Anatomy Physiology & Disease - Foundations for the Health Professions 2026 Release 1st edition Roiger Solutions Manual

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1 The Basics

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This chapter of the workbook is designed to help you learn the basic terms of anatomy and physiology of the human body. Like the following chapters in this workbook, this chapter is divided into five sections:

- **Coloring Book:** This section will help you locate the structures of the body and understand their relationship to each other.
- **Laboratory Exercises and Activities:** This section will help you understand the physiology of the human body. The exercises and activities may include the use of common household items.
- **Key Word Concept Maps:** This section will help you understand the relationships between anatomy and physiology by linking concepts together.
- **Instructor Resources: Group Activity/Discussion:** This section is designed to give instructors additional suggestions for group activities and discussion for each chapter.
- **Chapter Review Questions:** This section will give you practice to assess how much you have learned.

Learning Outcomes

After completing this chapter in your textbook and this workbook, you should be able to:

1. Define *anatomy, physiology,* and *pathology.*
2. Describe the location of structures in the human body using anatomical terms of direction, regions, planes, positions, and cavities.
3. Locate serous membranes by their individual names and relative location to organs.
4. Define *homeostasis* and explain why it is so important in human physiology.
5. Define *negative feedback* and *positive feedback* and explain their importance to homeostasis.
6. Define *disease* and describe the relationship between disease and homeostasis.
7. Define *predisposing factors* of disease and explain how specific predisposing factors affect disease.
8. Differentiate between signs and symptoms of disease and give an example of each.
9. Explain the function of pain and inflammation.
10. Explain the two classifications of disease and the subcategories of each.
11. Define *diagnosis* and list the steps involved in diagnosing diseases.
12. Define *differential diagnosis* and explain when it may be used.
13. Summarize four types of treatment plans.
14. Define *epidemiology* and explain how epidemiology affects health care.

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Anatomical Terms of Direction

Figure 1.1 shows the basic anatomical terms of direction. Color the box next to each of the following terms. Use the same color for the corresponding arrow(s) in the drawing.

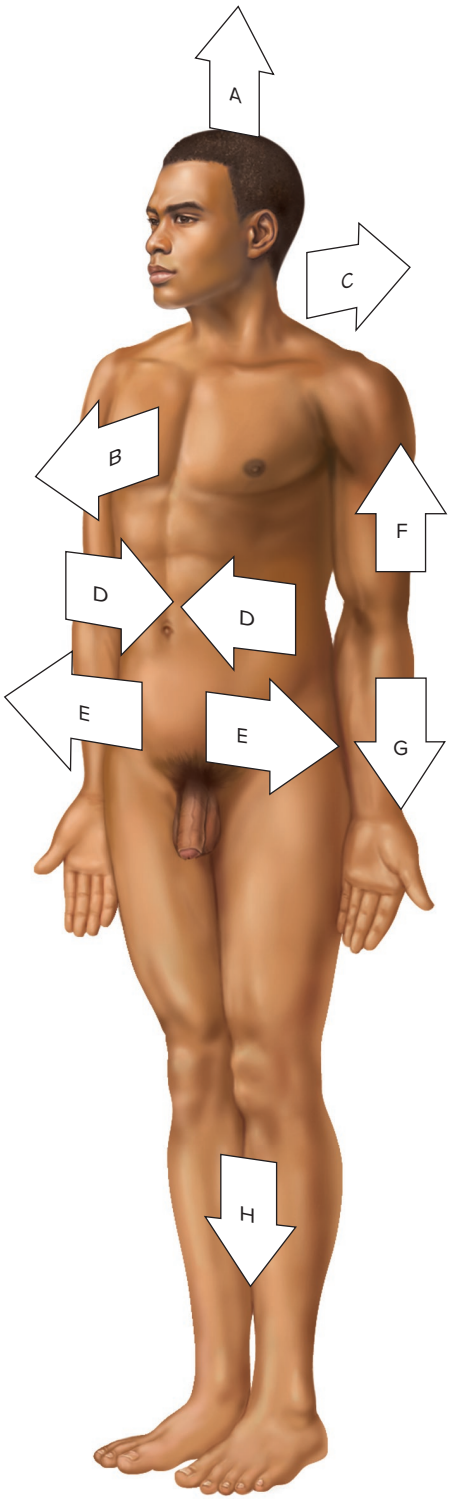

FIGURE 1.1 Anatomical terms of direction.

- ☐ **Cranial/superior(A).** These terms mean closer to the head end of the body or higher in the body than another structure. They are used for the axial region only.
- ☐ **Anterior/ventral(B).** These terms mean closer to the front or belly side of the body.
- ☐ **Posterior/dorsal(C).** These terms mean closer to the back side of the body.
- ☐ **Medial(D).** This term means closer to the midline of the body along the sagittal plane.
- ☐ **Lateral(E).** This term means farther from the midline of the body along the sagittal plane.
- ☐ **Proximal(F).** This term means closer to the attachment to the body. It is used for the appendicular region only.
- ☐ **Distal(G).** This term means farther from the attachment to the body. It is used for the appendicular region only.
- ☐ **Inferior(H).** This term means farther from the head end of the body or lower in the body than another structure. It is used for the axial region only.

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Anatomical Regions

Figure 1.2 shows anatomical regions. Color the box next to each region name shown. Use the same color for the arrow pointing to the corresponding region on the drawing.

Axial Region

- ☐ Abdominal region(A)
- ☐ Axillary region(B)
- ☐ Cranial/cephalic region(C)
- ☐ Cervical region(D)
- ☐ Facial region(E)
- ☐ Inguinal region(F)
- ☐ Pelvic region(G)
- ☐ Thoracic region(H)
- ☐ Umbilical region(I)

Appendicular Region

- ☐ Brachial region(J)
- ☐ Carpal region(K)
- ☐ Cubital region(L)
- ☐ Femoral region(M)
- ☐ Palmar region(N)
- ☐ Patellar region(O)
- ☐ Plantar region(P)
- ☐ Tarsal region(Q)

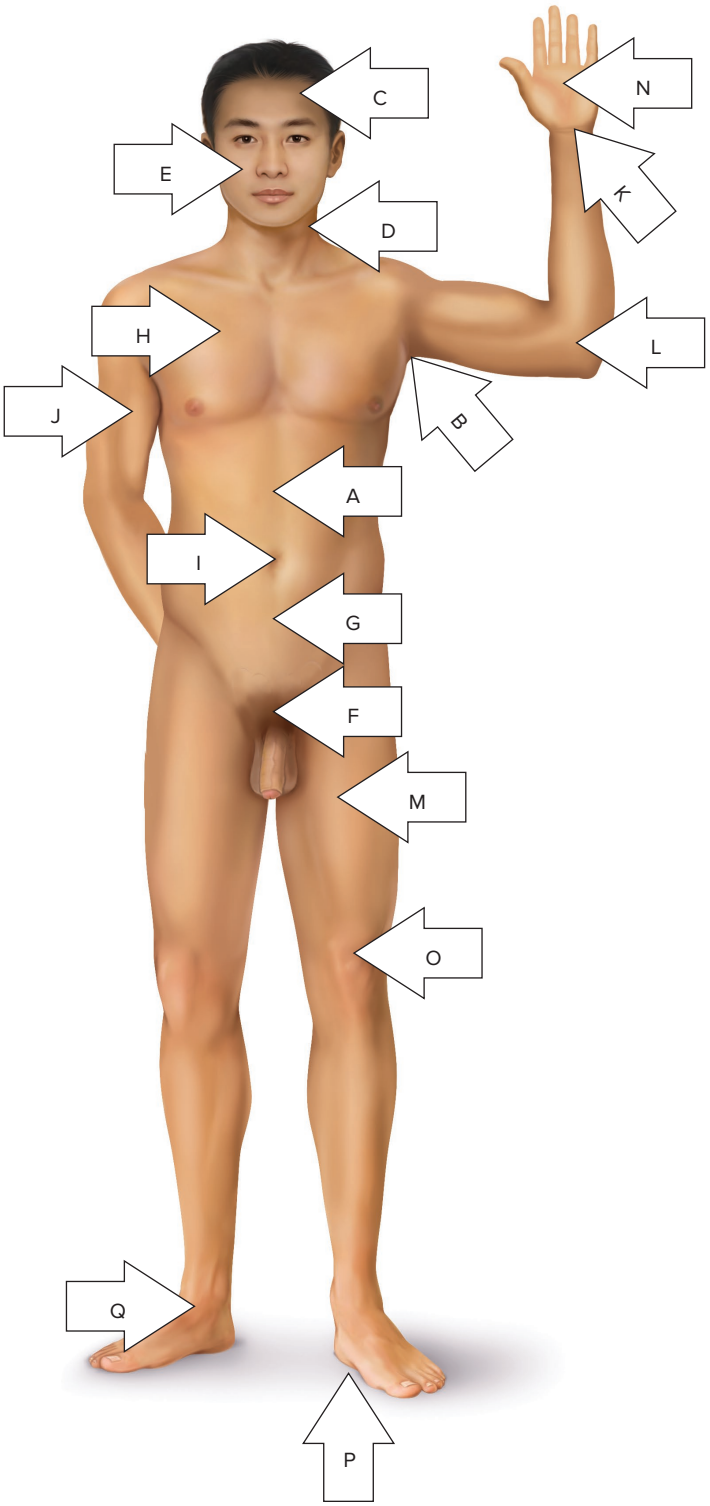

FIGURE 1.2 Anatomical regions.

Coloring Book

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Anatomical Planes

Figure 1.3 shows the anatomical planes of the human body. Color the box next to the name of each plane shown. Use the same color for the corresponding plane in the drawing.

- ☐ **Midsagittal plane(A).** This is a sagittal plane down the midline of the body.
- ☐ **Sagittal plane(B).** This plane separates right from left.
- ☐ **Frontal/coronal plane(C).** This plane separates front from back.
- ☐ **Transverse plane(D).** This plane separates top from bottom.

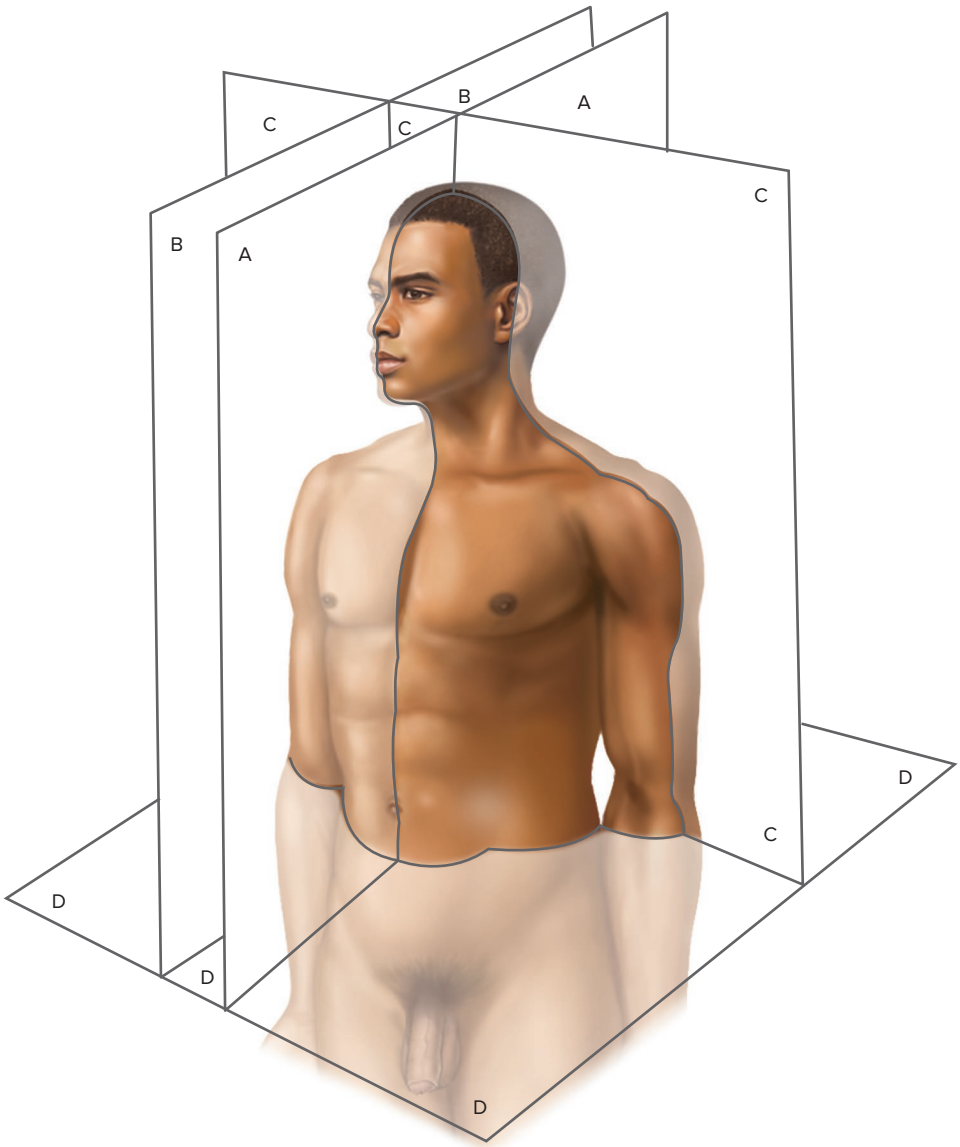

FIGURE 1.3 Anatomical planes.

