

CROWLEY'S

AN INTRODUCTION TO

HUMAN DISEASE

Pathology and Pathophysiology Correlations

TENTH EDITION

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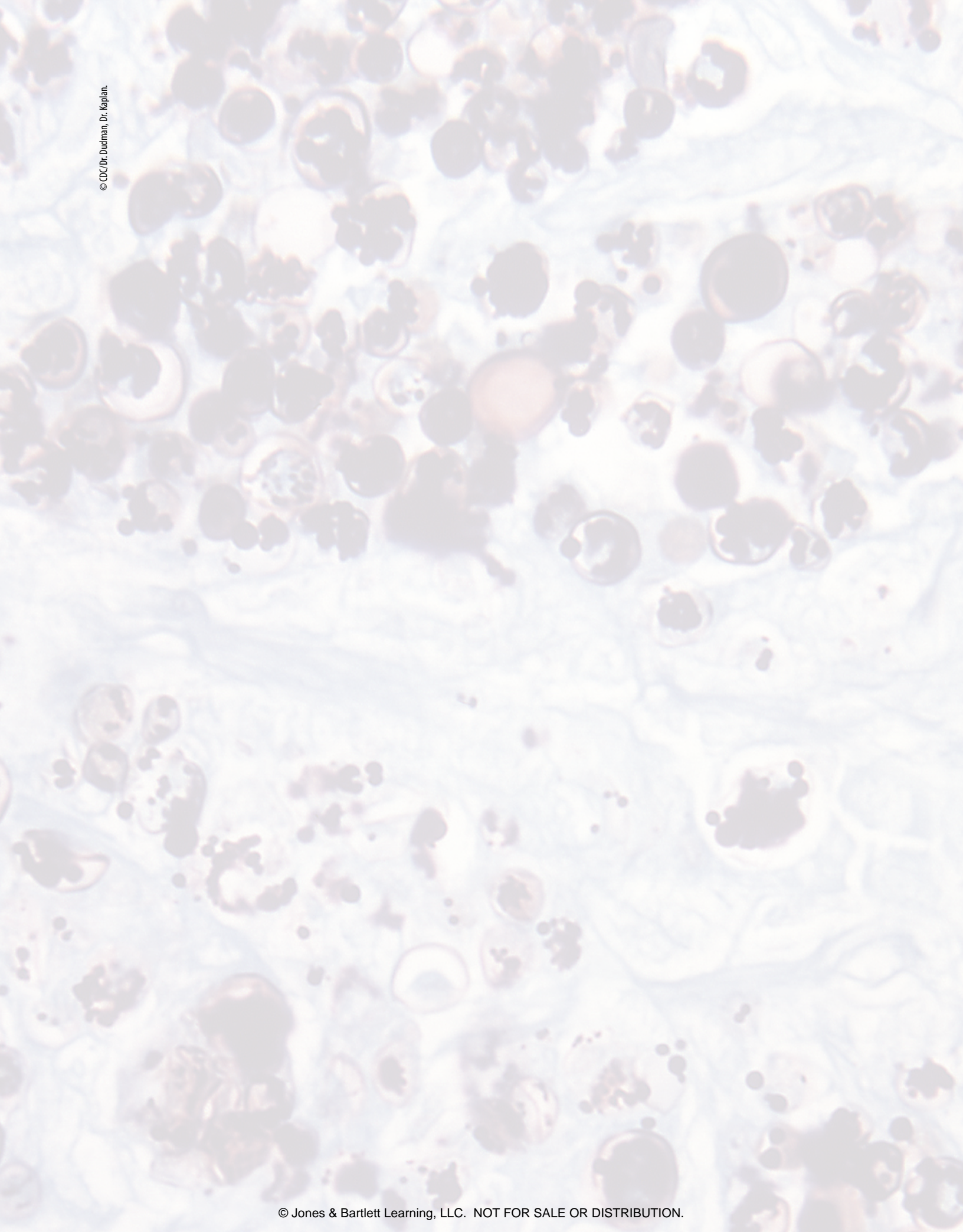
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This Tenth Edition is dedicated to the memory of Dr. Leonard V. Crowley, without whom there would be no book.



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Preface

In recent years, increased emphasis has been placed on how changes in the genome are expressed as disease. This information now has a larger role in both diagnosis and therapy, which is reflected in the text for this edition. We have preserved Dr. Crowley's organization from the *Ninth Edition*, starting with six general chapters followed by chapters on organ systems and their diseases, but in this *Tenth Edition* we have provided more information on the cellular and molecular roots of disease.

The Audience

How did we visualize the reader of this work? The authors hope that any individual interested in the health sciences who wishes to understand the nature of disease would find the text of interest. Specifically, we hope that the text would allow a beginning student of the health sciences who has a working knowledge of biology to equip themselves with the concepts and vocabulary for more specialized areas of study in any of the health related fields. To do this we have taken particular care to present recent information relating to the therapy and molecular diagnosis of disease.

New to This Edition

Throughout this new edition, extensive updates have been made.

