

Changes to This Edition

New throughout the book:

- Learning Outcomes are listed under each major heading along with at the beginning of the chapter.
- Learning Outcomes are now numbered.
- Anatomy & Physiology Revealed (APR) icons now appear with figures that have a corresponding APR figure.
- Location icons updated throughout.
- More *Begin Thinking Clinically* questions.
- *Content Checkup Questions* reformatted to include more critical thinking style questions.
- Updated all features to include current information and statistics
- New and updated art throughout

Chapter 1:

- Expanded **Medical Focus: Imaging the Body** now gives updated information regarding the latest imaging technologies, including fMRI and SPECT. Photographs tailored to show contrasting image styles and results.
- Negative feedback discussion reformatted for clarity, with corresponding new illustrations.
- Figure 1.2 updated to show correct anatomical position.
- Figure 1.5 showing major body cavities has been updated to reflect the text's artistic style
- Figure 1.8 showing negative feedback upgraded to include appealing visuals that match the text's illustration style.
- Figure 1.9 expanded to provide more information to students regarding human examples of negative feedback.
- Figure 1.10 redrawn to match the text's illustration style, using an anatomically correct, detailed figure for positive feedback.
- Figure 1.11 depicting regulation of tissue fluid composition redrawn for clarity.

Chapter 2:

- **New Medical Focus: The Deadly Effects of High-Level Radiation**
- Update: **Prions: Malicious Proteins?** Article updated to include current statistics
- Discussion on pH, acids and bases was revised for better student comprehension.
- Figure 2.5 updated and made more visual for ease in understanding the pH scale.

- Figure 2.6 replaced with a more appealing and colorful illustration of macromolecule synthesis and decomposition.
- Figure 2.7 and 2.8 redrawn to compare/contrast starch and glycogen with greater ease.
- Figure 2.10 image revised to show the phospholipid molecule in a more colorful and contextual setting.
- Figure 2.11 photographs replaced with currently popular and recognizable individuals.
- Figure 2.12 redrawn to show progression in protein structuring, and to create a more appealing and colorful illustration.
- **New Begin Thinking Clinically** regarding sickle-cell anemia.

Chapter 3:

- **New Visual Focus** on cell structure. Figure 3.1 replaced with a full-page figure drawn using a more modern, updated and appealing style.
- Figure 3.2 redrawn to better illustrate the details of the fluid-mosaic model of cell membrane structure.
- Figure 3.3 – new micrograph of the nucleus.
- Figure 3.4 redrawn to highlight the structures of the endomembrane system, using brighter colors, and new micrograph.
- Figure 3.5 new illustration of the endomembrane system, showing the mechanisms of endocytosis, phagocytosis, and exocytosis.
- Figure 3.6 replaced with an illustration showing the mitochondrion in a more modern and contextual presentation.
- Figure 3.10 improved to show a more realistic presentation of tonicity, with detailed SEM photomicrographs.
- Figure 3.11 replaced with a more three-dimensional presentation of active transport.
- Figure 3.12 redrawn to more clearly represent the cell cycle as a continuum, using better visuals and brighter color.
- Figure 3.15 now details transcription and translation using improved descriptions, better line art and brighter color.
- Figure 3.16 illustrates mitosis using a modern, descriptive and colorful style.

Chapter 4:

- **New Medical Focus: Targeting the Traitor Inside**
- **New What's New: Lab-Made Trachea**

- Update: ***Cancer: The Traitor Inside*** Article updated to include current information and statistics.
- Figures 4.1-4.5 updated to show the epithelial tissues in a more 3-dimensional fashion that reflects the text's artistic style.
- Figure 4.2 revised to show both keratinized and non-keratinized stratified epithelia.
- Figure 4.10 upgraded to show all 3 forms of cartilage.
- Figure 4.11 redrawn, expanded, and now a full-page illustration showing compact and spongy bone in context.
- Figures 4.13–4.15 redrawn to match the text's illustration style, and include new micrographs of the three forms of muscle tissue.
- Figure 4.16 now demonstrates both the neuron and all of its central nervous system glial cells, using modern style and bright colors.
- Figure 4.17 shows cellular junctions in the text's modern illustration style.