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Anatomical Cavities

Figure 1.4 shows the cavities in the human body. Color the box next to the name of each cavity shown. Use the same color for the corresponding cavity in the drawing.

- ☐ Cranial cavity(A)
- ☐ Thoracic cavity(B)
- ☐ Abdominal cavity(C)
- ☐ Pelvic cavity(D)
- ☐ Vertebral cavity(E)
- ☐ Pleural cavity(F)
- ☐ Pericardial cavity(G)

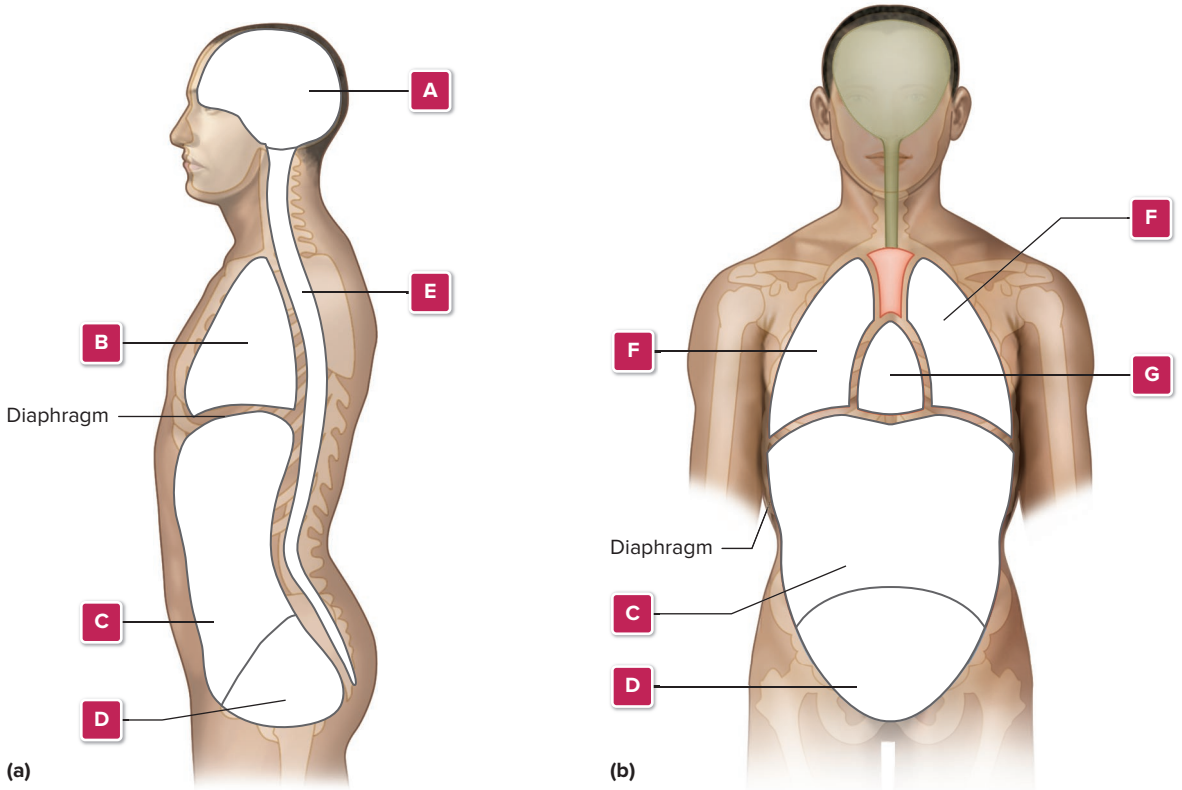

FIGURE 1.4 Cavities: (a) sagittal view, (b) anterior view.

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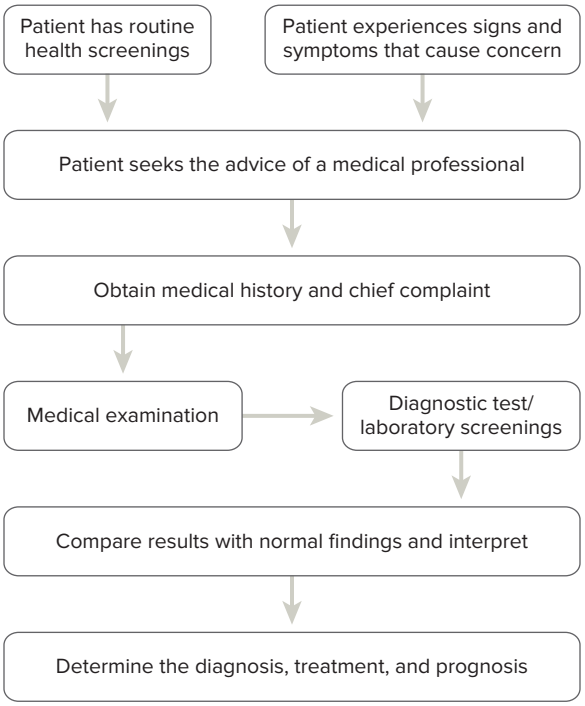
Diagnosing Disease

Figure 1.5 shows the steps to diagnosing disease. Select one color, and color the ovals in the flowchart correspond to actions taken by the patient. In a different color, color the ovals that correspond to actions taken by a health care provider.



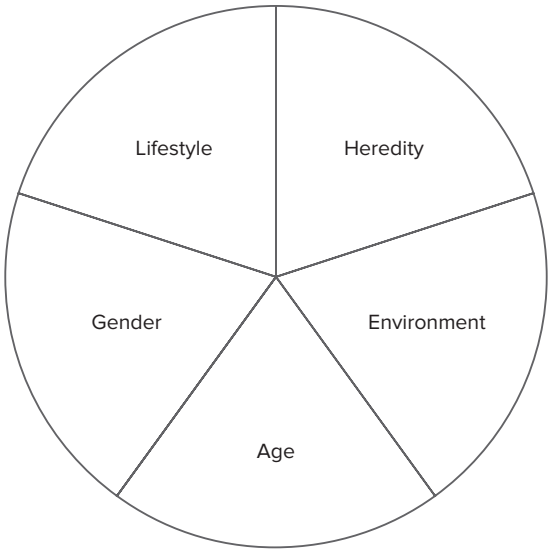
☐ Patient actions

☐ Health care provider actions

FIGURE 1.5 Steps to diagnosing disease.

Predisposing Factors of Disease

Figure 1.6 shows a pie chart with all of the predisposing factors of disease. Use one color to color all the sections of the pie that correspond to predisposing factors of disease that a person has control over. In a different color, color all of the pie sections that are predisposing factors of disease that a person cannot control.



☐ Under patient control

☐ Not under patient control

FIGURE 1.6 Predisposing factors of disease.

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Hand

One of the advantages of studying human body anatomy is that you have all the structures of the human body with you every day. You can use your own body to practice your terms. **Figure 1.7** shows the bones of the hand. Use anatomical terms of direction to answer the following questions.

FIGURE 1.7 Hand with bones drawn on it.
©Deborah Roiger

1. Which hand is this? _____
2. On what surface of the hand are the bones drawn? _____
3. Where is bone A in relation to bone B? _____
4. Where is bone C in relation to bone B? _____

Warning

Did you remember to put the hand in standard anatomical position before answering these questions? For which question(s) does standard anatomical position make a difference?

_____

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Heart

Figure 1.8 shows a heart surgery. Use the appropriate anatomical term(s) to answer the following questions.

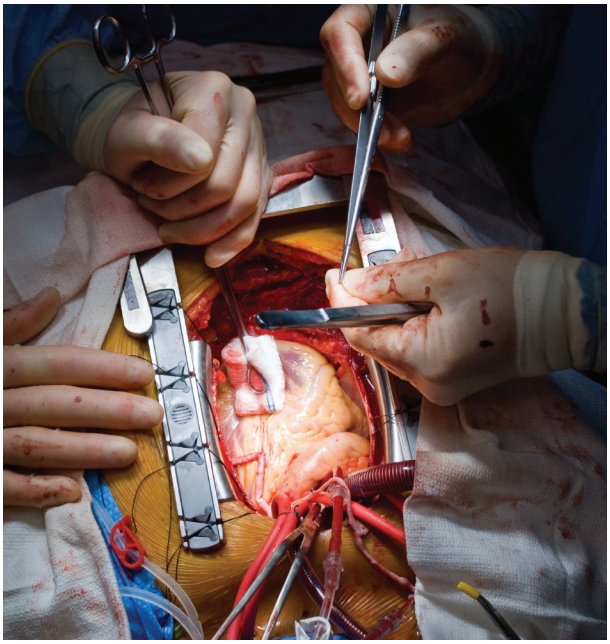

FIGURE 1.8 Heart surgery.
aaM Photography, Ltd./Vetta/miralex/Getty Images

1. In what general cavity is the heart located? _____
2. What specific cavities are lateral to the heart? _____
3. What specific membrane would need to be cut in order to expose the heart? _____
4. The aorta is a major vessel exiting the heart. The trachea and esophagus run posterior to the heart. In what space in the chest are the aorta, trachea, and esophagus located? _____

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Family Diseases

Your family history of disease can tell you a lot about your own potential for specific diseases. This is one reason why health care providers ask you about your family's medical history when you complete the patient questionnaire. For this workbook activity, interview someone who does not mind giving you information about their family medical history. It could be a person in your own family or a friend. You can fill in the table with information about your family, if you do not mind sharing this with the class. Complete Table 1.1 by listing the disease, which family member has it, and any risk factors the interviewee may take part in that make him or her more prone to developing the disease. After completing the table, answer the questions below.

TABLE 1.1 Family Diseases

Name of Disease		Family Member		Risk Factors for the Disease (Activities That the Interviewee Takes Part In)

1. Does the person interviewed have a better chance of developing diseases suffered by their parents or their aunts and uncles?

_____

2. Explain your reasoning for your answer to question 1.

_____

_____

3. Is there anything they can do specifically to lessen their chance of developing a disease or condition similar to the ones listed in the table?

_____

_____

_____

Childhood Diseases

In your textbook, you learned that age can be a predisposing factor to disease. More specifically, children are more susceptible to infectious diseases because their immune systems are still developing. Children receive a lot of vaccinations and immunizations between birth and 6 years of age to help defend them against harmful and potentially deadly infectious diseases. Table 1.2 shows a

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copy of the CDC's recommended immunization schedule. After reviewing the list of recommended immunizations, answer the following questions.

TABLE 1.2 Recommended Immunization Schedule

CDC Recommended Immunization Schedule for All Persons Aged 0–18 Years	
Vaccine	**Recommended Dosing Age**
Hepatitis B (HepB)	First dose given at birth Second dose given between 1 and 2 months of age Third dose given between 6 and 18 months of age
Rotavirus (RV)	First dose given at 2 months of age Second dose given at 4 months of age Third dose may be indicated depending on the type of vaccine used (given at 6 months of age)
Diphtheria, tetanus, and pertussis (DTaP)	First dose given at 2 months of age Second dose given at 4 months of age Third dose given at 6 months of age Fourth dose given between 15 and 18 months of age Fifth dose given between 4 and 6 years of age Administer 1 dose of DTaP vaccine to all adolescents aged 11 to 12 years.
Haemophilus influenzae type B (Hib)	Depending on the type of vaccine given, a three-dose or four-dose schedule is recommended. First dose given at 2 months of age Second dose given at 4 months of age For the vaccine that requires three doses, third dose is given between 12 and 15 months of age For the vaccine that requires four doses, third dose is given at 6 months of age For the vaccine that requires four doses, fourth dose is given between 12 and 15 months of age
Pneumococcal	First dose given at 2 months of age Second dose given at 4 months of age Third dose given at 6 months of age Fourth dose given between 12 and 15 months of age
Polio	First dose given at 2 months of age Second dose given at 4 months of age Third dose given between 6 and 18 months of age Fourth dose given between 4 and 6 years age
Influenza (flu)	One dose given annually
Measles, mumps, rubella (MMR)	First dose given between 12 and 15 months of age Second dose given between 4 and 6 years age
Varicella (VAR)	First dose given between 12 and 15 months of age Second dose given between 4 and 6 years age

(Continued)

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TABLE 1.2 concluded

CDC Recommended Immunization Schedule for All Persons Aged 0–18 Years	
Hepatitis A (HepA)	Two-dose series given between 12 and 23 months (doses should be between 6 to 18 months apart)
Meningococcal	First dose given between 11 and 12 years of age Booster given between 16 and 18 years of age
Human papillomavirus (HPV)	Two- or three-dose series depending on age at initial vaccination If initial vaccination given between ages 9 through 14 years, two-dose series recommended Second dose given between 6 and 12 months of age after initial dose If initial vaccination given age 15 years or older, three-dose series recommended Second dose given 2–4 weeks after initial dose Third dose given 12 weeks after second dose

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2016.