Chapter 1

- Expanded principles of diagnosis, including additional material on taking a history, performing a physical diagnosis, and selecting a diagnostic test
- Updated information on clinical laboratory testing and imaging techniques
- Introduction of concepts including evidence-based and patient-centered medicine
- Addition of new testing procedures, such as virtual colonoscopy and single-photon computed tomography (SPECT)
- Updated with new figures
- Case presentation added
- Expansion of definition list
- Update of reference list

Chapter 2

- Added information on cell–cell signaling
- Added/updated information on cell injury and cell death
- Added information on Hayflick limit for cell division
- Case presentation added
- Expansion of definition list
- Update of reference list

Chapter 3

- Information on genes and DNA moved from previous edition Chapter 2 and integrated into presentation of genetics
- Information added on pedigree analysis and inheritance patterns

- Information on the HLA system moved to Chapter 5
- Information added regarding definition of race
- Case presentation added
- More than doubled the number of definitions
- Update of reference list

Chapter 4 (was Chapter 9 in the previous edition)

- Reorganized to better integrate with Chapter 3
- Presentation on fetal testing updated
- Material added on HIV infection in the mother
- Cases reviewed and updated
- New figures
- Number of definitions increased
- Update of reference list

Chapter 5 (was Chapter 4 in the previous edition)

- Material and terminology modernized; chapter linked to Chapter 6 on immunology
- Case presentation added
- Number of definitions more than doubled
- Figures replaced
- Update of reference list

Chapter 6 (was Chapter 5 in the previous edition)

- Eighty percent rewritten to focus on the most recent information on the development of adaptive immunity
- Material added on immunodeficiency
- Number of definitions increased
- New figures added
- New case added
- Update of reference list

Chapter 7 (was Chapter 10 in the previous edition)

- Extensively rewritten to focus on principles of neoplastic process in general rather than results of the process in specific organs; neoplasia presentations are now in the specific organ chapters
- Added two additional figures to illustrate critical points; updated other figures and tables

- Expanded presentation of oncogenes and tumor suppressor genes
- Updated presentation on immunotherapy and anticancer drugs
- Case presentation added; original short cases deleted
- Update of reference list

Chapter 8 (was Chapter 6 in the previous edition)

- Material added on hemorrhagic fevers, including Ebola
- Material added on molecular testing for microorganisms
- Material added on aspergillosis
- Number of definitions increased
- New figures added
- New case about measles added
- Update of reference list

Chapter 9 (was Chapter 7 in the previous edition)

- Chapter renamed to better reflect material
- Material added on Chagas disease, leishmaniasis, strongyloidiasis, and trichomoniasis
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 10 (was Chapter 8 in the previous edition)

- Chapter renamed to better reflect material
- Chapter reorganized to improve presentation
- Material on Ebola transmission control added
- HIV material updated
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 11 (was Chapter 13 in the previous edition)

- Completely rewritten; now focused on the heart and associated diseases
- Material on vascular disease moved to Chapter 12

- Updated terminology
- Expanded definition list
- Replaced figures
- New case
- Update of reference list

Chapter 12 (was Chapter 13 in the previous edition)

- Completely rewritten; now focused on the vasculature and associated diseases
- Section on risks for atherosclerosis updated and completely rewritten
- Updated terminology
- Expanded definition list
- Replaced figures
- New case
- Update of reference list

Chapter 13

- Material on leukemia and lymphoma added and updated (This chapter contains all information on these systems, including neoplasms, which were previously split between Chapters 10 and Chapter 14.)
- Material on thalassemia was expanded
- Consolidation of all material on diseases of hematopoietic tissue
- Presentation on stem cell therapy updated
- Case presentation added; original short case deleted
- Update of definitions
- Update of reference list

Chapter 14

- Major rewrite of primary and secondary hemostasis to bring up-to-date with current concepts
- Material added on molecular mechanisms of Coumadin
- Enhanced presentation of coagulation diagnostic tests
- Case presentation added; original short cases deleted
- Update of definitions
- Figures replaced
- Update of reference list

Chapter 15

- Tuberculosis information updated
- Lung cancer information updated

- Information on MERS added
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 16

- Material added on molecular diagnosis of breast cancer
- Material updated to reflect most recent American Cancer Society diagnosis and treatment guidelines
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 17

- Material added on the anatomy of the female reproductive tract and the menstrual cycle
- Material added on polycystic ovary disease (PCOS)
- Expanded presentation of uterine cancer
- Terminology updated for presentation of HPV and cancer
- Case presentation added; original short cases deleted
- Update of reference list

Chapter 18

- Condensed and updated presentation of red cell system incompatibilities
- Updated presentation of preeclampsia and eclampsia
- New case
- Additional definitions
- Revised figures
- Update of reference list

Chapter 19 (incorporates material from previous edition Chapters 19 and 24)

- Material on body water management integrated from Chapter 24
- Expanded and revised section on glomerular injury
- Material on transplantation updated
- New case added with two diagnoses
- Update of definitions
- Update of illustrations
- Update of reference list

Chapter 20

- Material added on developmental abnormalities of the ureter and penis
- Material updated on adenocarcinoma of the prostate
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 21

- Chapter reorganized
- Material updated
- Case presentation added; original short cases deleted
- Figures replaced
- Update of reference list

