscle 258

SECTION B Smooth and Cardiac Muscle 287

■ 10 Control of Body Movement 301

■ 11 The Endocrine System 320

SECTION A General Characteristics of Hormones and Hormonal Control Systems 321

SECTION B The Hypothalamus and Pituitary Gland 333

SECTION C The Thyroid Gland 339

SECTION D The Endocrine Response to Stress 344

SECTION E Endocrine Control of Growth 348

SECTION F Endocrine Control of Ca^{2+} Homeostasis 352

■ 12 Cardiovascular Physiology 362

SECTION A Overview of the Circulatory System 363

SECTION B The Heart 372

SECTION C The Vascular System 390

SECTION D Integration of Cardiovascular Function: Regulation of Systemic Arterial Pressure 411

SECTION E Cardiovascular Patterns in Health and Disease 419

SECTION F Hemostasis: The Prevention of Blood Loss 431

■ 13 Respiratory Physiology 445

■ 14 The Kidneys and Regulation of Water and Inorganic Ions 488

SECTION A Basic Principles of Renal Physiology 489

SECTION B Regulation of Ion and Water Balance 503

SECTION C Hydrogen Ion Regulation 520

■ 15 The Digestion and Absorption of Food 531

■ 16 Regulation of Organic Metabolism and Energy Balance 572

SECTION A Control and Integration of Carbohydrate, Protein, and Fat Metabolism 573

SECTION B Regulation of Total-Body Energy Balance 587

SECTION C Regulation of Body Temperature 593

■ 17 Reproduction 604

SECTION A Gametogenesis, Sex Determination, and Sex Differentiation; General Principles of Reproductive Endocrinology 605

SECTION B Male Reproductive Physiology 614

SECTION C Female Reproductive Physiology 623

SECTION D Pregnancy, Contraception, Infertility, and Hormonal Changes Through Life 636

■ 18 The Immune System 655

■ 19 Medical Physiology: Integration Using Clinical Cases 694

SECTION A Case Study of a Woman with Palpitations and Heat Intolerance 695

SECTION B Case Study of a Man with Chest Pain After a Long Airplane Flight 699

SECTION C Case Study of a Man with Abdominal Pain, Fever, and Circulatory Failure 702

SECTION D Case Study of a College Student with Nausea, Flushing, and Sweating 706

APPENDIX A A-1

APPENDIX B A-17

APPENDIX C A-21

GLOSSARY/INDEX G1-1