1. After considering what you read about childhood disease in Chapter 1, The Basics, and reviewing the recommended immunization schedule earlier, why is it recommended that children receive the influenza vaccine yearly?

_____

_____

_____

2. What does DTaP vaccinate against?

_____

3. Use the Internet to find out how prevalent polio is today compared to 50 years ago. Has the incidence of polio decreased or increased over time? What factors contribute to the number of polio cases seen today compared to how many there were in the past?

_____

_____

_____

_____

4. What common childhood illness does the varicella vaccine help prevent? If a child can avoid getting this illness, what disease might he or she also avoid as an older individual?

_____

_____

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Key Words

The following terms are defined in the glossary of your textbook.

abdominal
acute
anatomy
appendicular
axial
chronic
communicable diseases
cranial
diagnosis
disease
epidemiology
etiologies
greater omentum
heredity
homeostasis
hypersensitivity
immunodeficiency
incidence
inflammation
malaise
meninges
mesentery
negative feedback
noncommunicable diseases
palliative
parietal
pathogens
pathology
pelvic
peritoneum
physiology
pleura
positive feedback
prevalence
prognosis
proximal
serous membrane
signs
symptoms
thoracic
visceral

Concept Maps

Complete the boxes in the following concept maps (**Figures 1.9** to **1.15**). Each map contains at least one key word.

Anatomical Terms

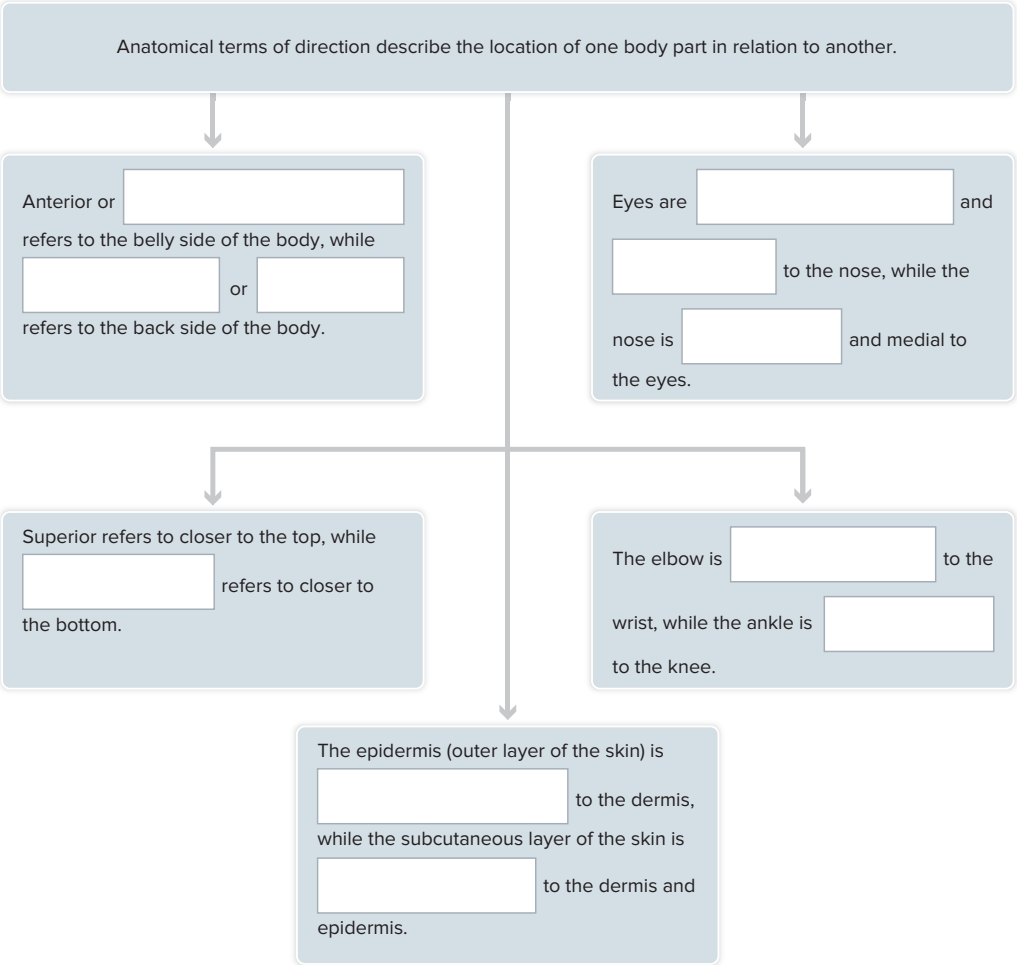

FIGURE 1.9 Anatomical terms concept map.

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Anatomical Regions

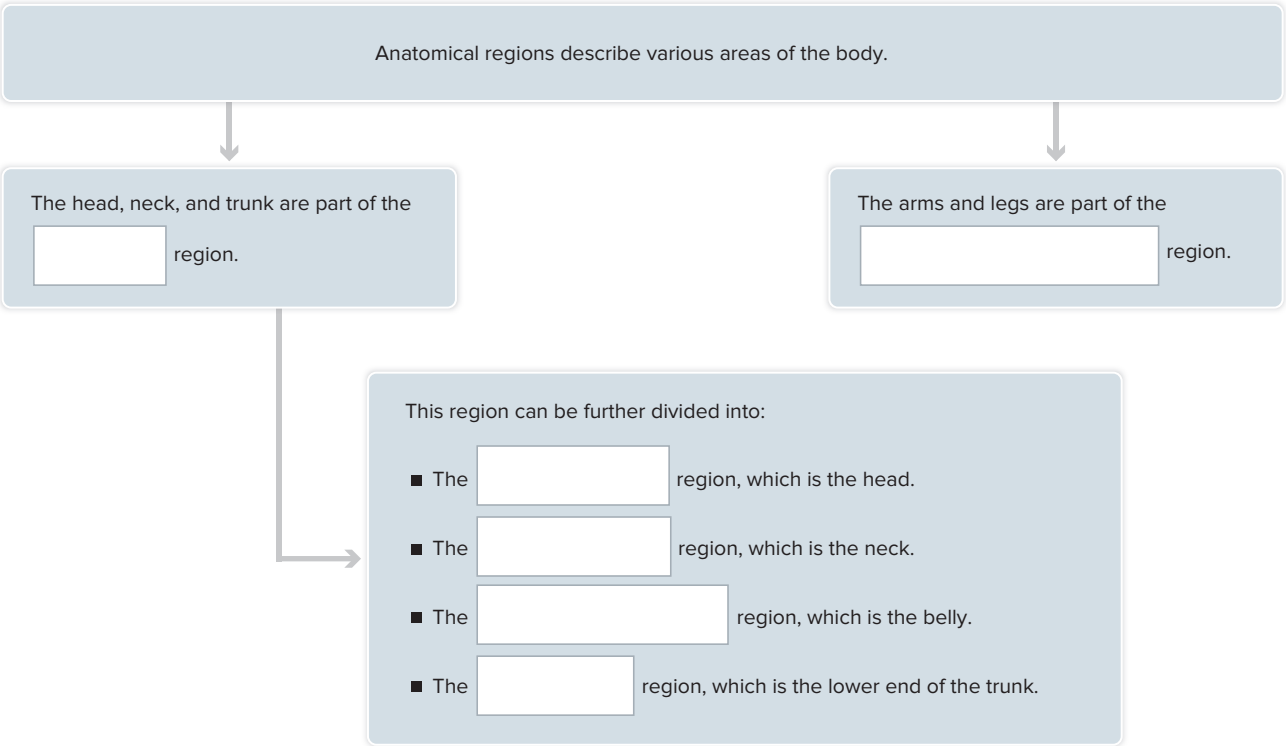

FIGURE 1.10 Anatomical regions concept map.

Key Word Concept Maps

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Anatomical Cavities

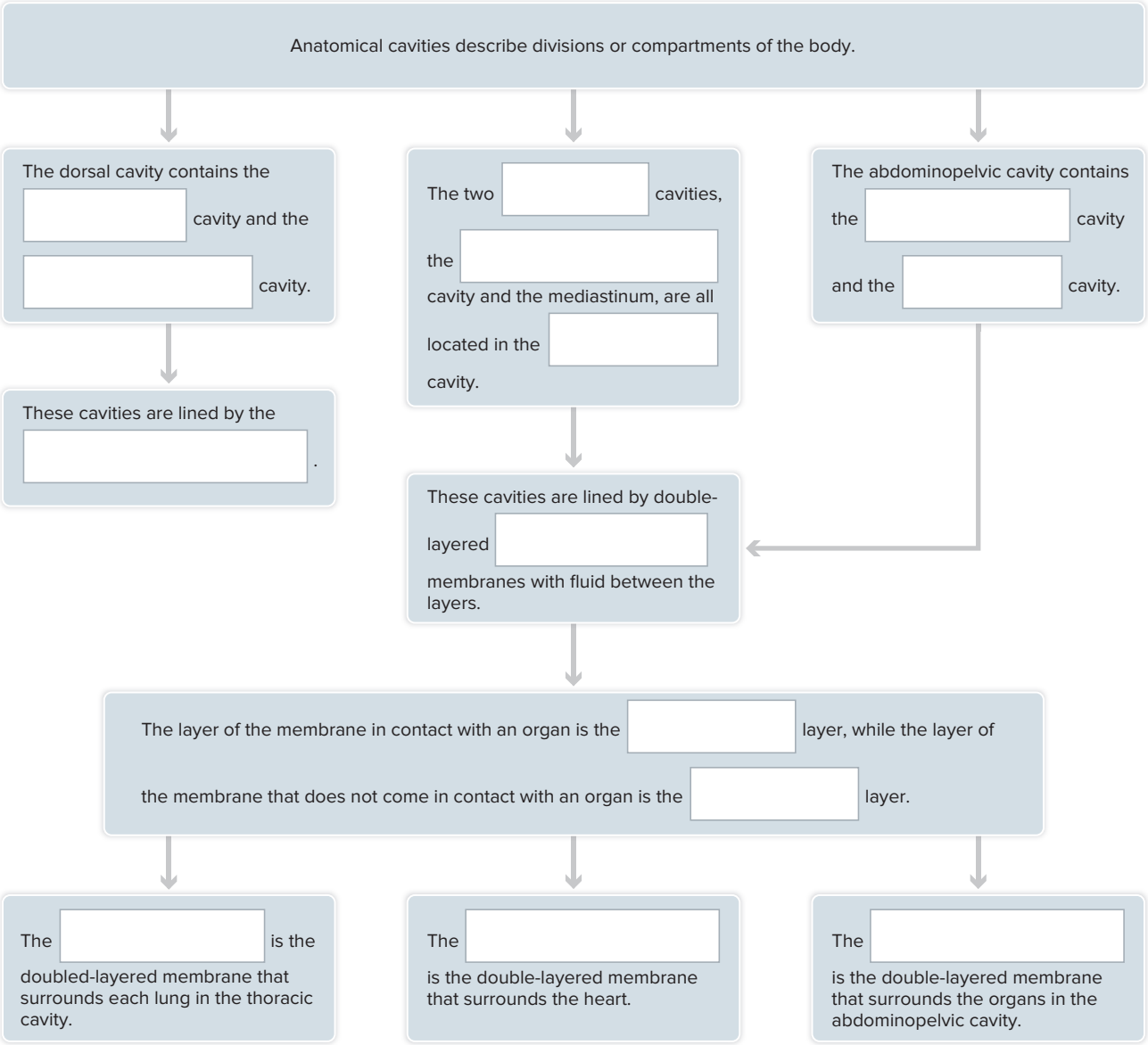

FIGURE 1.11 Anatomical cavities concept map.