Chapter 22

- Chapter reorganized
- Material updated, especially in regard to genetics of diabetes and metabolic syndrome
- Two case presentations added; original cases deleted
- Figures added
- Update of reference list

Chapter 23

- Chapter reorganized
- Material updated, especially in regard to addition of discussions of cholera and colorectal cancer
- Case presentation added on gluten sensitivity; original cases deleted
- Figures reviewed and replaced
- Update of reference list

Chapter 24 (was Chapter 25 in the previous edition)

- Material added on multiple endocrine neoplasia (MEN)
- Thyroid neoplasia presentation updated
- Case presentation added on short stature and growth hormone deficiency; original cases deleted
- Figures reviewed and replaced
- Update of reference list

Chapter 25

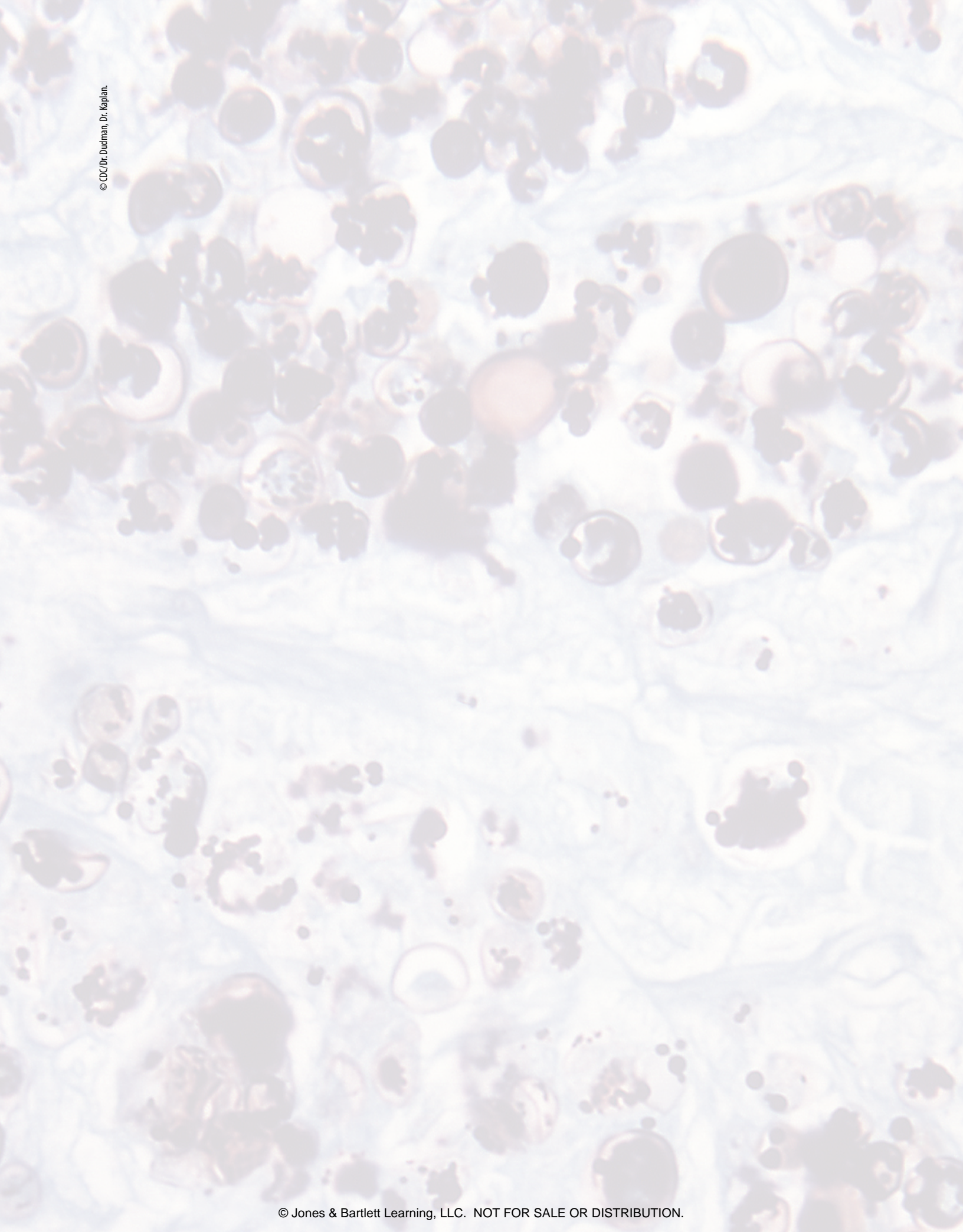
- Material added on rabies and brain cancer
- Peripheral neuritis presentation updated
- Material on Creutzfeldt-Jakob syndrome corrected
- Presentation on structure and function condensed
- Case presentation added; original cases deleted
- Update of definition list
- Figures reviewed and replaced
- Update of reference list

Chapter 26

- Discussion of rheumatoid arthritis updated
- Presentation of tumors of bone added
- Case presentation added
- Figures reviewed and replaced; figures describing skeleton and muscle structure added, along with others
- Definition list expanded
- Update of reference list

