





Title: Seeley's Anatomy & Physiology, 12e

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### Global Changes —

- Each Process Figure now includes a question following the figure legend to help students think about and apply the knowledge into everyday context. The answers to these Process Figure questions are found in Appendix D, which is new to the Twelfth Edition.
- Figure legends were updated throughout the text to be more descriptive of the figure content.
- Answers to even-numbered Predict questions can now be accessed by instructors in Connect, allowing instructors to assign these questions if desired. Answers to odd-numbered Predict questions appear in Appendix E.
- Answers to even-numbered Critical Thinking questions can now be accessed by instructors in Connect, allowing these questions to be assigned if desired. Answers to odd-numbered Critical Thinking questions appear in Appendix F.
- Appendix C: Genetic Code is new to the Twelfth Edition.



## Chapter 1

- New chapter opening photo; revised figures 1.2, 1.3, 1.8, 1.10, 1.14, and 1.16
- Body cavities section has been reorganized into dorsal and ventral

## Chapter 2

- Figure 2.15 is revised to show conjugate acid and base forms of buffer
- Figure 2.14 is recast as a graph to clarify the concept of pH and how it correlates to hydrogen ion concentration, and show the correlation of pH with hydrogen ion concentration in both decimal and scientific notation formats
- A new Case Study is included on cyanide poisoning from house fires, from a firefighter's perspective
- New Clinical Impact on clinical uses of atomic particles, which includes CT and MRI figures
- Incorporation of planetary models into atomic representations in figures 2.2 and 2.5, and clearer representation of partial charges on water molecules (figures 2.7, 2.8, table 2.4)
- Revision of electronegativity text and figure 2.4 to better describe covalent bonds
- Included an expanded definition of hydrophilic and hydrophobic properties of molecules in the water section
- Clarification that H bonds are important for both adhesion and cohesion—important for both intramolecular bonds and intermolecular bonds

#### Chapter 3

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- Section 3.2 How We See Cells was revised to provide more thorough coverage of electron microscopy
- Process figures now have questions to probe further understanding of concepts

#### Chapter 4

- Clarification of the distinct cell surfaces
  of epithelial cells
- Clarified that stereocilia are specialized microvilli, not cilia
- Revised figure 4.4 to add illustrative example of location of the three types of exocrine glands in the skin
- Reorganized the cells of connective tissue to emphasize the category of framework of connective tissue cells.
- Added image of platelets to the blood micrograph in table 4.12
- Simplified proteoglycan aggregate in figure 4.5.
- Rewrote Tissue damage and inflammation section to clarify how inflammation helps the healing process; simplified organization of the inflammatory response into 3 steps
- Clarified and expanded discussion on the regeneration abilities of labile, stable, and permanent cells, and the potential of stem cell therapy for tissue regeneration and replacement
- Rewrote Tissue Repair section to simplify organization of repair into 4 steps

#### Chapter 5

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- Added a description of Alopecia areata
- Description of fourth-degree burns added



### 6 Chapter 6

- New opening photo; revised figures 6.11, 6.13, and 6.14
- Chapter opening Learning to Predict box now covers Paget Disease
- Coverage of bone shapes is moved to chapter 7
- Revised table 6.2 Comparison of Intramembranous and Endochondral Ossification
- Added section on bone fracture classification, with table showing x-rays of fracture type
- Section 6.9 is rewritten

## Chapter 7

- The discussion on bone shapes is inserted into Section 7.1 Skeletal Anatomy Overview
- Removed terms neurocranium, viscerocranium, and braincase
- Revised table 7.2 to include examples of bone features
- Section 7.2 is reorganized by bone, from cranial bones to facial bones
- Vertebral Column section now has subheadings for vertebra type/region
- The term "rib cage" is now "thoracic cage"
- Appendicular Skeleton section now has bone names added to subheadings

## Chapter 8

- Table 8.1 has been divided into 2 separate tables on Fibrous Joints (Table 8.1) and Cartilaginous Joints (Table 8.2), with illustrated examples of each class of joint. Included defining feature of cartilaginous joints in table.
- Redesigned figure 8.8 on synovial

joints into a table to match organization of fibrous and cartilaginous joints tables; tables include examples and degree of axial movement