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Homeostasis

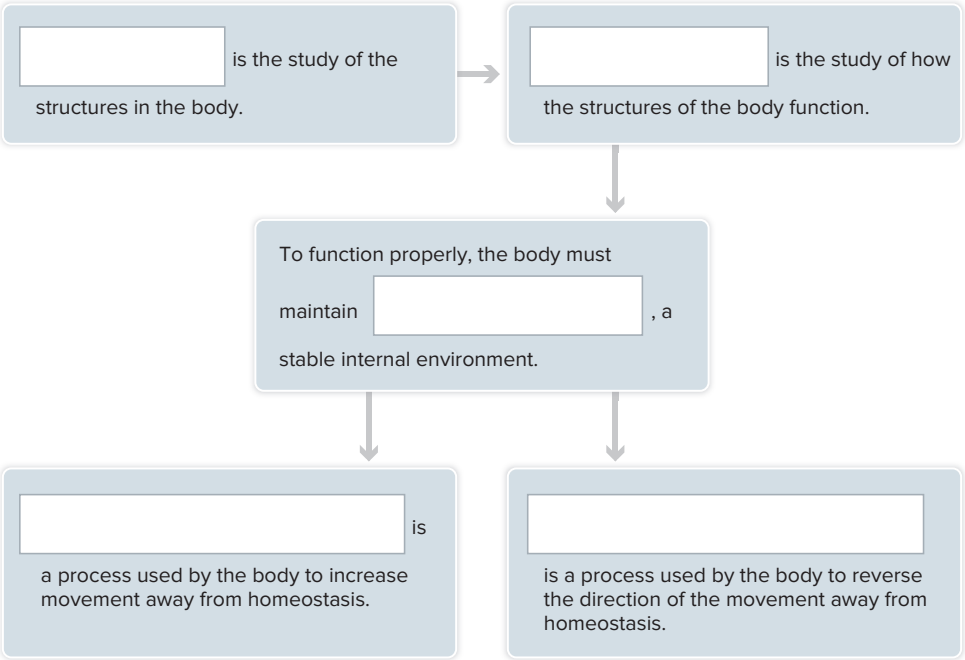

FIGURE 1.12 Homeostasis concept map.

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Predisposing Factors of Disease

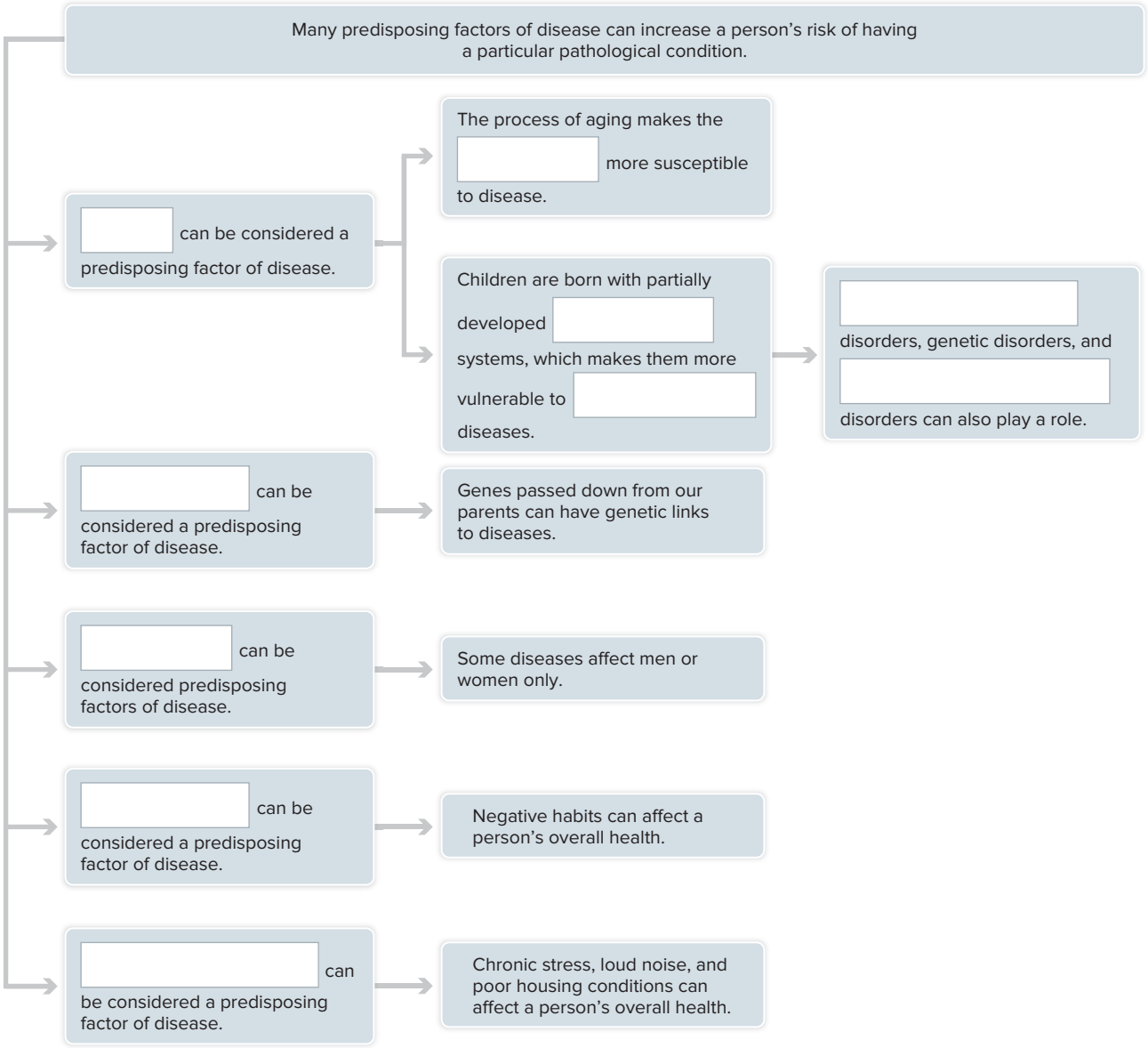

FIGURE 1.13 Predisposing factors of disease concept map.

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Classifications of Disease

Diseases can be classified in various ways.

[ ] diseases → are caused by [ ], which are disease-causing agents.

[ ] → are a class of diseases characterized by uncontrollable cell growth that forms [ ]. → [ ], which are cancer-causing agents, and [ ], which are genes that code for uncontrolled production of cellular growth factors, can cause this class of diseases.

[ ] disorders → are a class of diseases that result from the inability of the body to defend itself. → These can be caused by [ ], which are allergic reactions; immunodeficiencies; or [ ] disorders, which prevent the immune system from distinguishing between self and dangerous molecules and cells.

[ ] disorders → are a class of diseases characterized by a change in the genetic material. → These changes can be spontaneous, inherited, or caused by [ ].

[ ] disorders → are a class of conditions of the mind.

[ ] → are a class of conditions caused by a wound or shock resulting in the body's inability to function normally.

FIGURE 1.14 Classifications of disease concept map.

Key Word Concept Maps

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Immune Disorders

Immune disorders are a class of diseases that result from the inability of the body to defend itself. There are three general types of immune disorders:

- _____ are allergies that involve an overreaction of the immune system to an allergen.
  - The symptoms that result from this reaction can be mild, like hives, or severe, like _____.
- _____ disorders are characterized as immune disorders that cause a deficiency in the ability of the immune system to defend the body.
  - An example of this type of disorder is AIDS.
- _____ disorders are characterized as an inability of the immune system to distinguish between its own tissues and dangerous molecules and cells.

FIGURE 1.15 Immune disorders concept map.

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This section is meant to give instructors additional suggestions for group activities and discussions for each chapter. Many of the activities can be adapted to fit other chapters. Answers, background information, and/or authors' experience are shown in *italics*.

Group Activity

Group Activity 1:

Anatomical terms

Divide the class into groups of 3–5 students. Each student in the group should describe the location of a body structure using three anatomical terms not used by other members of the group. The group should compile a list of each member's contribution. When finished, each group exchanges their list with another group who checks the list for accuracy.

Discussions

Discussion 1:

Anatomical terms

Case study: Draw two kidneys on the board as they would appear in the body. Shade in a spot on the upper right edge of the kidney on the left. Tell the students the drawing represents an X-ray of a patient sent to radiology because of a suspected kidney tumor. The X-ray shows an anterior view of the abdomen. The shading represents a tumor. Ask the students to describe the location of the tumor, using anatomical terms.

Because this is an anterior view, the kidney on the left on the board would be the patient's right kidney (anatomical position), so the correct answer would be the superior, medial edge of the right kidney. Ask the students if they could place and describe a tumor differently.

Discussion 2:

Feedback

Several examples of negative feedback have been discussed in the chapter. Ask the students to think of another example of negative or positive feedback in their homes.

Discussion 3:

Epidemiology

Viruses mutate (change) over time. Imagine a change in a respiratory virus such as the coronavirus that causes COVID-19. The new strain of the coronavirus still produces the same disease and has the same CFR as does the original coronavirus but has an R0 that is significantly higher. What would be the effects of such a change on the speed of spread of the disease, the severity of the disease, and the number of deaths that would occur? Explain.

The new strain would spread faster due to the higher R0 (transmissibility). Each person who is infected will infect more people than if they had the original coronavirus. The disease would not be more severe. The same CFR means that the percentage of deaths will remain the same, but the actual number of deaths will increase because the number of infections has increased.

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Multiple Select: *Select the correct choices for each statement. The choices may be all correct, all incorrect, or any combination of correct and incorrect.*

1. Which of the following statements use(s) an anatomical term of direction correctly?
   - **a.** The anterior surface of the arm has the most hair.
   - **b.** The liver is distal to the diaphragm.
   - **c.** The elbow is superior to the wrist.
   - **d.** The cubital region is proximal to the carpal region.
   - **e.** The esophagus is posterior to the heart.
2. Which of the following statements is (are) correct concerning anatomical regions?
   - **a.** The plantar region is part of the appendicular region.
   - **b.** The palmar region is part of the axial region.
   - **c.** The abdominal region is superior to the pelvic region.
   - **d.** The pelvic region is part of the appendicular region.
   - **e.** The cranial region is superior to the cervical region.
3. When would a health care provider need to use a differential diagnosis?
   - **a.** To help determine a diagnosis when more than one possible disease is responsible for the patient's condition
   - **b.** To help determine a prognosis
   - **c.** To help determine a treatment plan
   - **d.** To help obtain a chief complaint
   - **e.** To help determine which medications to prescribe
4. What is the definition of *disease*?
   - **a.** A disturbance in homeostasis
   - **b.** A normal function of the human body
   - **c.** An abnormal function of the human body that results in the inability to maintain homeostasis
   - **d.** The ability of the body to reestablish balance
   - **e.** The inability of the body to maintain levels within the normal range
5. How does age act as a predisposing factor of disease?
   - **a.** Age does not act as a predisposing factor of disease.
   - **b.** Children and older adults are more susceptible to disease due to the state of their immune systems.
   - **c.** All organs regenerate as the body gets older; therefore, age does not have an effect on disease.
   - **d.** Children are more vulnerable to infectious disease.
   - **e.** As the body ages, there is a general reduction in function at the cellular level.
6. What is the difference in signs and symptoms of disease?
   - **a.** Signs can be measured.
   - **b.** Signs cannot be measured.
   - **c.** Symptoms can be measured.
   - **d.** Symptoms cannot be measured.
   - **e.** Signs and symptoms can both be measured.
7. What is the function of pain?
   - **a.** Protection of an injured body part
   - **b.** An alert that there is a potential problem with a particular part of the body
   - **c.** A defense mechanism
   - **d.** A signal for a person to take medication
   - **e.** A test of how much discomfort a person can tolerate
8. What are the signs of inflammation?
   - **a.** Bluish skin color
   - **b.** Heat
   - **c.** Swelling
   - **d.** Pus
   - **e.** Pain

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9. When is palliative treatment used?
   a. When the patient's condition is responding to medication
   b. When the focus of patient care is making the patient comfortable, not curing the disease
   c. When the patient's condition can be cured
   d. When the patient needs therapy to improve his or her condition
   e. When the health care provider wants to teach the patient ways to avoid a particular disease
10. What is the definition of *epidemiology*?
   a. The study of disease
   b. The study of the prevalence of disease
   c. The study of the incidence of disease
   d. The study of the spread of disease
   e. A branch of medical science that deals with the scope, distribution, and control of disease in a population.