Chapter 5:

- Text updated to include a complete description of all layers of the epidermis.
- Description of dermal structure and function upgraded for completeness.
- Figure 5.1 updated to illustrate all layers of the epidermis.

Chapter 6:

- Text description of vertebral column upgraded for completeness.
- Figure 6.3 replaced to show endochondral ossification in the text's modern illustration style.
- Figure 6.4 depicts the major axial and appendicular skeletal structures using a more accurate, detailed and anatomically correct depiction.
- Figure 6.8 replaced to better show the characteristics of the vertebral column.
- Figure 6.15 redrawn to detail the skeleton of the hand.
- Figure 6.16 revised to contrast male versus female pelvis, and show true and false pelvis in color.
- Figure 6.20 replaced; now shows the complete structure of a synovial joint.
- Figure 6.21 replaced; now accurately depicts the knee joint.
- Figure 6.22 completely redrawn, using the chapter's skeletal structures in their proper context as the different types of synovial joints.

- Figure 6.23 replaced; new illustration completes the descriptions of various synovial joint movements.

Chapter 7:

- **New *Begin Thinking Clinically*** regarding foot-drop.
- Description of sliding filament process revised and improved.
- Details of muscle activity during single twitch, summation and tetanus upgraded for clarity.
- Figure 7.1 showing 3 muscle types upgraded to match text's modern style.
- Figure 7.2 redrawn to show continuum of tendon, deep fascia and perimysium.
- Figure 7.3 updated to show muscle fiber anatomy and sliding filament action with greater detail, more vibrant colors and new micrograph.
- Figure 7.4 revised; now depicts the neuromuscular junction in a clearer, more 3-dimensional style using a new micrograph.
- Figure 7.5 replaced with an illustration that shows actin-myosin cross-bridge formation in the text's modern illustration style.
- Figure 7.9 updated with anatomically correct line art of origin, insertion and antagonist muscle activity; includes new photograph to provide more clarity for students.
- Figures 7.10-7.11 replaced with modern, colorful depictions of major anterior and posterior muscles.
- Figures 7.13-7.19 redrawn to be more colorful and three-dimensional.

Chapter 8:

- **New *What's New: Research on Alzheimer's Disease: Causes, Treatments, Prevention and Hope for a Cure.***
- Reformatted discussion of graded potential, action potential and receptor potential
- Figure 8.1 reorganized to show interaction between central and peripheral nervous systems more clearly; line art improved to delineate nerves.
- Figure 8.3 revised to correctly show sodium and potassium channels.
- Figure 8.4 redesigned to improve clarity and present saltatory conduction in a more 3-dimensional style.
- Figure 8.5 of synaptic transmission revised and stepped out; presentation now displays the text's contemporary, colorful style. Now includes color micrograph.

- Figure 8.6 replaced to show the relationship of the scalp and meninges in the text's contemporary style.
- Figure 8.7 of the spinal cord now includes a new and more detailed photograph.
- Figure 8.8 updated to now show both lateral and anterior view of the brain's four ventricles.
- Figure 8.12 has different spinal nerves color-coded so students can easily distinguish between them.

Chapter 9:

- Reformatted and restructured discussion on proprioceptors, cutaneous receptors and nociceptors.
- Discussion of inner ear functions revised and improved.
- Figure 9.1 expanded to not only show the muscle spindle, but also its action, and the pathway it follows.
- Figure 9.3 line art revised to more accurately display a taste bud, and an electron micrograph of the taste bud is now included.
- Figure 9.8 updated to match the text's contemporary style and to show the accommodation process in greater detail.
- Text art 9B replaced with intricate line art of the eye, and an American Federation for the Blind photograph simulating macular degeneration has been included.
- Figure 9.11 redrawn to follow the current illustration style.

Chapter 10:

- **New: What's New: Options for Type I Diabetics: The Artificial Pancreas System and the Biocapsule**
- Added a discussion of ghrelin to Hormones from Other Tissues.
- Figure 10.1 revised to include the pineal gland.
- Figure 10.13 photograph replaced with a current version that more clearly depicts Cushing's syndrome

Chapter 11:

- **New: What's New: Improvements in Transfusion Technology**
- Figure 11.1 replaced with a detailed version that includes natural killer cells; line art in the text's up-to-date style, micrograph showing formed elements of blood now included.
- Figure 11.2 completely redrawn using contemporary, 3-dimensional style; erythrocyte development now incorporates reticulocyte stage; lymphoid cell development now includes natural killer cells.