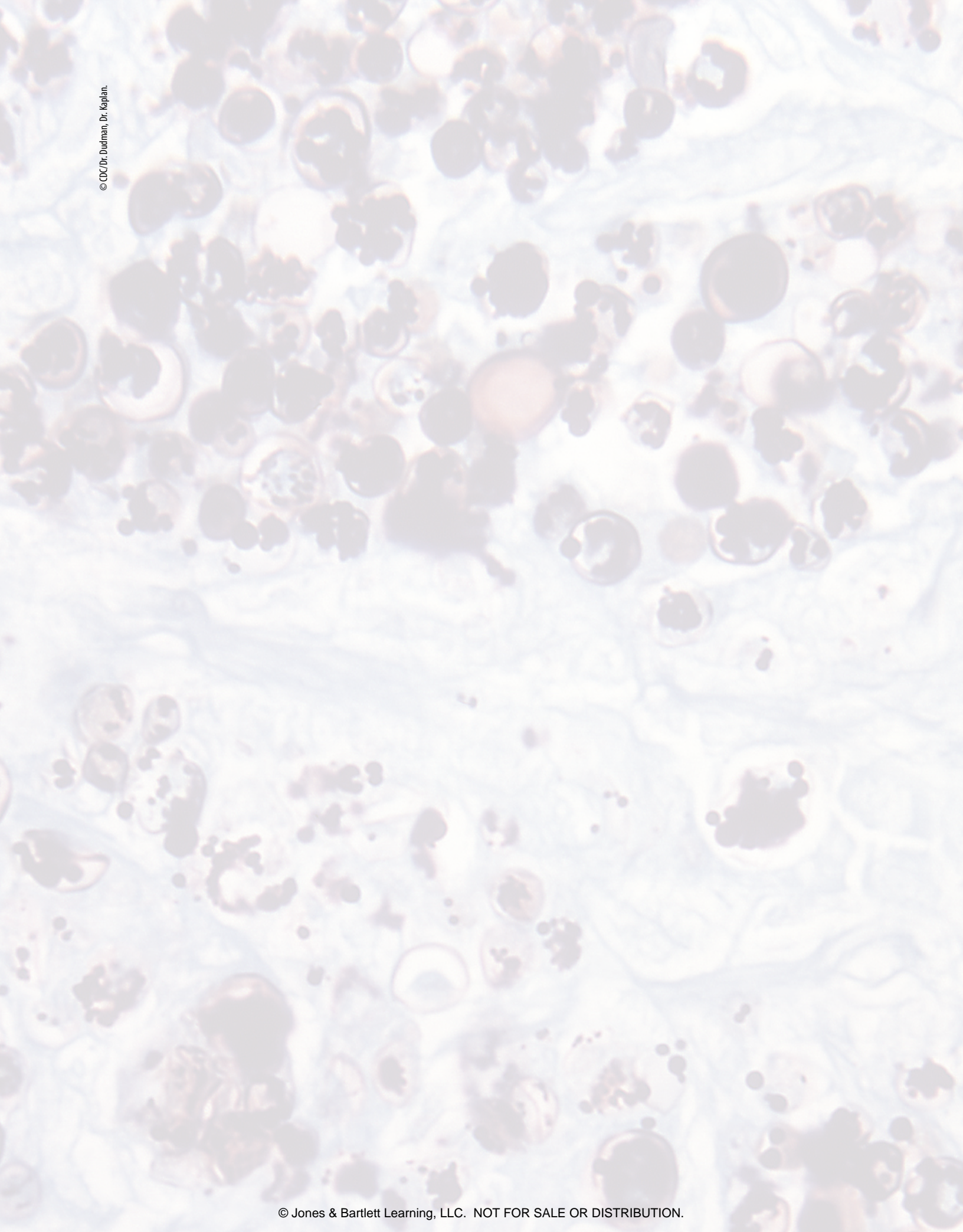
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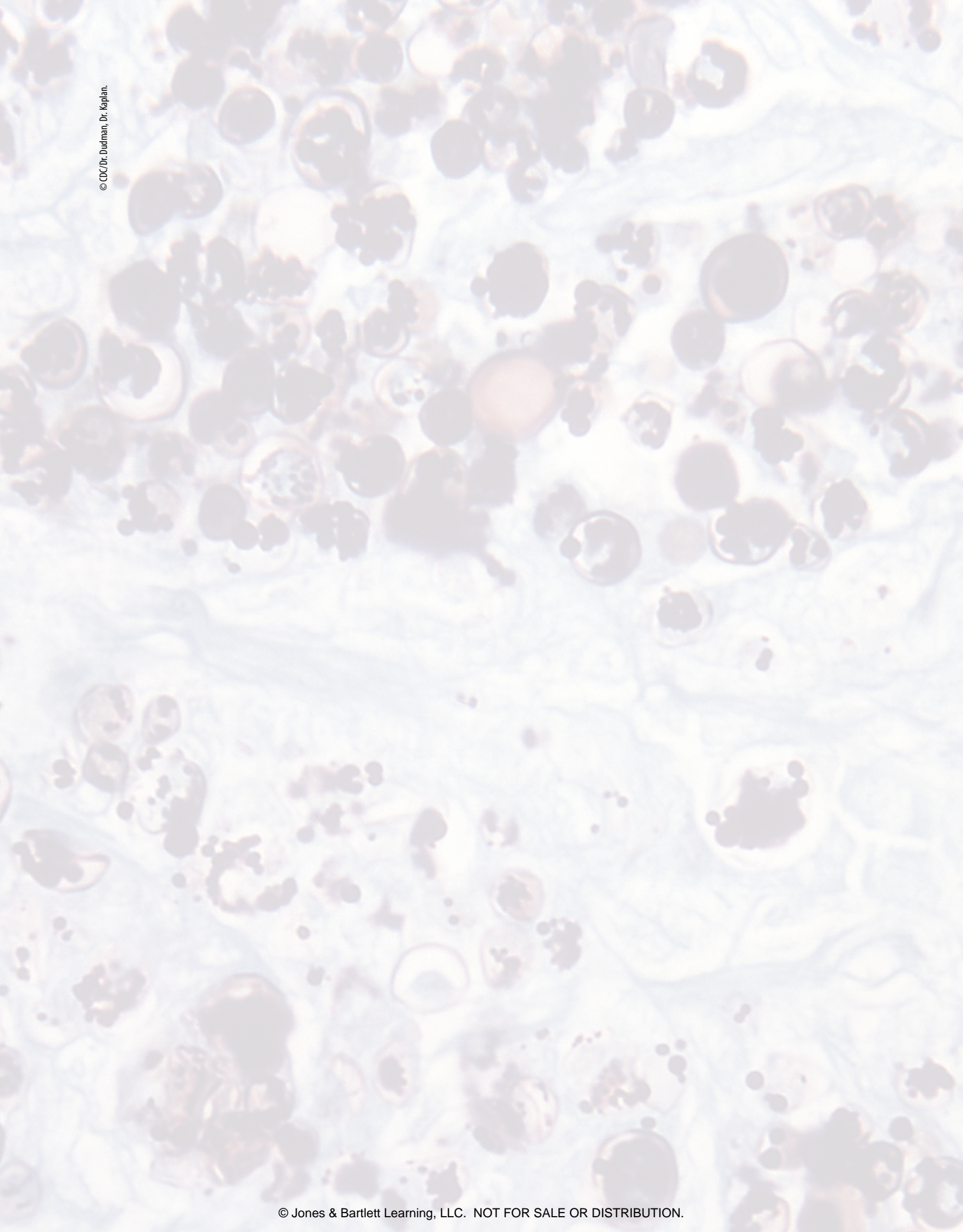
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A Visual Walkthrough