Matching: *Match the organ to the cavity in which it is located.*

_____	**1.** Pleural cavity	**a.** Uterus
_____	**2.** Pericardial cavity	**b.** Brain
_____	**3.** Abdominal cavity	**c.** Lung
_____	**4.** Pelvic cavity	**d.** Heart
_____	**5.** Cranial cavity	**e.** Liver

Matching: *Match the steps of determining a diagnosis to the purpose of that step. Answers may be used more than once.*

_____	**6.** Obtaining a medical history	**a.** Allows the health care provider to establish a baseline of what is normal for that patient
_____	**7.** Performing diagnostic tests	**b.** Allows the health care provider to determine whether the patient falls within the normal range
_____	**8.** Performing a medical examination	**c.** Allows the health care provider to assess the patient for any abnormal findings
_____	**9.** Performing a routine screening of the patient	**d.** Allows the health care provider to determine whether the patient's test results indicate the presence of disease
_____	**10.** Comparing results with normal findings	

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Completion: *Fill in the blanks to complete the following statements concerning the cadaver images in* **Figures 1.16** *to* **1.18**. *Use a term for an anatomical plane in statements 1 to 3.*

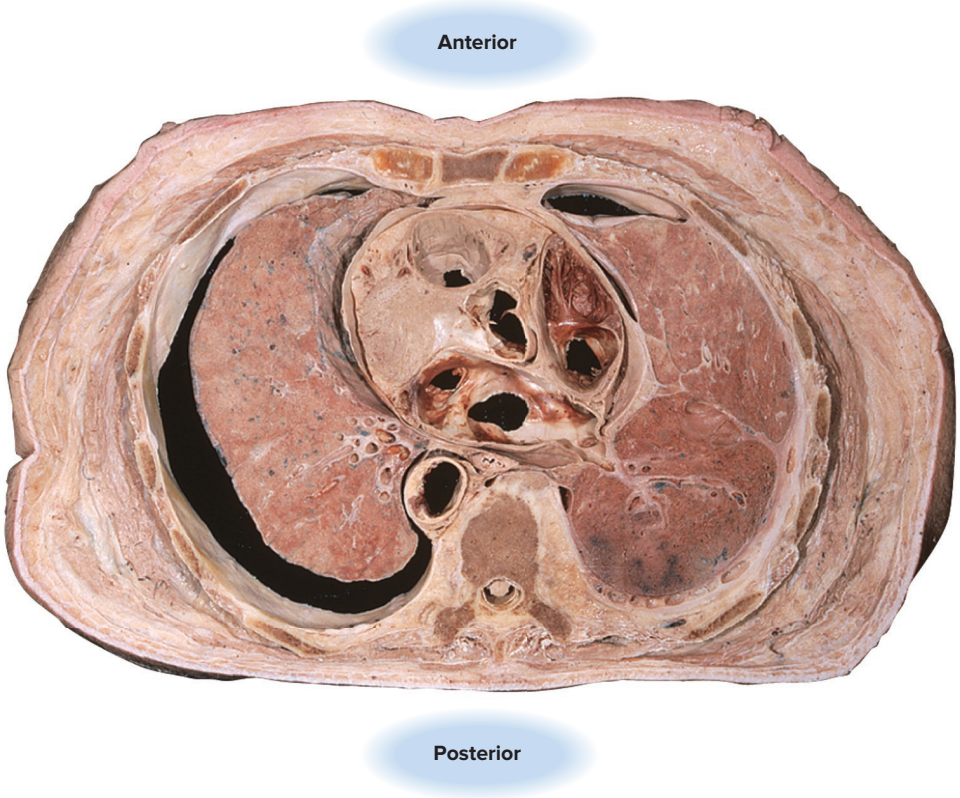

FIGURE 1.16
Rebecca Gray/Don Kincaid/McGraw Hill

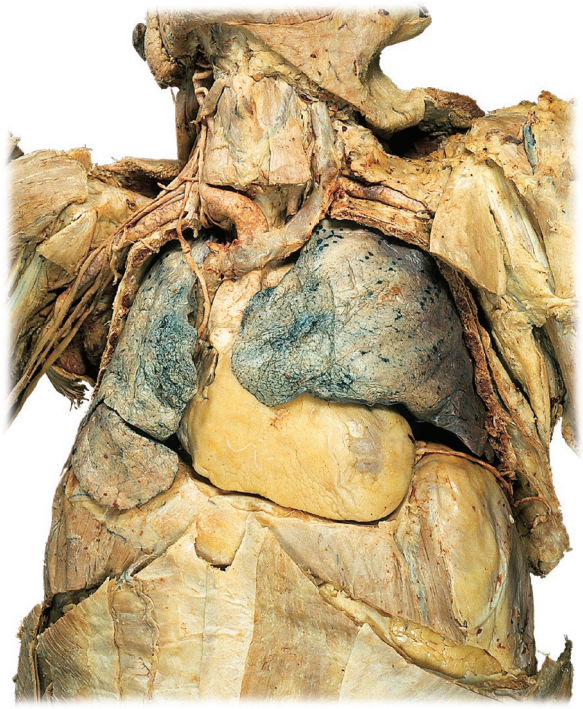

FIGURE 1.17
Rebecca Gray/McGraw Hill

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FIGURE 1.18
Rebecca Gray/McGraw Hill

1. The body in **Figure 1.16** was cut along a(n) _____ plane.
2. The body in **Figure 1.17** was cut along a(n) _____ plane.
3. The body in **Figure 1.18** was cut along a(n) _____ plane.
4. The definition of *homeostasis* is _____.
5. The definition of *physiology* is _____.
6. Dilation of blood vessels during inflammation results in the symptoms of _____, _____, _____, and _____.

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Critical Thinking

1. An arrow entered the left axillary region of a hunter and lodged in his heart. List in order the layers of serous membrane the arrow would have pierced. (Hint: You may want to sketch the arrow entering the thorax and the relative serous membranes.)

2. What anatomical plane of the body would be used to illustrate the relative position of the liver, stomach, and spinal column? _____

   What anatomical plane of the body would be used to illustrate the relative position of the urinary bladder, the stomach, and the liver? _____

3. In your textbook, you explored how important it is for the body to maintain homeostasis to avoid disease. What are some ways that the body maintains homeostasis? In the presence of disease, what are some examples of the body not maintaining homeostasis? _____

_____

_____

_____

Case Study

1. A patient comes to the emergency room with an elevated heart rate and a low blood pressure that continues to fall. He is diagnosed as having a bleeding ulcer. The bleeding is stopped with medical intervention, and he is given a blood transfusion. His heart rate and blood pressure return to normal. What homeostatic feedback mechanisms, if any, are evident in this situation? _____

_____

_____

_____

_____

DieterMeyrl/Getty Images

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2. A patient comes into the clinic experiencing frequent urination and excessive thirst. Describe the steps involved in determining a diagnosis for this patient. _____

_____

_____

_____

3. What questions may be asked when obtaining the patient's chief complaint? _____

_____

_____

_____

_____

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Chapter 1: The Basics

Overview

The purpose of this chapter is to introduce basic anatomical terms and the physiological concept of homeostasis. The chapter also introduces the concepts of pathology relating to the human body.

Competency Correlation Grid

Learning Outcome	CAAHEP Competencies	ABHES Competencies
1.1 Define *anatomy*, *physiology*, and *pathology*.	I.C.1. Describe structural organization of the human body	3.b. Build and dissect medical terms from roots/suffixes
1.2 Describe the location of structures in the human body using anatomical terms of direction, regions, planes, positions, and	I.C.3. Describe body planes, directional terms, and quadrants	2.a. List all body systems and their structures and functions
1.3 Locate serous membranes by their individual names and relative location to organs.	I.C.3. Describe body planes, directional terms, and quadrants	2.a. List all body systems and their structures and functions
1.4 Define *homeostasis* and explain why it is so important in human physiology.	I.C.1. Describe structural organization of the human body	3.a. Define and use entire basic structure of medical words and be able to accurately identify in the correct context (i.e., root, prefix, suffix, combinations, spelling, and definitions)
1.5 Define *negative feedback* and *positive feedback* and explain their importance to homeostasis.	I.C.2. Identify body systems	2.a. List all body systems and their structures and functions
1.6 Define *disease* and describe the relationship between disease and homeostasis	I.C.9. Analyze pathology for each body system	2.b. Describe common diseases, symptoms, and etiologies as they apply to each system
1.7 Define *predisposing factors* of disease and explain how specific predisposing factors affect disease.	I.C.9. Analyze pathology for each body system	2.b. Describe common diseases, symptoms, and etiologies as they apply to each system

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Learning Outcome	CAAHEP Competencies	ABHES Competencies
1.8 Differentiate between signs and symptoms of disease and give an example of each.	I.C.9. Analyze pathology for each body system	2.b. Describe common diseases, symptoms, and etiologies as they apply to each system
1.9 Explain the function of pain and inflammation.	I.C.9. Analyze pathology for each body system	2.b. Describe common diseases, symptoms, and etiologies as they apply to each system
1.10 Explain the two classifications of disease and the subcategories of each.	I.C.9. Analyze pathology for each body system	2.b. Describe common diseases, symptoms, and etiologies as they apply to each system
1.11 Define *diagnosis* and list the steps involved in diagnosing diseases.	I.C.9. Analyze pathology for each body system	2.c. Identify diagnostic and treatment modalities as they relate to each body system
1.12 Define *differential diagnosis* and explain when it may be used.	I.C.8. Identify common pathology related to each body system	2.c. Identify diagnostic and treatment modalities as they relate to each body system
1.13 Summarize four types of treatment plans.	I.C.9.b. Analyze pathology for each body system, including treatment modalities	2.c. Identify diagnostic and treatment modalities as they relate to each body system
1.14 Define *epidemiology* and explain how epidemiology affects health care.	I.C.9. Analyze pathology for each body system	2.c. Identify diagnostic and treatment modalities as they relate to each body system

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Summary Table 1

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.1 Define *anatomy*, *physiology*, and *pathology*.	1.1 Overview	**Workbook Concept Maps:** (For answers, see below) ☐ Figure 1.12 Homeostasis concept	**Workbook Review Questions:** ☐ Completion: 5 ☐ Critical Thinking
1.2 Describe the location of structures in the human body using anatomical terms of direction, regions, planes, positions, and cavities.	1.2 Terms of Anatomy A. Anatomical Terms of Direction B. Anatomical Regions C. Anatomical Planes D. Anatomical Positions E. Anatomical Cavities **Chapter Figures:** Figure 1.1 Standard anatomical position Figure 1.2 Sagittal view of the head Figure 1.3 Chest and abdominal organs Figure 1.4 Layers of the skin Figure 1.5 Anatomical regions Figure 1.6 Abdominal quadrants and	**Talking Point**: Stress that all directional terms are in reference to the patient—not to you. Stress that all terms mean the same thing regardless of the position the patient is in. Always think of the patient as being in the anatomical position. **Discussion 1**: IM page 10 **Group Activity 1:** IM page 10 **Workbook Coloring Book:** ☐ Figure 1.1 Anatomical terms of direction ☐ Figure 1.2 Anatomical regions ☐ Figure 1.3 Anatomical planes ☐ Figure 1.4 Anatomical cavities	**Spot Check:** 1-2 **Workbook Review Questions:** ☐ Multiple Select: 1-2 ☐ Matching: 1-5 ☐ Completion: 1-3

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.2 *Continued*	**Tables:** Table 1.1 Anatomical Terms of Direction Table 1.2 Anatomical Regions Table 1.3 Anatomical Planes Table 1.4 Anatomical Positions Table 1.5 Anatomical Cavities	**Workbook Lab Exercises and Activities:** ☐ **Hand** ☐ Figure 1.7 Hand with bones drawn on it **Talking Point:** Check for use of anatomical position ☐ Figure 1.8 Heart surgery **Workbook Concept Maps:** (For answers, see below) ☐ Figure 1.9 Anatomical terms concept map ☐ Figure 1.10 Anatomical regions	

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.3 Locate serous membranes by their individual names and relative location to organs.	1.2 Terms of Anatomy F. Serous Membranes **Chapter Figures:** Figure 1.9 Water balloon Figure 1.10 Pericardial and pleural membranes Figure 1.11 Peritoneal membrane Figure 1.12 Anterior view of the abdominopelvic organs Figure 1.13 Anterior view of omentums and mesenteries	**Talking Point:** Serous membranes are introduced in this chapter as they relate to cavities. They will be covered in later chapters as they relate to physiology. For example, pleural membranes are explained more fully in Chapter 12 in relation to the mechanics of breathing. **Workbook Lab Exercises and Activities:** ☐ Figure 1.8 Heart surgery **Workbook Concept Maps:**	**Spot Check:** 3-4 **Suggested Activities:** ☐ Quiz 1.1, IM page 11 **Workbook Review Questions:** ☐ Critical Thinking: 1

