© Jones & Bartlett Learning, LLC. NOT FOR SALE OR DISTRIBUTION

Introduction to Pathology

for the Physical Therapist Assistant

Jahangir Moini, MD, MPH

Professor of Allied Health Sciences Everest University Melbourne, Florida

Reviewers

Julie Feeny, MS, PT PTA Program Director Illinois Central College Cosette Hardwick, PT, DPT Assistant Professor PTA Program Missouri Western State University



World Headquarters Jones & Bartlett Learning 5 Wall Street Burlington, MA 01803 978-443-5000 info@jblearning.com www.jblearning.com

Jones & Bartlett Learning books and products are available through most bookstores and online booksellers. To contact Jones & Bartlett Learning directly, call 800-832-0034, fax 978-443-8000, or visit our website, www.jblearning.com.

Substantial discounts on bulk quantities of Jones & Bartlett Learning publications are available to corporations, professional associations, and other qualified organizations. For details and specific discount information, contact the special sales department at Jones & Bartlett Learning via the above contact information or send an email to specialsales@jblearning.com.

Copyright © 2013 by Jones & Bartlett Learning, LLC, an Ascend Learning Company

All rights reserved. No part of the material protected by this copyright may be reproduced or utilized in any form, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the copyright owner.

Introduction to Pathology for the Physical Therapist Assistant is an independent publication and has not been authorized, sponsored, or otherwise approved by the owners of the trademarks or service marks referenced in this product.

Some images in this book feature models. These models do not necessarily endorse, represent, or participate in the activities represented in the images.

This publication is designed to provide accurate and authoritative information in regard to the Subject Matter covered. It is sold with the understanding that the publisher is not engaged in rendering legal, accounting, or other professional service. If legal advice or other expert assistance is required, the service of a competent professional person should be sought.

Production Credits

Publisher: William Brottmiller Senior Acquisitions Editor: Joseph Morita Managing Editor: Maro Gartside Production Manager: Tracey McCrea Marketing Manager: Grace Richards Manufacturing and Inventory Control Supervisor: Amy Bacus Composition: Publishers' Design and Production Services, Inc.

To order this product, use ISBN: 1-978-1-4496-3058-4

Library of Congress Cataloging-in-Publication Data

Rights & Photo Research Manager: Katherine Crighton Rights & Photo Researcher: Sarah Cebulski Cover Image: © Fabrizio Argonauta/Dreamstime.com Printing and Binding: Courier Kendallville Cover Printing: Courier Kendallville

Cover Design: Scott Moden

Moini, Jahangir, 1942-Introduction to pathology for the physical therapist assistant / Jahangir Moini. p.; cm. Includes bibliographical references and index. ISBN 978-0-7637-9908-3 (pbk.) I. Title. [DNLM: 1. Pathologic Processes. 2. Allied Health Personnel. 3. Physical Therapy (Specialty) QZ 4] 615.8'2023--dc23 2011037934

6048

Printed in the United States of America 16 15 14 13 12 10 9 8 7 6 5 4 3 2 1

Dedication

This book is dedicated to my granddaughter, Laila Jade Mabry.

Brief Table of Contents

UNIT I	Introduction to Health and Disease 1
Chapter 1	Health Versus Disease 3
Chapter 2	Mechanisms of Disease 13
Chapter 3	Growth and Development of Children 23
Chapter 4	Health Problems in Children 33
UNIT II	Pathology of the Cell 43
Chapter 5	Cell Injury and Cell Death 45
Chapter 6	Genetic and Congenital Disorders 55
Chapter 7	Oncology 75
UNIT III	Infection, Inflammation, and Repair 89
Chapter 8	Infectious Disease 91
Chapter 9	Inflammation and Healing 105
Chapter 10	Immune Response, Hypersensitivity, and Autoimmune Disorders 113
UNIT IV	Pathology of the Body Systems 137