Various learning features are included to enhance the usefulness of this product.

LEARNING OBJECTIVES

Learning objectives provide students with expected outcomes for each chapter as well as a checklist for measuring comprehension.

LEARNING OBJECTIVES

1. Explain the basic anatomic and physiologic principles of ventilation and gas exchange.
2. Describe the physiological basis and use of pulmonary function tests.
3. Describe the causes, clinical effects, complications, and treatment of pneumothorax and atelectasis.
4. Describe the clinical symptoms, complications, and treatment of pneumonia.
5. Describe the histologic characteristics of a tuberculous infection. Explain the possible outcome of an infection. Describe methods of diagnosis and treatment.
6. Differentiate between bronchitis and bronchiectasis.
7. List the anatomic and physiologic derangements in obstructive lung disease. Explain its pathogenesis. Describe clinical manifestations and methods of treatment.
8. Describe the pathogenesis and manifestations of bronchial asthma and respiratory distress syndrome.
9. Explain the causes and effects of pulmonary fibrosis. Describe the special problems associated with asbestosis.
10. List the major types of lung carcinoma. Describe the clinical manifestations of lung carcinoma and explain the principles of treatment.

EXTENSIVE GLOSSARY

The extensive glossary proves useful to students who may not have had a course in medical terminology. It also serves as a convenient reference for students who want to quickly review a particular term. Words appearing in the glossary are set in boldface type in the text and set off in the margin for easy reference.