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.4 Define *homeostasis* and explain why it is so important in human physiology.	1.3 Terms of Physiology A. Homeostasis	**Workbook Concept Maps:** (For answers see below) ☐ Figure 1.12 Homeostasis concept map	**Workbook Review Questions:** ☐ Completion: 4
1.5 Define *negative feedback* and *positive feedback* and explain their importance to homeostasis.	1.3 Terms of Physiology A. Homeostasis 1. Negative feedback 2. Positive feedback **Chapter Figure**: Figure 1.14 Negative feedback mechanisms for blood sugar regulation	**Talking Point:** The homeostasis icon (introduced in this section of the chapter) will appear throughout all of the chapters when topics directly relate to homeostasis. **Discussion 2:** IM page 12 **Talking Point:** A thermostat in a home is a good example of negative feedback. As a room gets colder, the room's thermostat sends a message to the furnace to send more heat, which it does until the thermostat sends another message to stop. How would this work in the summer? **Talking Point:** Draw representative examples of negative and positive feedback graphs	**Spot Check:** 5 **Workbook Review Questions:** ☐ Critical Thinking: 3 ☐ Case Study: 1
1.6 Define *disease* and describe the relationship between disease and	1.4 Terms of Pathology A. Introduction to Disease		**Workbook Chapter Review Questions:** ☐ Critical Thinking: 3

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.7 Define *predisposing factors* of disease and explain how specific predisposing factors affect disease.	1.4 Terms of Pathology B. Predisposing Factors of Disease 1. Age a. Children • Congenital disorders • Genetic disorders • Developmental disorders b. The elderly 2. Gender 3. Lifestyle 4. Environment 5. Heredity **Chapter Figures:** Figure 1.15 A child suffering with	**Workbook Coloring Book:** ☐ Figure: 1.6 Predisposing factors of disease **Lab Exercises and Activities:** ☐ Table 1.1 Family Diseases ☐ **Childhood Diseases** ☐ Table 1.2 CDC Recommended Immunization Schedule for All Persons Aged 0–18 Years **Workbook Concept Maps:** ☐ Figure 1.13 Predisposing factors of disease concept map	**Spot Check:** 6 **Workbook Chapter Review Questions:** ☐ Multiple Select: 5
1.8 Differentiate between signs and symptoms of disease and give an example of each.	1.4 Terms of Pathology C. Signs and Symptoms of Disease		**Spot Check:** 7 **Workbook Chapter Review Questions**: ☐ Multiple Select: 6

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.9 Explain the function of pain and inflammation.	1.4 Terms of Pathology C. Signs and Symptoms of Disease 1. Pain 2. Inflammation **Chapter Figure:** Figure 1.18 Splinter in the skin damages tissues and promotes an		**Workbook Chapter Review Questions:** ☐ Multiple Select: 7-8 ☐ Completion: 6
1.10 Explain two classifications of disease and the subcategories of each.	1.4 Terms of Pathology D. Classification of Disease 1. Infectious diseases a. Communicable diseases b. Noncommunicable diseases 2. Noninfectious diseases a. Cancers b. Immune disorders 1. Hypersensitivities 2. Immunodeficiency disorders 3. Autoimmune disorders 3. Genetic disorders 4. Mental disorders 5. Trauma/injury	**Workbook Concept Maps:** ☐ Figure 1.14 Classification of disease concept map ☐ Figure 1.15 Immune disorders concept map	
1.11 Define *diagnosis* and list the steps involved in diagnosing diseases.	1.4 Terms of Pathology E. Diagnosing Disease	**Workbook Coloring Book:** ☐ **Diagnosing Disease** ☐ Figure 1.5 Steps to diagnosing disease	**Workbook Chapter Review Questions:** ☐ Matching: 6-10 ☐ Case Study: 1, 2

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Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.12 Define *differential diagnosis* and explain when it may be used.	1.4 Terms of Pathology E. Diagnosing Disease 1. Differential diagnosis 2. Diagnostic tests and screenings **Chapter Figure:** Figure 1.20 Sample of a diagnostic		**Workbook Chapter Review Questions:** ☐ Multiple Select: 3 ☐ Case Study: 2-3
1.13 Summarize four types of treatment plans.	1.4 Terms of Pathology F. Treatment of the Disease 1. Palliative treatment 2. Curative treatment 3. Therapeutic treatment 4. Preventive treatment **Chapter Figures:** Figure 1.21 Home health care for a terminally ill patient Figure 1.22 Patient receiving		**Spot Check:** 9 **Workbook Chapter Review Questions:** ☐ Multiple Select: 9
1.14 Define *epidemiology* and explain how epidemiology affects health care.	1.4 Terms of Pathology G. Epidemiology **Chapter Figure:** Figure 1.23 Patients suffering from the Spanish flu pandemic of 1918 **Table:** Table 1.6 Most Prominent Chronic	**Discussion 3:** IM page 13	**Spot Check:** 10 and 11 **Workbook Chapter Review Questions:** ☐ Multiple Select: 10

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Suggested Activities

Learning Outcome 1.2

Group Activity 1: Anatomical terms

Divide the class into groups of three, four, or five students. Each student in the group should describe the location of a body structure using three anatomical terms not used by other members of the group. The group should compile a list of each member's contribution. When finished, each group exchanges their list with another group, who checks the list for accuracy.

Discussion 1: Anatomical terms

Case Study: Draw two kidneys on the board as they would appear in the body. Shade in a spot on the upper right edge of the kidney on the left. Tell the students the drawing represents an X-ray of a patient sent to radiology because of a suspected kidney tumor. The X-ray shows an anterior view of the abdomen. The shading represents a tumor. Ask the students to describe the location of the tumor, using anatomical terms.
Because this is an anterior view, the kidney on the left on the board would be the patient's right kidney (anatomical position), so the correct answer would be the superior, medial edge of the right kidney. Ask the students whether they could place and describe a tumor differently.

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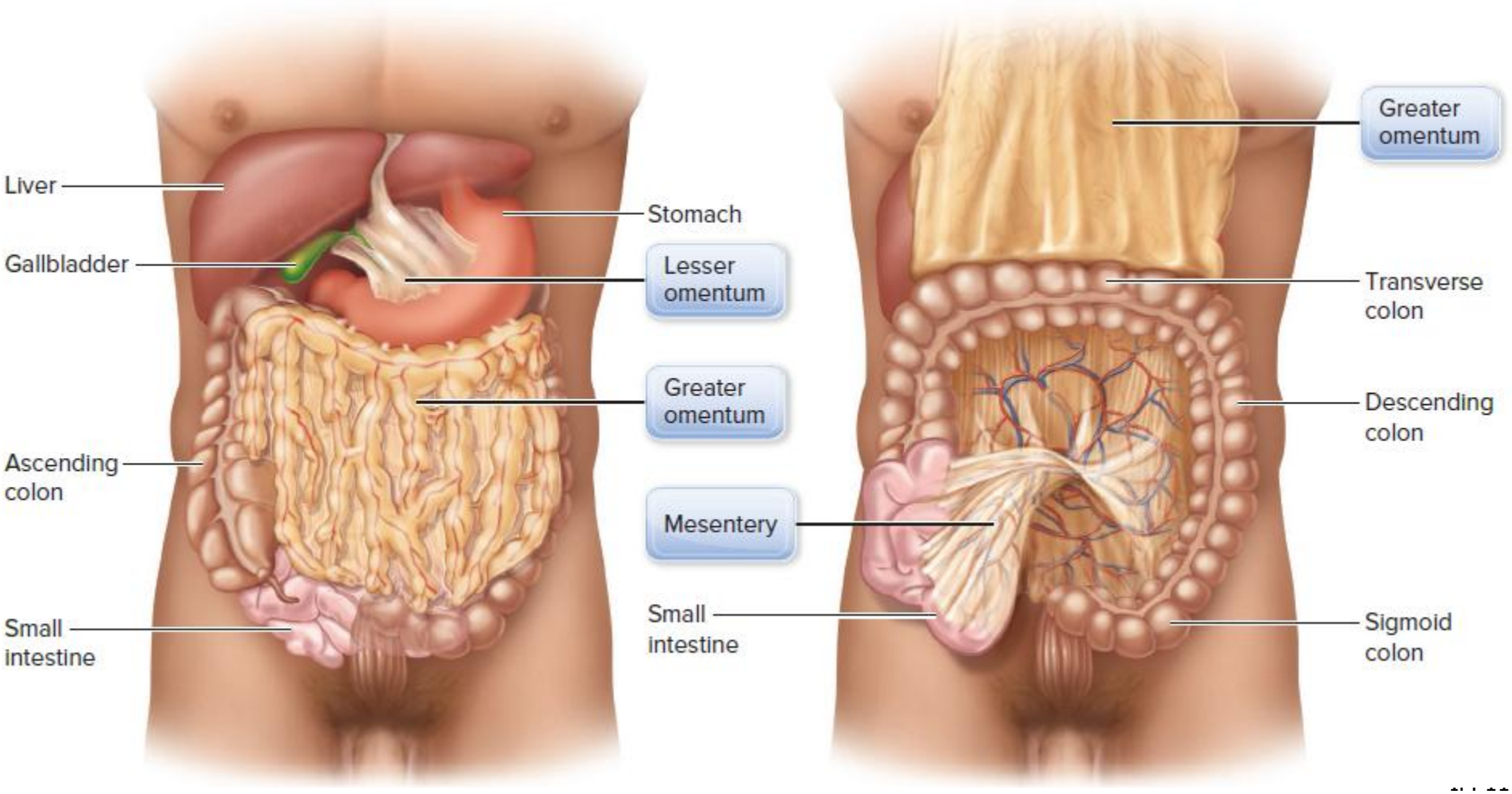
Learning Outcome 1.3

Quiz 1.1

Use Text Figure 1.13 for this quiz.



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1. In what cavity are the organs shown here located? *Answer: abdominal or abdominopelvic*

2. The lesser and greater omenta and the mesentery are shown here. Of what membrane are they an extension? *Answer: The peritoneum*

3. Where is gallbladder in relation to the liver? *Answer: Inferior*

4. In what quadrant is the sigmoid colon located? *Answer: LLQ*

5. What other term can be used to describe the region location of the sigmoid colon? *Answer: Left inguinal region*

6. What view is represented in this figure? *Answer: Anterior*

7. Where is the transverse colon in relation to the greater omentum? *Answer: Deep*

8. Along what plane would a cut have to be made to offer this view? *Answer: Frontal or coronal*

9. On what side of the body is the stomach located? *Answer: Left*

10. What is the term for the study of these structures? *Answer: Anatomy*

Learning Outcome 1.5

Discussion 2: Feedback

Several examples of negative feedback have been discussed (in the chapter and Talking Point). Ask the students to think of another example of negative or positive feedback in their homes.

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Learning Outcome 1.14

Discussion 3: Epidemiology

Viruses mutate (change) over time. Imagine a change in a respiratory virus such as the coronavirus that causes COVID-19. The new strain of the coronavirus still produces the same disease and has the same CFR as does the original coronavirus but has an R0 that is significantly higher. What would be the effects of such a change on the speed of spread of the disease, the severity of the disease, and the number of deaths that would occur? Explain.

The new strain would spread faster due to the higher R0 (transmissibility). Each infected individual will infect more people than if they had the original coronavirus. The disease would not be more severe. The same CFR means that the percentage of deaths will remain the same, but the actual number of deaths will increase because the number of infections has increased.

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Workbook Key Word Concept Maps

Anatomical terms, Figure 1.9

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Anatomical terms of direction describe the location of one body part in relation to another.

Anterior or **ventral** refers to the belly side of the body, while **posterior** or **dorsal** refers to the back side of the body.

Eyes are **superior** and **lateral** to the nose, while the nose is **inferior** and medial to the eyes.

Superior refers to closer to the top, while **inferior** refers to closer to the bottom.

The elbow is **proximal** to the wrist, while the ankle is **distal** to the knee.

The epidermis (outer layer of the skin) is **superficial** to the dermis, while the subcutaneuos layer of the skin is **deep** to the dermis and epidermis.