Chapter 11 Cardiovascular Disorders 139

- Chapter 12 Blood Disorders 163
- Chapter 13 Lymphatic Disorders 179

- Chapter 14 Nervous System Disorders 189
- **Chapter 15** Disorders of the Eye and Ear 211
- Chapter 16 Musculoskeletal Disorders 229
- Chapter 17 Respiratory System Disorders 257
- Chapter 18 Digestive System Disorders 283
- Chapter 19 Urinary System Disorders 309
- Chapter 20 Endocrine System Disorders 325
- Chapter 21 Male Reproductive System Disorders 343
- Chapter 22 Female Reproductive System Disorders 355
- Chapter 23 Integumentary System Disorders 375

UNIT V Environmental Hazards 393

- Chapter 24 Occupational Disorders and Injuries 395
- Chapter 25 Psychological Disorders and the Influence of Stress 403
- Chapter 26 Substance Abuse 415
- **Chapter 27** Fluid, Electrolyte, and Acid-Base Imbalances 421
- Chapter 28 Aging and Disease Processes 431
- Chapter 29 Effects of Immobility 439
- **Appendix A** Reference Laboratory Values 445
- Appendix B Normal Vital Signs 447
- Appendix C Temperature Conversion Chart 449
- Answer Key 451
- **Glossary** 455
- **Index** 481
- Credits 501

Table of Contents

Dedication iii Preface xvii Rievewers/Contributor xix Acknowledgments xxi About the Author xxiii

UNIT I	Introduction to Health and Disease 1
Chapter 1	Health Versus Disease 3 Outline 3 Learning Objectives 3 Key Terms 3 Key terms continued 4 Overview 4 Study of Pathophysiology 4 Developments in Pathophysiology 5 Classifications of Disease 7 Patient History 7 Physical Examination 7 Diagnosis of Disease 7 Treatment 11 Summary 11 Review Questions 11 Case Studies 12 Websites 12
Chapter 2	Mechanisms of Disease 13 Outline 13 Learning Objectives 13

Key Terms 13

Overview 14 Predisposing Factors 14 Age **14** Gender 14 Environment 14 Heredity 16 Lifestyle 16 Physical Activity 16 Socioeconomic Status 16 Cancer 16 Genetic Diseases 16 Immune Disorders 16 Infection 16 Inflammation and Repair 17 Nutrition and Obesity 17 Diseases Related to Obesity **17** Physical Trauma and Chemical Agents 18 Domestic Violence 18 Child Abuse 18 Elder Abuse 18 Cultural Diversity 19 Mental Disorders 19 Psychological Factors 19 Role of the PTA in Patients with Stress 20 Summary 20 Review Questions 20 Case Studies 21 Websites 21

Chapter 3 Growth and Development of Children 23

Outline 23 Learning Objectives 23 Key Terms 23 Chapter 4

Key terms continued 24 Overview 24 Growth and Development **24** Prenatal Growth and Development 24 Embryonic Development 25 Fetal Development 26 Birth Weight and Gestational Age 27 Abnormal Intrauterine Growth 27 Small for Gestational Age 27 Large for Gestational Age 28 Growth of Organ Systems 28 Nervous System 28 Thermoregulation 29 Cardiovascular System 29 Respiratory System 29 Gastrointestinal System 30 Urinary System 30 Summary 30 Review Ouestions 30 Case Studies 31 Websites 31 Health Problems in Children 33 Outline 33 Learning Objectives 33 Kev Terms 33 Key terms continued **34** Overview 34 Neonatal Health Problems 34 Birth Injuries **34** Hypoglycemia 35 Jaundice 35 Erythroblastosis Fetalis 36 Premature Infants 36 Infants 37 Nutrition 37 Colic 38 Sudden Infant Death Svndrome 38 Infectious Disease 38 Injuries 38 Early Childhood 38 Common Health Problems 39 Middle to Late Childhood **39** Common Health Problems 39 Adolescence 40 Common Health Problems 41 Summary 41