Introduction

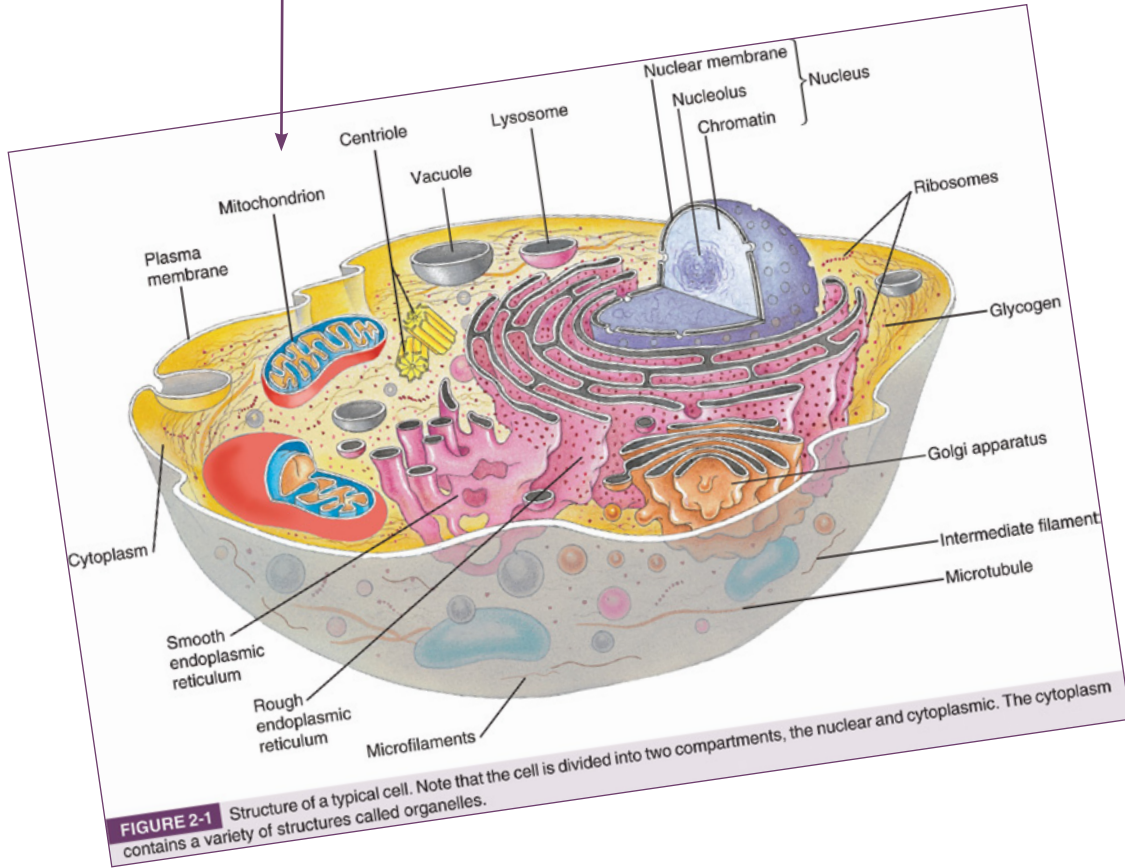
Transmission of genetic information was initially studied through the analysis of the inheritance of detectable traits (**phenotypic traits**) from parent through successive generations of offspring using **patterns of inheritance**. These phenotypic traits are now understood as the expression of the **genotype** of the individual; that is, the genes that are the functional manifestation of the chemical code of the **DNA** organized in **chromosomes** in the nucleus of the cell. The human **genome** contains about

Phenotype Collection of inherited/phenotypic traits detectable in an individual.

Phenotypic traits Characteristics apparent in the individual.

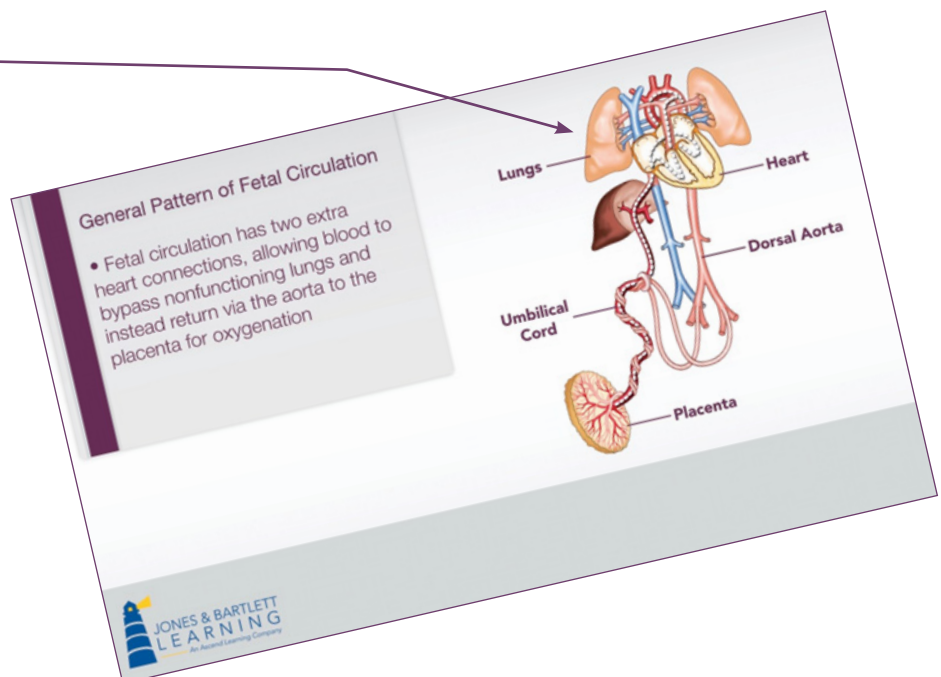
EXTENSIVE ART PROGRAM

The extensive art program with a number of new photos and revised illustrations has been updated and enhanced to support the new focus on the cellular and molecular roots of disease, as well as to provide additional visual support for student comprehension.



ANIMATIONS

Animations come with new, unused purchases of this book. Animations add visual clarity to key concepts and competencies.