- Expanded description of functional classification of joints
- Revised several Assess Your Progress questions
- Clarified costrochondral joint description
- Revised definitions of articular disk
  and meniscus
- Clarification of pronation and supination and other movements of the elbow joint
- Added emphasis on factors that dictate range of motion
- Reorganized tables to list major ligaments first
- Revised Clinical Impact to focus on only knee ligament injuries
- New Case Study on ankle injury to a soccer player
- Removed Clinical Impacts on joint replacement and gingivitis, with incorporation of key points into text body
- Addition of chondromalacia of the knee to the Representative Diseases and Disorders table

- Clarified that myoblasts are uninucleate
- Section 9.3 reorganized
- The term "myokinase" is replaced with "adenylate cyclase"
- New figure 9.23 on production of ATP in skeletal muscle



• The term "recovery oxygen consumption" is replaced with "excess post-exercise consumption"

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## Chapter 10

- Revised Figures 10.2, 10.19; combined figures 10.31 and 10.32
- Added cadaver photos to figures 10.17 and 10.29
- The term "pelvic diaphragm" replaces "floor"

### Chapter 11

- Section 11.2 is reorganized
- New table 11.1; new figure 11.2; revised figure 11.8
- Table 11.2 (formerly Table 11.1) added composite drawing of glial cells
- "Changing the Resting Membrane Potential" section is reorganized by depolarization vs. hyperpolarization

### Chapter 12

- Added overview of meninges
- New introduction to reflexes, and
  revised description of the stretch reflex
- Clinical Impact on Spinal Cord Injury condensed and updated to include computer-controlled electrical stimulation
- Moved coverage of the "funny bone" from a Clinical Impact box to chapter text
- Revised figures 12.3 and 12.4 to use dorsal and ventral labels for spinal cord horns
- Clarified nerves to and from the brain in figure 12.6, including a description of the gamma motor neuron.
- Included spinal stenosis in Representative Diseases and Disorders table

### Chapter 13

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- Revised chapter opener to note the myth that humans use only 10% of our brains is false
- Section 13.3 Cerebellum is reorganized
- Clinical Impact 13.1 Traumatic Brain Injuries has been updated to focus on clinical consequences
- Case Study 13.1 has been revised to focus on Subdural Hematoma
- Revised Table 13.1 to include structural regions of cerebrum
- Revised Limbic System section to clarify it is a major contributor to motivation, emotion, learning, and memory, and influences the endocrine and autonomic nervous systems
- Revised figure 13.7 to add arcuate
  nucleus, showing hypothalamic nuclei
- Simplified Table 13.3 by removing hypothalamic nuclei; select examples added to text
- Expanded coverage of role of hypothalamus in setting the biological clock
- Role of habenula updated to emphasize its role in motivation and reward behavior

- Chapter opener revised to emphasize the brain as a challenging and exciting area for further study
- Clinical Impact box on pain revised into Pain Pathways section within chapter text; Clinical Impact
- 14.1 covers Phantom Pain
- Responses of Sensory Receptors section revised to clarify roles of tonic and phasic receptors for multiple sensory receptors



- Revised table 14.1 to include all the proprioception receptors
- Added photos of healthy brain compared to brain of Alzheimer patient in Clinical Genetics 14.1
- Figure 14.24 on long-term potentiation mechanism has been simplified

#### Chapter 15

- Reduced level of detail in text and in figure 15.6 on olfactory receptor types
- Content from Clinical Impact: Visual Acuity box has been incorporated into regular text



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15

#### Chapter 16

 Modified entry for urinary wall in Table 16.3 to note that sympathetic affect is relaxation; receptor type is β3

## Chapter 17

 Sections on Characteristics of the Endocrine System and Comparison of the Nervous and Endocrine Systems are moved to precede section on Classes of Chemical Messengers

### Chapter 18

- Clarified that prolactin-releasing hormone's identity is not known
- Changed the term "Caucasian" to "white"
- Case Study 18.1 Negative Feedback and Hypothyroidism moved from Chapter 17 to this chapter

### Chapter 19

- Added a new column for Average Abundance for each of the formed elements in table 19.2
- Revised figure 19.7 Hemoglobin
  Breakdown

- Removed Factor VI from Table 19.3 (the information is now a footnote at the bottom of the table)
- Deleted figure 19.12

# 20 Chapter 20

- Pericarditis and Cardiac Tamponade
  box has moved to chapter 1
- Content from Clinical Impact: Alterations in the Electrocardiogram is now incorporated into text
- Table 20.2 Summary of the Events of the Cardiac Cycle is deleted