Review Questions **41** Case Studies **42** Websites **42**

UNIT II Pathology of the Cell 43

Chapter 5 Cell Injury and Cell Death 45 outline 45 Learning Objectives 45 Key Terms 45 Key terms continued **46** Overview 46 Cellular Changes 46 Cellular Adaptation 46 Atrophy 46 Dysplasia 47 Hypertrophy **47** Hyperplasia 48 Metaplasia 48 Cellular Injury 49 Mechanisms of Cell Injury 49 Hypoxic Injury 49 Mechanisms of Chemical Injury **49** Accidental Injuries 50 Asphyxial Injuries 50 Suffocation 50 Strangulation 51 Chemical Asphyxiants **51** Drowning **51** Cellular Death and Necrosis **51** Aging and Altered Cellular and/or Tissue Biology 53 Summary 53 Review Questions 53 Case Studies 53 Websites 54 Chapter 6 Genetic and Congenital Disorders 55

outline **55** Learning Objectives Key Terms Key terms continued Overview **56** Genetic Control Single-Gene Disorders

Autosomal Dominant Disorders 58 Autosomal Recessive Disorders 59 X-Linked Disorders 60 Multifactorial Inheritance Disorders 61 Neural Tube Defects 62 Cleft Lip and Cleft Palate 63 Chromosomal Disorders 64 Down Syndrome 64 Turner's Syndrome 65 Klinefelter's Syndrome 65 Developmental Disorders 66 Musculoskeletal Conditions 67 Teratogenic Agents 69 Radiation 69 Chemicals and Drugs 69 Fetal Alcohol Syndrome 70 Prenatal Screening and Diagnosis **70** Gene Technology **71** Gene and DNA Testing 71 Genetic Engineering and Gene Therapy **71** Summary 71 Review Questions 72 Case Studies 72 Websites 73

Chapter 7 Oncology 75

Outline 75 Learning Objectives 75 Key Terms 75 Overview 76 Benign and Malignant Tumors **76** Names of Tumors 76 Characteristics of Tumors 76 Cancer 77 Pathophysiology 77 Etiology 81 Risk Factors 81 Signs and Symptoms 81 Diagnosis 82 Treatment 83 Prognosis 85 Screening 85 Summary 85 Review Questions 86

Case Studies **86** Websites **87**

UNIT III Infection, Inflammation, and Repair 89

Infectious Disease 91 Chapter 8 outline 91 Learning Objectives **91** Key Terms 91 Key terms continued 92 Overview 92 Causative Infectious Diseases 92 Classes of Infectious Microorganisms 92 Bacteria 93 Rickettsiae 94 Mycoplasmas 94 Chlamydiae 94 Viruses 94 Fungi 95 Protozoa 96 Epidemiology of Infectious Diseases 96 Resident Flora 96 Transmission 96 Resistance 96 Pathogenicity 97 Current Trends 98 Development of Infection 98 Signs and Symptoms 100 Diagnostic Tests 100 Treatments 101 Immunotherapy **101** Surgical Intervention 102 Summary 102 Review Ouestions 102 Case Studies 102 Websites 103

Chapter 9 Inflammation and Healing 105

Outline 105 Learning Objectives 105 Key Terms 105 Key terms continued 106 Overview 106 Physiologic Mechanisms of Inflammation 106

Classifications of Inflammation 106 Acute Inflammation 107 Chronic Inflammation 109 Treatment of Inflammation 109 Healing and Tissue Repair **109** Factors Affecting Healing **110** Summary 111 Review Questions 111 Case Studies 111 Websites 112 **Chapter 10** Immune Response, Hypersensitivity, and Autoimmune Disorders 113 Outline 113 Learning Objectives 113 Key Terms 113 Kev terms continued **114** Overview 114 Immune System 114 Process of Acquiring Immunity **115** Immune Response 117 Immune System Components 118 Diagnostic Tests 121 Acquiring Immunity **121** Transplant Rejection 121 Autoimmune Disorders 122 Hematopoietic Disorders 125 Renal Disorders 125 Collagen Diseases 125 Immunodeficiency Disorders 127 AIDS 128 X-Linked Agammaglobulinemia 130 Thymic Hypoplasia **131** Hypersensitivity Reactions 131 Type I: Allergic Reactions 131 Type II: Cytotoxic Hypersensitivity 133 Type III: Immune Complex Hypersensitivity 133 Type IV: Cell-Mediated or Delayed Hypersensitivity 134 Summary 134 Review Questions 134 Case Studies 134 Websites 135