CASE STUDIES

Case studies in each chapter provide an opportunity for the student to apply the concepts presented in the text to a medical setting. The cases range from common diseases likely to be encountered by the student to more uncommon conditions, both of which serve to teach specific information that expands on what is presented in the chapter. For this reason, the cases are integral to the information we hope to impart.

CASE 10-1

The patient, an eighteen-year-old female, is seen at the emergency room of a local hospital complaining of severe abdominal pain, vaginal bleeding, and delay in her expected menstrual period. She notes that she had unprotected vaginal intercourse about seven weeks prior and is concerned about a sexually transmitted disease. She experienced coitarche (initial sexual intercourse) at age fifteen and has been sexually active since that time with a variety of partners. She states that usually barrier protection was used by the male (condoms) but they did sometimes "forget." She notes that she has been seen in a venereal disease clinic several times in the past and was diagnosed with both gonorrhea and chlamydia infections for which she received antibiotic therapy "several times." A rapid pregnancy test is ordered, which is positive. Transvaginal ultrasound detects signs of an ectopic pregnancy (the fetus is implanted in a site other than the uterus) located in the fallopian tube (oviduct), a so-called tubal pregnancy. She suffers a decrease in blood pressure with hemorrhage (hemorrhagic shock) and is rushed to surgery. At surgery blood is found in the abdominal cavity (hemoperitoneum) and an 8 cm left mass was found that encompassed both the left fallopian tube and ovary. The mass contained a nonviable fetus judged to be of eight weeks gestational age (FIGURE 10-10). Both the left ovary and fallopian tube were removed (salpingo-oophorectomy). The contralateral fallopian tube and ovary showed numerous adhesions that distorted their anatomy and were considered to be consistent with long-standing pelvic inflammatory disease. Recovery was complicated by ongoing infections, but she eventually recovered.

REVIEW QUESTIONS AND A DETAILED OUTLINE SUMMARY

Review questions and a detailed outline summary are provided for each chapter and provide students with a means to measure their learning.

QUESTIONS FOR REVIEW

1. Why do spontaneous abortions occur? What are the consequences of prolonged retention of a dead fetus within the uterine cavity?
2. What is an ectopic pregnancy? What factors predispose to development of an ectopic pregnancy in the fallopian tube? What are the consequences of a tubal pregnancy?
3. What is the difference between a hydatidiform mole and a choriocarcinoma?
4. In infants with hemolytic disease, why does jaundice increase after delivery? Why does anemia become more severe after delivery?
5. How does the physician make a diagnosis of hemolytic disease? How is the disease treated?
6. What structures contribute to the formation of the placenta? What are the main functions of the placenta?
7. Describe some of the important abnormalities of the placenta and umbilical cord that may have an unfavorable effect on pregnancy.
8. What is the source of amniotic fluid? What factors regulate the total volume of amniotic fluid?
9. What are the possible causes and the significance of polyhydramnios? of oligohydramnios?

SUPPLEMENTARY READINGS

Supplementary readings were selected to provide an opportunity for the student to dig deeper. We have tried to emphasize information sources that review and expand on the text although in some cases we have suggested more research-based material that we think is of specific interest. Such papers may be a challenge to some readers, but we hope they will encourage the learner. When possible we have tried to include authoritative sources and freely available material, much of which is web-based. We hope this text will interest and encourage anyone interested in pursuing a health-related career to continue in what is an area of critical importance to our society.

SUPPLEMENTARY READINGS

Loeffler, A. G., and Hart, M. N. 2015. *Introduction to Human Disease*. 6th ed. Burlington, MA: Jones & Bartlett Learning.

- ▶ Those interested in the detailed study of male reproductive disease should consult a work on human pathology aimed at the undergraduate medical curriculum. However, a good place to start at a less advanced level is by reading Chapter 16 in this book.

Simmons, M. N., Berglund, R. K., and Jones, S. J. 2011. A practical guide to prostate cancer diagnosis and management. *Cleveland Clinic Journal of Medicine* 78:321–31.