### 21 Chapter 21

- Section 21.2 is reorganized to place "Structure of Blood Vessels" and "Types of Arteries" sections before "Capillaries"
- Content from Trauma and the Aorta Clinical Impact box is incorporated into regular text
- Table 21.14 Blood Pressure Classification in Adults is updated with 2017 recommendations

### Chapter 22

- The summary table is now divided into two tables—one for innate immunity and one for adaptive immunity
- Clarified the difference between plasma cells and memory B cells
- Updated discussion of monoclonal antibody use in immunotherapy

- Complete chapter reorganization
  and rewrite for more coherent flow of
  information
- Combined discussion of ventilation
  and gas laws
- Organized physiology discussion into



respiration versus gas transport, with separate section on metabolic factors affecting gas transport

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# Chapter 24

- Reorganized and consolidated structures and functions of the digestive tract (in text and in Table 14.1)
- Clarification of definition of tooth crown as the anatomical crown in text and in figure 24.8 Reorganization of saliva constituents and functions
- Expansion of description of lingual lipase and gastric lipase functions, including their relative importance in neonates
- Simplification of segmental contractions process in figure 24.3, which allows easier comparison with peristalsis steps
- New information added to Table 24.2, including large intestine secretions
- Revised presentation of stomach anatomy, histology, and secretions
- Inclusion of gastric lipase in the Secretions of the Stomach section
- Reorganization of the Secretions of the Small Intestine and Motility in the Small Intestine sections
- Revised figures 24.20, 24.21, 24.23, and 24.24 to simplify the arrow paths
- Eliminated 3 Clinical Impact boxes
- Revised Pancreatic Secretions and Regulation of Pancreatic Secretion sections
- Emphasize that pancreatic lipase is the major carbohydrate digestive enzyme, but that the brush border disaccharidases are required before sugars can be absorbed

- Addition of cholesterol lipase and its role in digesting dietary cholesteryl esters
- Added that lack of intrinsic factor can also lead to peripheral neuropathy
- Content from Clinical Impact: Rehydration has been moved into the main text

### 25 Chapter 25

- New USDA food label presented in figure 25.2
- Updated description of cellular respiration to use the terms "pyruvate" and "lactate"
- Use of "aerobic glycolysis" has been updated to "aerobic respiration"
- Updated ATP estimate from glucose metabolism to more current number of 32

- Altered figure 26.1 to more accurately reflect the anatomical position of the kidneys
- Reorganized section 26.1 to more clearly state kidney function early
- Reorganized "The Renal Corpuscle" in section 26.2
- Numbered equations for logical flow of information
- Reorganized section on "Regulation of Glomerular Filtration Rate" for sequential presentation
- Reorganized section on "Reabsorption in the Proximal Convoluted Tubule" for clarity
- Updated "Urine Concentration Mechanism" with a discussion of the two parts of the countercurrent mechanism: countercurrent exchanger



and countercurrent multiplier

- Revised "Hormonal Mechanisms" section for clarity
- Added homeostasis figure 26.20 on regulation of blood volume

# 7 Chapter 27

- Revised chapter introduction
- Converted 11/e introduction into a Clinical Impact box on water intoxication
- Added a new figure on review of osmotic pressure and osmosis
- Revised "Regulation of Extracellular Fluid Osmolality" section for clarity
- Added discussion of hypokalemia to section on "Regulation of Potassium lons" section
- Reorganized section on "Mechanisms of Acid-Base Balance Regulation" for clarity
- Added some clinical correlations to discussion of "Acidosis and Alkalosis", especially diabetic ketoacidosis

## Chapter 28

- Updated terminology to use "female" and "male" throughout
- Included new Clinical Impact on Gender and Sex
- Revised the description of sexual karyotype for clarity

- Updated the description of progesterone release from the corpus luteum
- Added new recommendations for HPV vaccination for males in Microbes in Your Body box
- Revised the "Puberty in Females" section to provide additional information
- Revised the description of the length of the menstrual cycle to clarify the use of "average" duration of the cycle
- Revised the description of the ovarian cycle in section 28.6 Physiology of Female Reproduction
- Revised Table 28.2 to include the ovarian cycle
- Clinical Impact Birth Control Methods greatly revised for currency and accuracy

- Updated Clinical Impact 29.1 Stem Cell Research
- Revised description of hormones associated with lactation to include dopamine
- Revised the description of the development of the urinary system for clarity