UNIT IV Pathology of the Body Systems 137

Chapter 11 Cardiovascular Disorders 139 Outline 139 Learning Objectives 139 Key Terms 139 Key terms continued 140 Overview 140 Anatomy and Physiology 140 Common Signs and Symptoms 144 Diagnostic Tests 144 Cardiovascular Rehabilitation **146** Common Diseases of the Cardiovascular System 146 Diseases of the Heart 146 Diseases of the Blood Vessels 155 Summary 160 Review Ouestions 160 Case Studies 161 Websites 161 Chapter 12 Blood Disorders 163 Outline 163 Learning Objectives 163 Key Terms 163 Key terms continued 164 Overview 164 Nature of Blood 164 Red Blood Cells 164 White Blood Cells 164 Platelets 166 Plasma 166 Diagnostic Tests 166 Red Blood Cell Disorders 166 Anemias 166 Polycythemia 171 Transfusion Therapy and Incompatibility Reaction 171 White Blood Cell and Lymphoid Tissue Disorders 173 Neutropenia (Agranulocytosis) **173** Leukemias 174 Blood-Clotting Disorders 175 Summary 177 Review Ouestions 177

Case Studies 177 Websites 178

Chapter 13 Lymphatic Disorders 179

outline 179 Learning Objectives 179 Key Terms 179 Overview 180 Anatomy and Physiology 180 Common Signs and Symptoms 180 Diagnostic Tests 180 Lymphatic Disorders 181 Lymphedema 181 Lymphadenitis 182 Lymphangitis 182 Lipedema 182 Mononucleosis 183 Lymphomas 183 Multiple Myeloma 185 Summary 186 Review Questions 186 Case Studies 187 Websites 187

Chapter 14 Nervous System

Disorders 189 outline 189 Learning Objectives 189 Kev Terms 189 Key terms continued **190** Overview 190 Anatomy and Physiology 190 Central Nervous System 190 Peripheral Nervous System 191 Common Signs and Symptoms 194 Diagnostic Tests 194 Nervous System Disorders 194 Infectious Diseases 194 Vascular Disorders 197 Functional Disorders 198 Dementia 200 Sleep Disorders 202 Brain Tumors 203 Trauma 203 Concussions and Contusions 203 Skull Fractures 204 Epidural and Subdural Hematomas 204 Spinal Cord Injury 204

Rare Diseases Amyotrophic Lateral Sclerosis Guillain-Barré Syndrome Huntington's Chorea Multiple Sclerosis Myasthenia Gravis Summary **208** Review Questions Case Studies Websites **209**

Chapter 15 Disorders of the Eye and Ear 211

outline 211 Learning Objectives **211** Key Terms **211** Key terms continued **212** Overview **213** Anatomy and Physiology of the Eye **213** Disorders of the Eye **214** Blepharitis **214** Blepharoptosis 215 Dry Eye **215** Chalazion 215 Conjunctivitis 216 Exophthalmos 216 Ectropion 216 Entropion 217 Corneal Trauma 217 Keratitis 217 Nystagmus 217 Uveitis 218 Refractive Errors 218 Glaucoma 218 Cataracts 220 Diabetic Retinopathy 221 Color Blindness **221** Macular Degeneration 221 Retinal Detachment 222 Strabismus 222 Anatomy and Physiology of the Ear 223 Disorders of the Ear **224** Impacted Cerumen 224 Otitis Externa 224 Mastoiditis 224 Otitis Media 224

Otosclerosis 225 Tinnitus 225 Motion Sickness 225 Hearing Loss 225 Vertigo 225 Ménière's Disease 226 Summary 226 Review Questions 226 Case Studies 226 Websites 227

Chapter 16 Musculoskeletal

Disorders 229 outline 229 Learning Objectives 229 Key Terms 229 Key terms continued 230 Overview 231 Anatomy and Physiology of the Musculoskeletal System 231 Common Diseases of the Musculoskeletal System 233 Bone Diseases 234 Joint Diseases 240 Trauma Affecting the Musculoskeletal System 246 Muscle and Connective Tissue Diseases 253 Summary 255 Review Questions 255 Case Studies 256 Websites 256