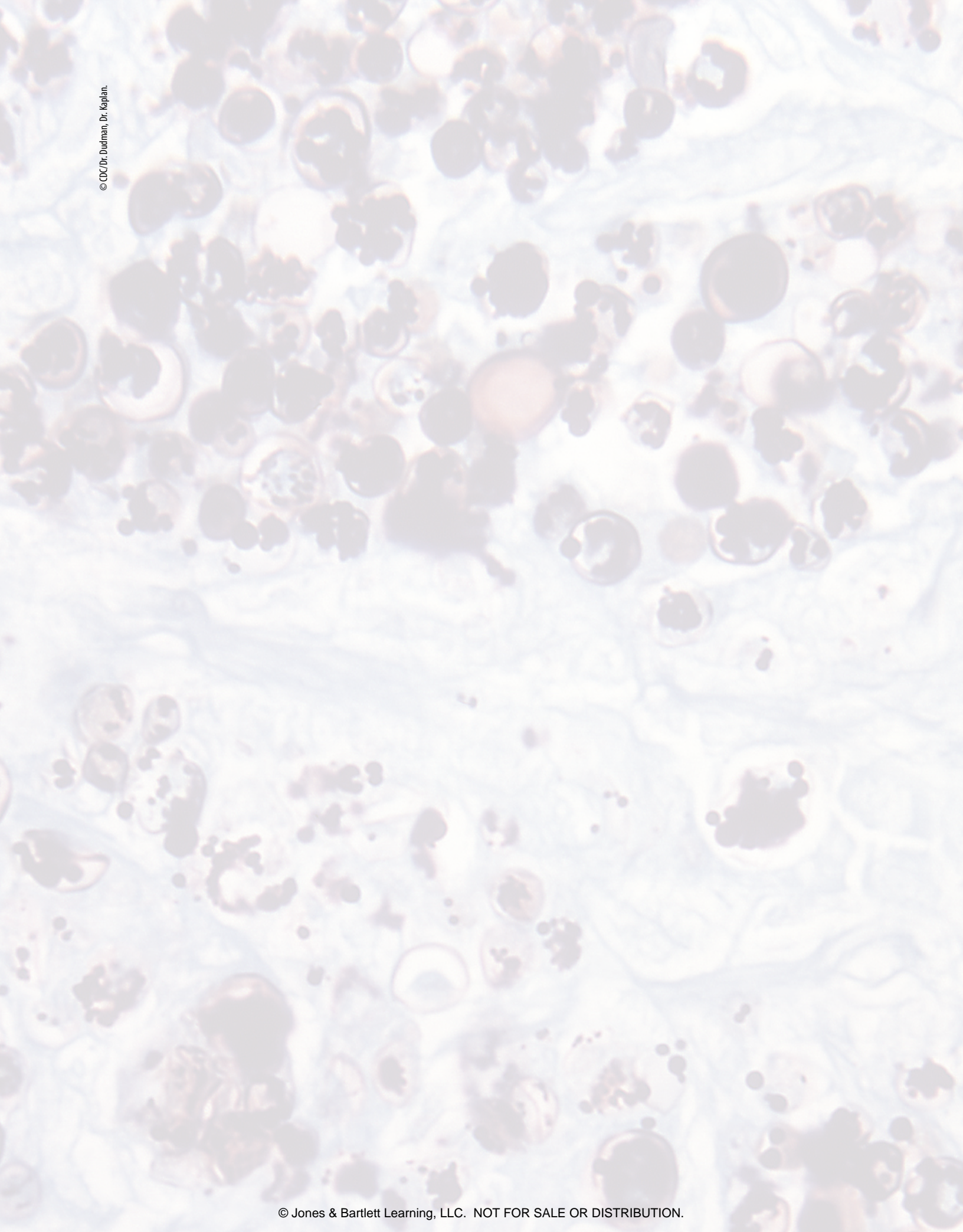
Ilic, D., Neuberger, I. D., Djulbegovic, M., and Dahm, P. 2013. Screening for prostate cancer (Review). Wiley Online Library. The Cochrane Collaboration. doi: 10.1002/14651858.CD004720.pub3

Hayes, J. H., and Barry, M. J. 2014. Screening for prostate cancer with prostate-specific antigen test. A review of current literature. *JAMA* 311:1143–49.

- ▶ One of the more controversial areas in urology is the appropriate role of prostate cancer screening. The first reference represents a conservative point of view for both diagnosis and therapy. The second entry provides a book-length review (see pages 1–9 for a brief review aimed at nontechnical readers). Both the second and third entries provide exhaustive of the literature with results that suggest little or no benefit for most groups of men (as measured in reduced deaths as a result of prostate cancer) using current approaches to screening.

Case Studies

Chapter	Case Study
1	Appendicitis
2	Steatosis or Alcoholic Fatty Liver Disease
3	Hemophilia B
4	Congenital Cytomegalovirus Infection
5	Wound Infection
6	IgA Deficiency
7	Colon Cancer
8	Measles
9	Chagas Disease
10	Tubal Pregnancy
11	Sudden Cardiac Death
12	Kawasaki Disease
13	Acute Lymphoblastic Leukemia
14	Hemolytic Uremic Syndrome
15	Childhood Asthma
16	Fat Necrosis
17	Polycystic Ovary Syndrome
18	Potter Sequence
19	Minimal Change Disease
20	Testicular Cancer
21	Tylenol Overdose
22	Diabetes Cases (2)
23	Celiac Disease
24	Isolated GH Deficiency
25	Meningitis
26	Duchenne Muscular Dystrophy



Teaching and Learning Aids

Instructor Resources Include:

- Testbank
- Slides in PowerPoint Format
- Answers to Student Workbook
- Animations
 - Chromosomes -> DNA
 - Mitosis Stages A–F
 - Meiosis
 - Gametogenesis
 - Phagocytosis
 - Formation of Antigen Binding Regions in T and B Cells
 - How Antibodies Work in Host Defense
 - Pathogenesis of an Allergy
 - Replication Cycle of HIV
 - Blood Flow in the Heart
 - Fetal Circulation
 - Development of Gametes and Fertilization
 - Maturation of Ovum
 - TIPS Procedure
 - Rotary Twist of Sigmoid Colon

Student Resources Include:

- Writable workbook exercises
- Student practice activities and assessments