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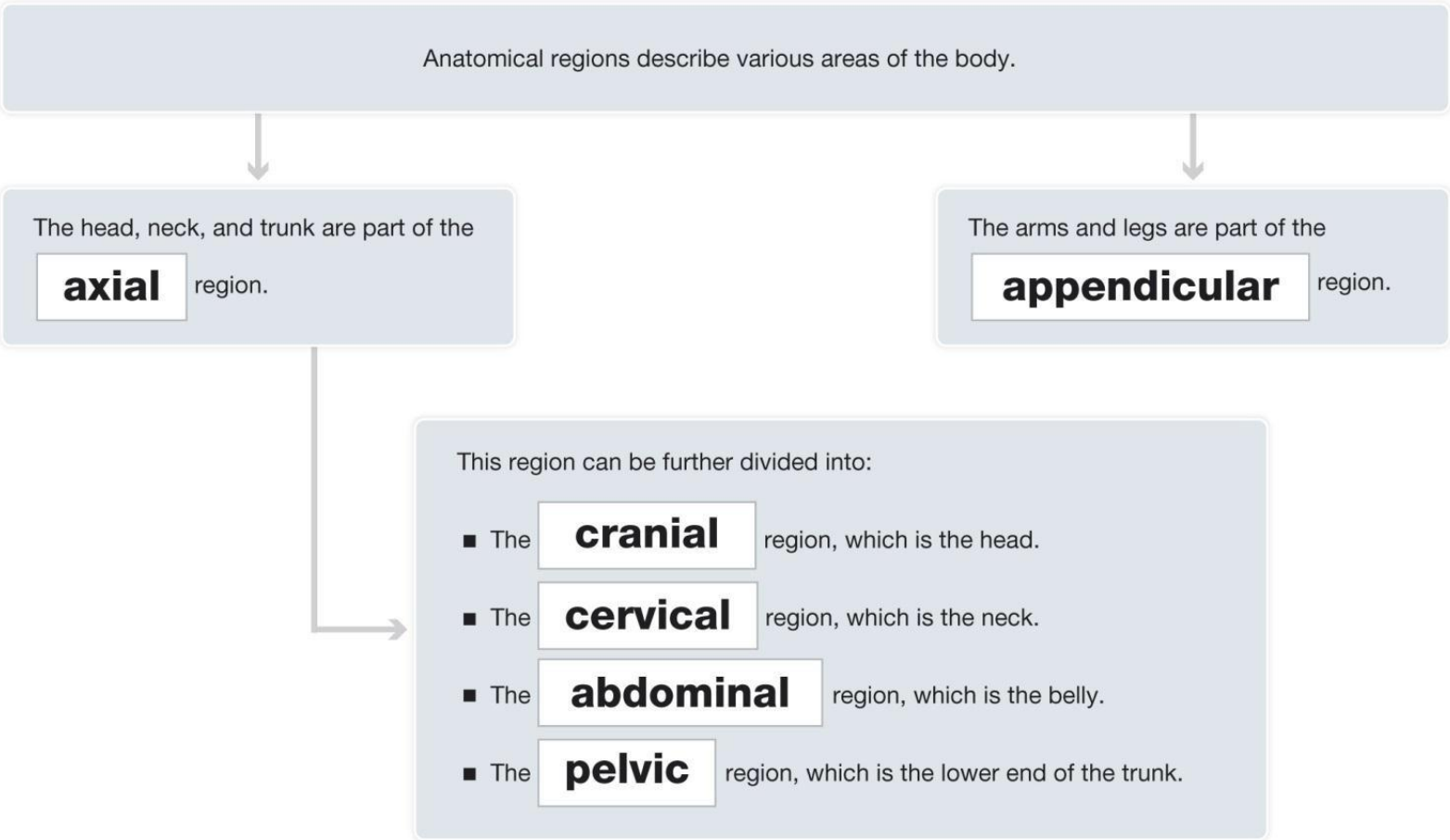
Anatomical regions, Figure 1.10



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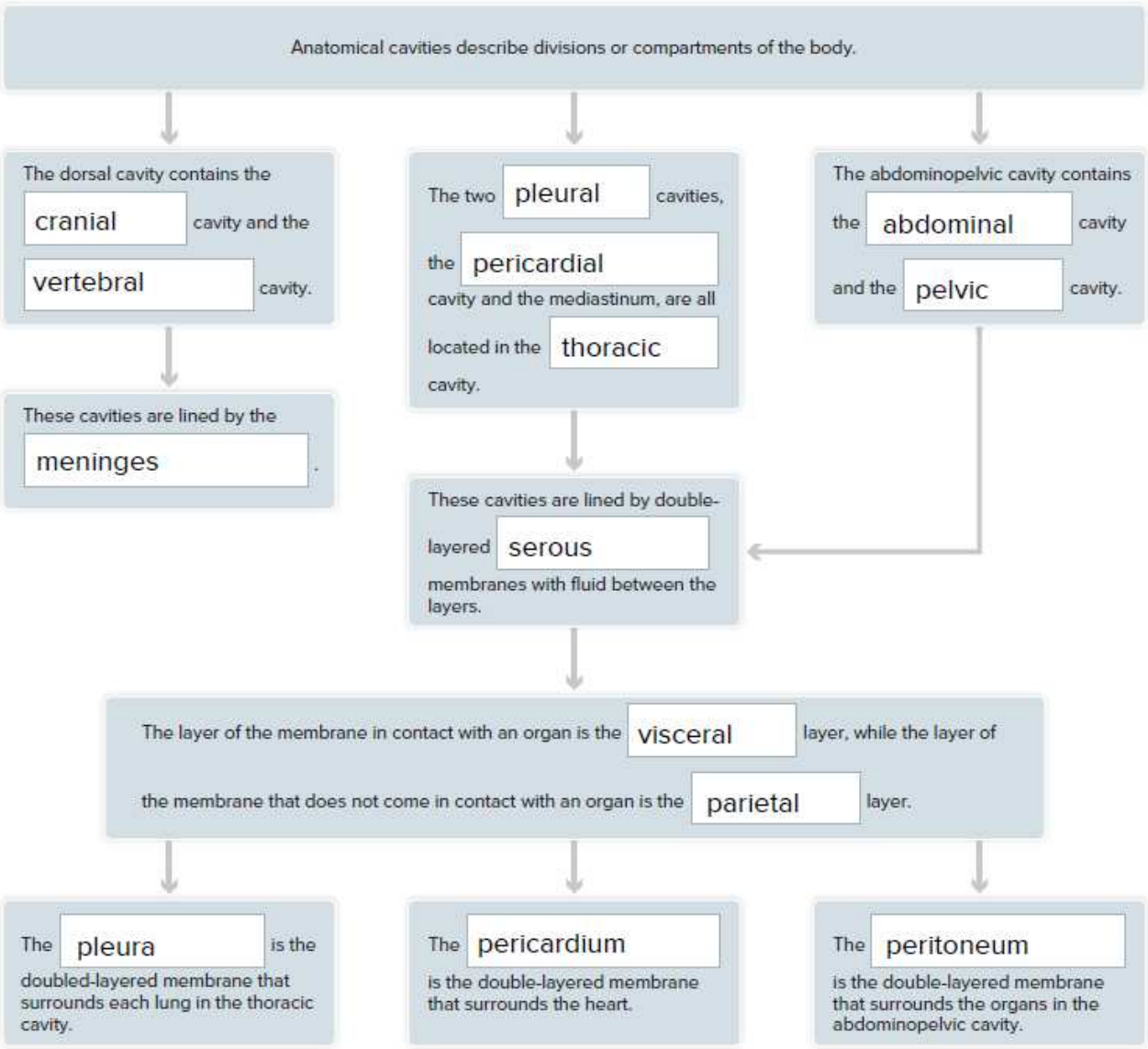
Anatomical cavities, Figure 1.11



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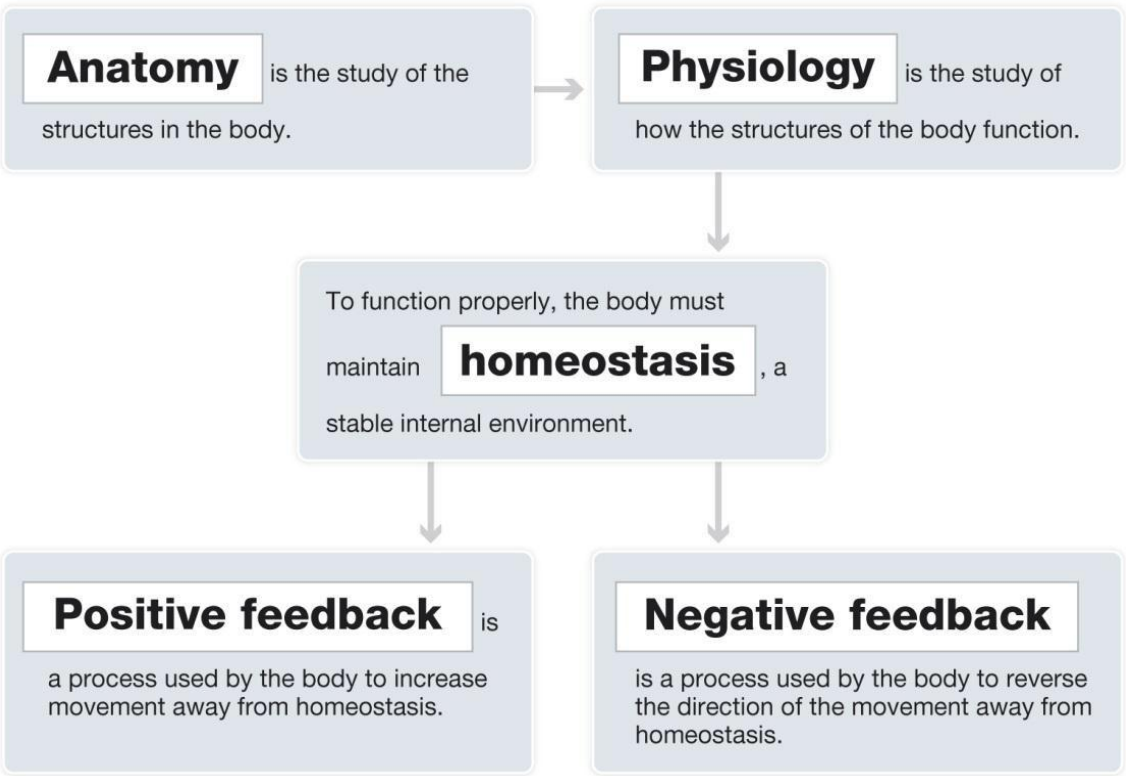
Homeostasis, Figure 1.12



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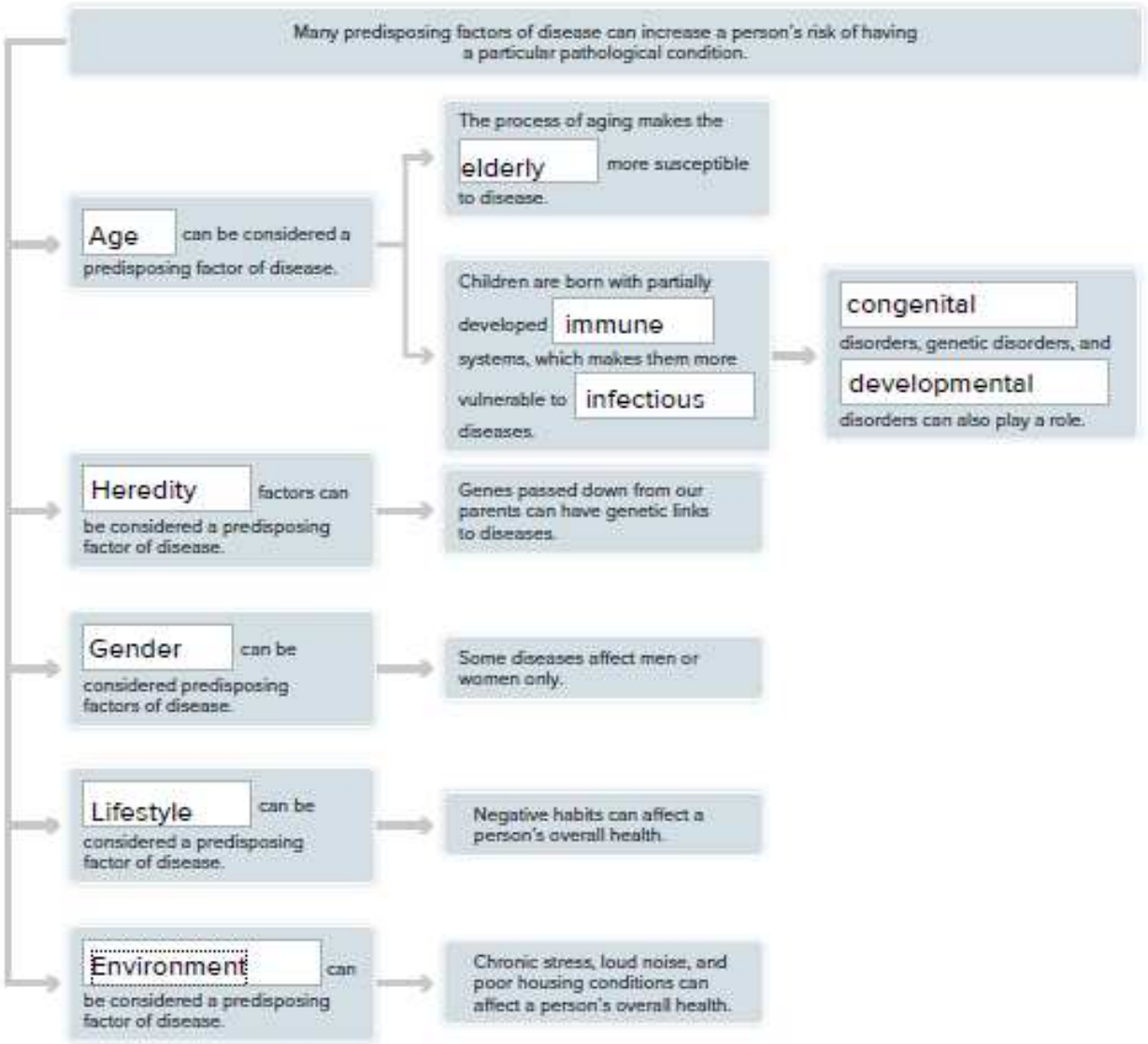
Predisposing factors of disease, Figure 1.13