Chapter 17 Respiratory System

Disorders 257 Outline 257 Learning Objectives **257** Key Terms 257 Key terms continued 258 Overview 258 Anatomy and Physiology of the Respiratory System 259 Common Diseases of the Respiratory System 264 Infectious Diseases 264 Obstructive Lung Disease 268 Chronic Obstructive Pulmonary Disease 270 Pneumoconioses 273 Vascular Disorders 273 Expansion Disorders 274

Laryngeal Cancer **278** Lung Cancer **278** Infant Respiratory Distress Syndrome **279** Adult Respiratory Distress Syndrome **279** Acute Respiratory Failure **280** Summary **280** Review Questions **280** Case Studies **281** Websites **281**

Chapter 18 Digestive System

Disorders 283 Outline 283 Learning Objectives 283 Key Terms 283 Key terms continued **284** Overview 285 Anatomy and Physiology of the Digestive System 285 Common Diseases of the Digestive System **289** Disorders of the Oral Cavity 290 Esophagus Diseases 290 Stomach Diseases 292 Lower Gastrointestinal Diseases 293 Liver Diseases 300 Gallbladder Diseases 304 Pancreatic Diseases 305 Summary 307 Review Ouestions 307 Case Studies 308 Websites 308

Chapter 19 Urinary System Disorders 309

Outline **309** Learning Objectives **309** Key Terms **309** Key terms continued **310** Overview **310** Anatomy and Physiology of the Urinary System **310** Common Diseases of the Urinary System **312** Urinary Tract Infection **312** Kidney Diseases **313** Bladder Diseases **319** Trauma **320** Neurogenic Bladder **320**

xiii

Straddle Injuries Rare Diseases Goodpasture's Syndrome Interstitial Cystitis Summary **321** Review Questions Case Studies Websites **323**

Chapter 20 Endocrine System

Disorders 325 Outline 325 Learning Objectives 325 Key Terms 325 Key terms continued **326** Overview 326 Anatomy and Physiology of the Endocrine System 326 Common Signs and Symptoms 330 Diagnostic Tests 330 Common Diseases of the Endocrine Svstem **330** Pituitary Gland Diseases 330 Thyroid Gland Diseases 333 Parathyroid Gland Diseases 336 Adrenal Gland Diseases 337 Endocrine Dysfunction of the Pancreas 339 Summary 340 Review Ouestions 340 Case Studies 341 Websites 341

Chapter 21 Male Reproductive System

Disorders 343 Outline 343 Learning Objectives 343 Key Terms 343 Key terms continued **344** Overview 344 Anatomy and Physiology of the Male Reproductive System 344 Male Hormones 344 Infertility 346 Congenital Abnormalities 346 Epispadias and Hypospadias **346** Cryptorchidism 346 Hydrocele 346 Varicocele 348 Torsion of the Testis 348

Infections and Inflammation Orchitis **348** Epididymitis Prostatitis Neoplasms Benign Prostatic Hypertrophy Prostate Cancer Testicular Cancer Summary **352** Review Questions Case Studies Websites **353**

Chapter 22 Female Reproductive System Disorders 355

Outline 355 Learning Objectives 355 Key Terms 355 Key terms continued **356** Overview 356 Anatomy and Physiology of the Female Reproductive System **357** Female Hormones 359 Infertility 359 Menstrual Disorders 359 Menstrual Abnormalities 359 Endometriosis 361 Infections and Inflammation 361 Neoplasms 362 Cervical Polyps 362 Cancer of the Cervix 362 Benign Uterine Tumors 363 Endometrial Cancer 364 Ovarian Cysts and Benign Ovarian Tumors **364** Ovarian Cancer **365** Fibroadenoma and Fibrocystic Breast Disease 366 Breast Cancer 366 Pelvic Floor Dysfunction 368 Cystocele and Rectocele 368 Uterine Prolapse 368 Menopause 368 Sexually Transmitted Infections 368 Chlamydial Infection 368 Gonorrhea 369 Syphilis 369 Genital Herpes 371