- Figure 11.4 completely redrawn using text's modern style.
- Figure 11.5 updated with new micrograph.

Chapter 12:

- **New: Visual Focus:** Figure 12.1 expanded to display all vascular beds in an easy-to-understand illustration
- Figures 12.7 and 12.13 redrawn using the contemporary 3-dimensional text style.
- Figure 12.15 incorporates an up-to-date photograph.

Chapter 13:

- **New: What's New: Parasite Prescription for Autoimmune Disease**
- **Medical Focus: Immunization: The Great Protector** updated to include current Centers for Disease Control recommendations.
- **Medical Focus: AIDS Epidemic** updated with current statistics regarding infection and morbidity/mortality.
- **Medical Focus: Influenza: A Constant Threat of Pandemic** now incorporates data and history of the 2010 H1N1 epidemic, along with discussion of how influenza viruses evolve and how to prevent infection.
- Figure 13.1 revised for greater accuracy in displaying immune system organs.
- Figure 13.3 completely redrawn and updated to show the non-specific inflammatory response in greater detail. Line art now corresponds to the text's contemporary style.
- Figure 13.7 updated with new micrograph.
- Figure 13.9 replaced with a modern photograph.

Chapter 14:

- **New: What's New: Bronchial Thermoplasty: A Surgical Treatment for Asthma**
- **New:** Figure 14.4 depicts pseudostratified ciliated columnar epithelium of the airways, and includes 2 new photomicrographs.
- Figure 14.5 of respiratory membrane completely redrawn using up-to-date illustration style.
- Figure 14.8 replaced with 3-dimensional and more intelligible line art showing respiratory control mechanisms.
- Figure 14.9 corrected placement of pathways in process of oxygen-carbon dioxide diffusion
- Figure 14.11 replaced with new photomicrographs depicting normal, emphysematous and cancerous lungs.

Chapter 15:

- Figure 15.6 of peritoneum and mesenteries redrawn to update to contemporary text style
- **New** Figure 15.7 – showing the regions of the small intestine.
- Figure 15.9 of large intestine updated with greater detail and brighter colors.
- **New** Figure – Figure 15.13 – Completing digestion and absorption in the small intestine.
- Figure 15.14 updated with current Choose My Plate illustration from the United States Department of Agriculture.
- Figure 15.15: new and contemporary photographs that realistically depict anorexia nervosa and bulimia nervosa.
- **Medical Focus: Tips for Effectively Using Nutrition Labels** revised and improved.

Chapter 16:

- Figure 16.5 of renal tubular reabsorption and secretion reworked with brighter color and improved accuracy.
- Figure 16.10 line art improved and updated to match current text techniques.

Chapter 17:

- **New: Medical Focus: Breast and Testicular Self-Exams for Cancer** now reflect current recommendations from the American Cancer Society.
- Introduced complete discussion regarding regulation of female hormone levels
- Reformatted contraception area; all information about current practices now updated and accurate

- Figure 17.1 redrawn using current text style to contrast mitosis and meiosis
- Figure 17.2 depicting meiosis completely reworked to improve detail and accuracy
- Figure 17.11 showing oogenesis entirely redrawn using 3-dimensional text style.
- **New** Figure – Figure 17.14 – showing hormonal control of ovary.
- Figure 17.15 revised; new version more effectively shows events of the menstrual cycle as a continuum
- Text art 17A displays current technique recommendations from the American Cancer Society, along with line art matching the book's style
- Text art 17D1 new and more modern photograph

Chapter 18:

- **Medical Focus: Therapeutic Cloning** updated to describe the status of this research at present
- **Medical Focus: Preventing Birth Defects** revised to include most current recommendations from the March of Dimes foundation

Chapter 19:

- Figure 19.1 improved with new photomicrograph
- Figure 19.2 showing nondisjunction replaced with more detailed and easily understood line art
- Table 19.2 updated to include breast cancer, diabetes mellitus and coronary artery disease as multifactorial disorders
- **Focus on Forensics: The Innocence Project** now describes the current work and success rate of the organization.