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Classification of disease, Figure 1.14

Diseases can be classified in various ways.

Infectious diseases → are caused by pathogens, which are disease-causing agents.

Cancers → are a class of diseases characterized by uncontrollable cell growth that forms neoplasms. → Carcinogens, which are cancer-causing agents, and oncogenes, which are genes that code for uncontrolled production of cellular growth factors, can cause this class of diseases.

Immune disorders → are a class of diseases that result from the inability of the body to defend itself. → These can be caused by hypersensitivities, which are allergic reactions; immunodeficiencies; or autoimmune disorders, which prevent the immune system from distinguishing between self and dangerous molecules and cells.

Genetic disorders → are a class of diseases characterized by a change in the genetic material. → These changes can be spontaneous, inherited, or caused by mutagens.

Mental disorders → are a class of conditions of the mind.

Traumas → are a class of conditions caused by a wound or shock resulting in the body's inability to function normally.

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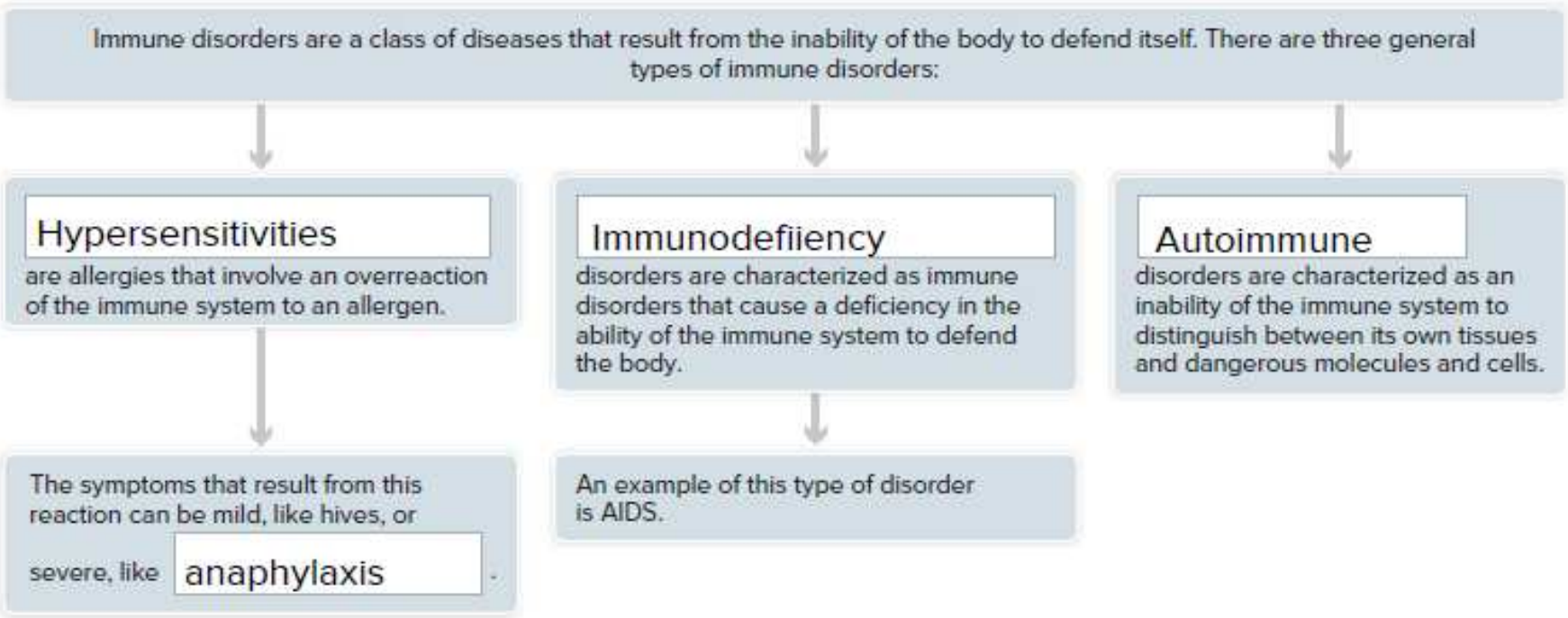
Immune disorders, Figure 1.15



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Chapter Review Questions

Multiple Select: Select the correct choices for each statement. The choices may be all correct, all incorrect, or any combination of correct and incorrect.

1. Which of the following statements use(s) anatomical terms of direction correctly?
   a. The anterior surface of the arm has the most hair.
   b. The liver is distal to the diaphragm.
   c. The elbow is superior to the wrist.
   d. The cubital region is proximal to the carpal region.
   e. The esophagus is posterior to the heart.

2. Which of the following statements is (are) correct concerning anatomical regions?
   a. The plantar region is part of the appendicular region.
   b. The palmar region is part of the axial region.
   c. The abdominal region is superior to the pelvic region.
   d. The pelvic region is part of the appendicular region.
   e. The cranial region is superior to the cervical region.

3. When would a health care provider need to use a differential diagnosis?
   a. to help determine a diagnosis when more than one possible disease is responsible for the patient's condition
   b. to help determine a prognosis
   c. to help determine a treatment plan
   d. to help obtain a chief complaint
   e. to help determine which medications to prescribe

4. What is the definition of *disease?*
   a. a disturbance in homeostasis
   b. a normal function of the human body
   c. an abnormal function of the human body that results in the inability to maintain homeostasis
   d. the ability of the body to reestablish balance
   e. the inability of the body to maintain levels within the normal range

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5. How does age act as a predisposing factor of disease?
   a. Age does not act as a predisposing factor of disease.
   b. Children and elderly people are more susceptible to disease due to the state of their immune systems.
   c. All organs regenerate as the body gets older; therefore, age does not have an effect on disease.
   d. Children are more vulnerable to infectious disease.
   e. As the body ages, there is a general reduction in function at the cellular level.

6. What is the difference in signs and symptoms of disease?
   a. Signs can be measured.
   b. Signs cannot be measured.
   c. Symptoms can be measured.
   d. Symptoms cannot be measured.
   e. Signs and symptoms can both be measured.

7. What is the function of pain?
   a. protection of an injured body part
   b. an alert that there is a potential problem with a particular part of the body
   c. a defense mechanism
   d. a signal for a person to take medication
   e. a test of how much discomfort a person can tolerate

8. What are the signs of inflammation?
   a. bluish skin color
   b. heat
   c. swelling
   d. pus
   e. pain

9. When is palliative treatment used?
   a. when the patient's condition is responding to medication

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b. when the focus of patient care is making the patient comfortable, not curing the disease
c. when the patient's condition can be cured
d. when the patient needs therapy to improve his or her condition
e. when the health care provider wants to teach the patient ways to avoid a particular disease

10. What is the definition of *epidemiology?*
a. the study of disease
b. the study of the prevalence of disease
c. the study of the incidence of disease
d. the study of the spread of disease
e. the study of the effect of disease on the population

Matching: Match the organ to the cavity in which it is located.

___*C*___1. Pleural cavity	a. Uterus
___d_____2. Pericardial cavity	b. Brain
___e 3. Abdominal cavity	c. Lung
___a 4. Pelvic cavity	d. Heart
___b 5. Cranial cavity	e. Liver

Matching: Match the following steps of determining a diagnosis to the purpose of that step. Choices may be used more than once.

__*a*___6. Obtaining a medical history a. Allows the health care provider to establish a baseline of what is normal for that patient

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__*b, c*__ 7. Performing a diagnostic test

__*b, c*__ 8. Performing a medical examination

__*b, c*__ 9. Performing a routine screening of that patient

__*d*__ 10. Comparing results with normal findings

b. Allows the health care provider to determine whether the patient falls within the normal range

c. Allows the health care provider to assess the patient for any abnormal findings

d. Allows the health care provider to determine whether the patient's test results indicate the presence of disease

Completion: Complete the following statements. Use a term for an anatomical plane to complete the following statements concerning the cadaver images in Figures 1.16-1.18.

1. The body in Figure 1.16 was cut along a *transverse* plane.

2. The body in Figure 1.17 was cut along a *frontal/coronal* plane.

3. The body in Figure 1.18 was cut along a *sagittal* plane.

4. The definition of homeostasis is *the maintenance of a stable internal environment in which the body functions best.*

5. The definition of physiology is *the study of how structures in the body function.*

6. Dilation of blood vessels during inflammation results in the symptoms of *redness, heat, swelling, and pain.*

Critical Thinking:

1. An arrow entered the left axillary region of a hunter and lodged in his heart. List in order the layers of serous membrane the arrow would have pierced. (Hint: You may want to sketch the arrow entering the thorax, and the relative serous membranes.)

The arrow would have pierced the parietal pleura, and then the visceral pleura before entering the left lung, then the visceral pleura, the parietal pleura, the parietal pericardium, and the visceral pericardium before entering and lodging in the heart.

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2. What anatomical plane of the body would be used to illustrate the relative position of the liver, stomach, and spinal column?

The transverse plane would best show these relative positions. The liver, stomach, and spinal column are all in the same area in a frontal view, they will not all be seen in a sagittal view, but in the transverse plane you can see the liver on the right, the stomach on the left, and the spinal column centrally located behind them.

What anatomical plane of the body would be used to illustrate the relative position of the urinary bladder, the stomach, and the liver?

The frontal plane would best show these relative positions. The urinary bladder, stomach, and liver are not able to be seen in a sagittal view nor transverse view. In the frontal plane you can see the liver on the right, the stomach on the left, and the urinary bladder centrally located below them.

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3. In the textbook, you explored how important it is for the body to maintain homeostasis to avoid disease. What are some ways that the body maintains homeostasis?

Answers will vary.

In the presence of disease, what are some examples of the body not maintaining homeostasis?

Answers may vary but should include fever, malaise, inflammation, pain, and abnormal results of diagnostic exams.

Case Study:

1. A patient comes to the emergency room with an elevated heart rate and a low blood pressure that continues to fall. He is diagnosed as having a bleeding ulcer. The bleeding is stopped with medical intervention and he is given a blood transfusion. His heart rate and blood pressure return to normal. What homeostatic feedback mechanisms, if any, are evident in this situation?

The bleeding of the ulcer caused the blood pressure to fall. The heart responded by beating faster to create more blood pressure (negative feedback). This however, caused more bleeding, which lowered the blood pressure even further (positive feedback). All of this reinforces that negative feedback mechanisms sometimes require medical intervention to return the body to homeostasis.

2. A patient comes into the clinic experiencing frequent urination and excessive thirst. Describe the steps involved in determining a diagnosis for this patient.

Refer to the chart in textbook Clinical Point, page 23.

3. What questions may be asked when obtaining the patient's chief complaint?

How often do they urinate? How often do they feel thirsty? What is their diet like? Do they exercise? Do they smoke? Others…

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