Human Papillomavirus UNIT V (Condylomata Acuminata) 371 Pelvic Inflammatory Disease 372 Trichomoniasis 372 Candidiasis 373 Summary 373 Review Questions 374 Case Studies 374 Websites 374 Chapter 23 Integumentary System Disorders 375 Outline 375 Learning Objectives 375 Key Terms 375 Key terms continued **376** Overview 376 Anatomy and Physiology of the Integumentary System 376 Common Signs and Symptoms 380 Lesions and Rashes 380 Pruritus 380 Dry Skin 381 Variations in Dark-Skinned People 381 Diagnostic Tests 381 Inflammatory Disorders 381 Contact Dermatitis 381 Urticaria (Hives) 382 Atopic Dermatitis (Eczema) 382 Psoriasis 383 Pemphigus 384 Acne Vulgaris 384 Decubitus Ulcers 384 Skin Infections 385 Bacterial Infections 385 Viral Infections 385 Fungal Infections 387 Burns 387 Skin Tumors 388 Keratoses 389 Basal Cell Carcinoma 389 Squamous Cell Carcinoma 389 Malignant Melanoma 390 Kaposi's Sarcoma 390 Summary 391 Review Questions 391 Case Studies 391

Environmental Hazards 393

Chapter 24 Occupational Disorders and Injuries 395

outline 395 Learning Objectives 395 Key Terms 395 Overview 396 Risk Factors for Occupational Injuries **396** Ergonomics 396 Occupational Injuries 396 Musculoskeletal Disorders 396 Pulmonary Disorders 397 Skin Disorders 399 Occupational Infections 399 Occupational Burns 399 Occupational Cancer 399 Summary 400 Review Questions 400 Case Studies 401 Websites 401

Chapter 25 Psychological Disorders and

the Influence of Stress 403 Outline 403 Learning Objectives 403 Key Terms 403 Key terms continued **404** Overview 404 Effects of Heredity and Environment **404** Brain Structures 404 Cerebral Cortex 404 Limbic System 404 Perceptions 405 Perception Disorders 405 Hallucinations 406 Delusions 406 Neuromediators 406 Psychotropic Medications 407 Antidepressants 407 Neuroimaging 407 Schizophrenia 407 Depressive Disorders 408

Major Depression and Dysthymia 408 Bipolar Depression 409 Anxiety Disorders 409 Panic Disorder 409 Generalized Anxiety Disorder 410 **Obsessive-Compulsive** Disorder 410 Social Phobia 410 Sleep Disorders 410 Insomnia 410 Sleep Apnea 411 Coping with Stress **411** Summary **411** Review Ouestions 412 Case Studies **412** Websites **413**

Chapter 26 Substance Abuse 415

Outline **415** Learning Objectives 415 Key Terms 415 Overview **416** Terminology **416** Tolerance **416** Classifications of Substance Abuse **416** Causes of Substance Abuse 418 Recognizing Substance Abuse 418 Withdrawal Syndrome 418 Complications of Substance Abuse **419** Getting Help 419 Summary 419 Review Questions 419 Case Studies 420 Websites 420

Chapter 27 Fluid, Electrolyte, and Acid-Base

Imbalances 421

Outline **421** Learning Objectives Key Terms Key terms continued Overview **422** Distribution of Body Fluids Body Fluid Compartments Body Fluid Composition Movement of Fluid Between Compartments Pediatrics and Distribution of Body Fluids 423 Water Balance Disorders 423 Dehvdration **423** Water Intoxication 424 Edema **424** Electrolyte Balance 424 Hypernatremia 425 Hyponatremia 425 Hyperchloremia 425 Hypochloremia 425 Hyperkalemia **425** Hypokalemia **426** Acid-Base Balance **426** Acid-Base Imbalance **427** Acidosis 427 Alkalosis 428 Summary **428** Review Ouestions 429 Case Studies 430 Websites **430**

Chapter 28 Aging and Disease

Processes 431 Outline **431** Learning Objectives 431 Key Terms 431 Overview 432 Aging **432** Effects of Aging **432** Integumentary System 432 Musculoskeletal System 432 Neurologic and Sensory Systems 434 Endocrine System **435** Cardiovascular System 435 Respiratory System 436 Digestive System 436 Urinary System 436 Reproductive System 436 Disease Processes Associated with Aging **437** Summary 437 Review Ouestions 437 Case Studies 438 Websites 438

Chapter 29 Effects of Immobility 439

Outline **439** Learning Objectives **439** Key Terms 439 **Appendix A** Reference Laboratory Overview 440 Values 445 Effects on the Skin **440** Appendix B Normal Vital Signs 447 Effects on the Musculoskeletal System **440 Appendix C** Temperature Conversion Effects on Breathing **441** Chart 449 Effects on the Cardiovascular System **441** Answer Key 451 Effects on the Digestive **Glossary** 455 System **442** Effects on the Urinary System 442 **Index** 481 Effects on Children **442** Summary **442** Credits 501 Review Questions 442 Case Studies 443 Websites 443

Preface

After 22 years of teaching pathology for allied health, I realized each allied health profession needs its own specialized pathology textbook. Therefore, I have attempted to write this book to specifically target physical therapist assistants as an introduction to pathology.

Pathology is a core area of knowledge for allied health students. For physical therapist assistants, the material must be easy to understand while focusing on the day-to-day requirements of their jobs. This textbook contains 29 chapters organized into five units. It also features three appendices, a glossary, and an index. Each chapter contains an overview, learning objectives, bolded medical terms, "Red Flag" boxes that alert students to critical material, many tables and figures, a summary, multiple choice review questions, practical scenarios based on actual cases with critical thinking questions, and relevant website addresses. The book is printed in full color.

This book is also accompanied by a student companion website that contains an interactive glossary, chapter quizzes, and other activities to help students understand and reinforce key concepts. An Instructor's Manual, PowerPoints, and test bank are available for instructors.

Reviewers/Contributor

Contributor

Karen Coupe, PT, DPT, MSEd Physical Therapist Assistant Program Keiser University Ft. Lauderdale, Florida

Reviewers

Dennis Gavin, PT, MTC, MSc Physical Therapist, Supervisor Health First, Inc. Palm Bay, Florida

Jacqueline Klaczak Kopack, PT, DPT Program Director, Physical Therapist Assistant Program Harcum College Bryn Mawr, Pennsylvania

Jennifer L. Pitchford, PTA, BS

Instructor, Physical Therapist Assistant Program Jefferson Community and Technical College Louisville, Kentucky

Barbara "BJ" Simmons, PTA, Med

Instructor, Academic Coordinator for Physical Education Kellogg Community College, Physical Therapist Assistant Program Battle Creek, Michigan

Stacey Bell Sloas, PT, MSE Assistant Professor Arkansas State University State University, Arkansas

Heather C. Taylor, PT Academic Coordinator of Clinical Education, Faculty Surry Community College Dobson, North Carolina

Wendy M. Zorman, PT Instructor Physical Therapist Assistant Program Remington College Cleveland, West Campus Euclid, Ohio

Acknowledgments

I acknowledge the following individuals for their time and efforts in aiding me with their contributions to this book.

Morvarid Moini, Designer Nova Southeastern University, College of Dental Medicine

> Greg Vadimsky, Manuscript Assistant Melbourne, Florida

Also, I thank the entire staff of Jones & Bartlett Learning, especially David Cella and Maro Gartside.

I also thank the reviewers who gave their time and guidance in helping me to complete this book.

About the Author



Dr. Moini was assistant professor at Tehran University School of Medicine for 9 years, where he taught medical and allied health students. The author is a professor and former director (for 15 years) of allied health programs at Everest University (EU). Dr. Moini established several programs at EU's Melbourne campus.

As a physician and instructor for the past 35 years, he advocates that all health professionals must understand the pathology of the human body, which requires understanding of major core subjects such as pharmacology, anatomy, and physiology.

Dr. Moini is actively involved in teaching and helping students prepare for service in various health professions. He has been an internationally published author of various allied health books since 1999.