

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 <i>anatomy</i> , <i>physiology</i> , and <i>pathology</i> .	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 <i>homeostasis</i> 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 <i>negative feedback</i> and <i>positive feedback</i> 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 <i>disease</i> 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 <i>predisposing factors</i> 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

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 <i>diagnosis</i> 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 <i>differential diagnosis</i> 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 <i>epidemiology</i> 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

Summary Table 1

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.1 Define <i>anatomy</i> , <i>physiology</i> , and <i>pathology</i> .	1.1 Overview	Workbook Concept Maps: (For answers, see below) ☐ Figure 1.12 Homeostasis concept	Workbook Review Questions: ☐ Completion: 5 ☐ Critical Thinking: 1
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

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.2 <i>Continued</i>	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	

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

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.4 Define <i>homeostasis</i> 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 <i>negative feedback</i> and <i>positive feedback</i> 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 <i>disease</i> and describe the relationship between disease and	1.4 Terms of Pathology A. Introduction to Disease		Workbook Chapter Review Questions: ☐ Critical Thinking: 3

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.7 Define <i>predisposing factors</i> 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

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 <i>diagnosis</i> 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

Learning Outcome	Lecture Outline	Activities—Talking Points	Assessments
1.12 Define <i>differential diagnosis</i> 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 <i>epidemiology</i> 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

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.

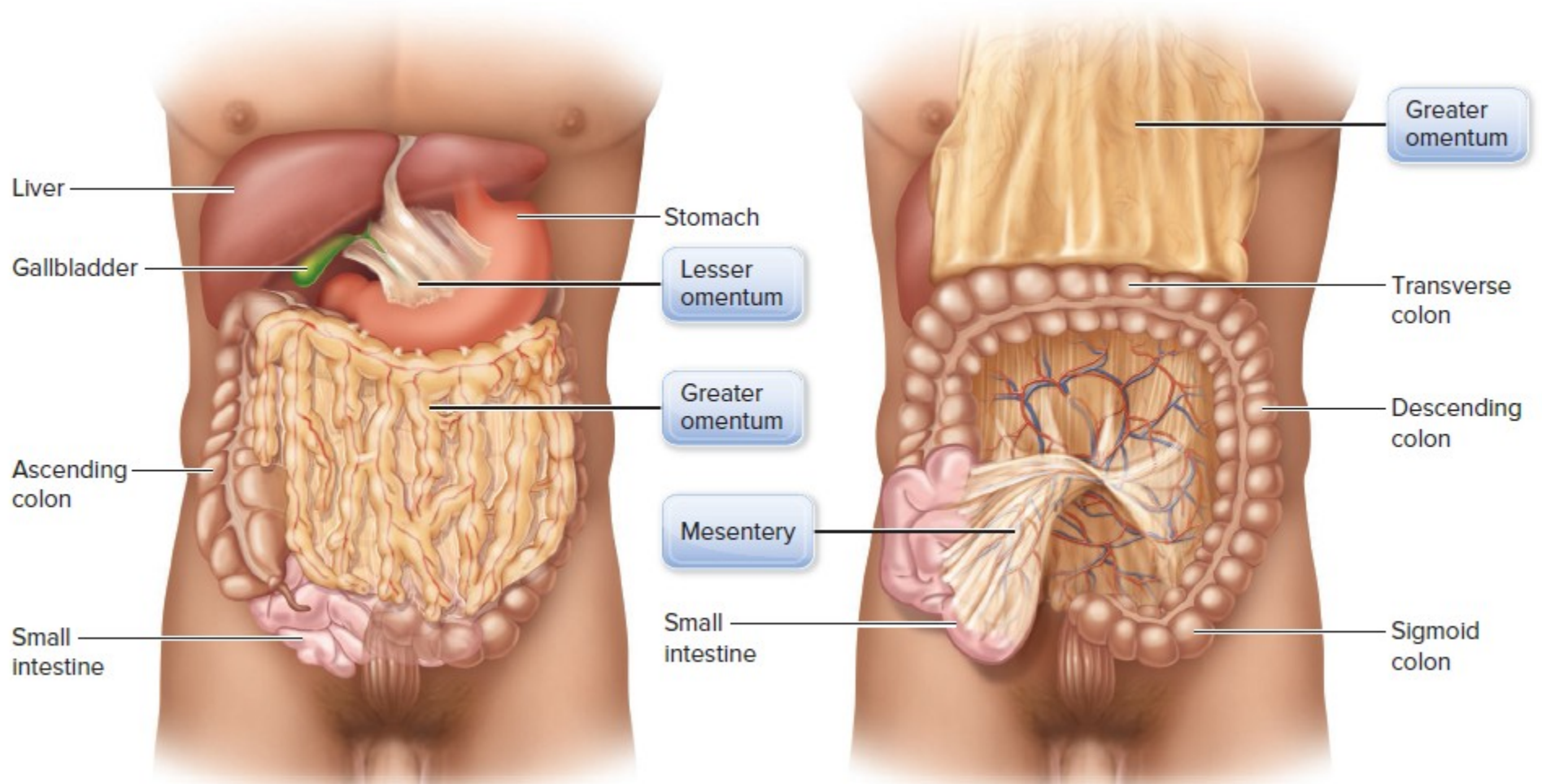
Discussion 1: Anatomical terms

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.*

Learning Outcome 1.3

Quiz 1.1

Use Text Figure 1.13 for this quiz.



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.

Learning Outcome 1.14

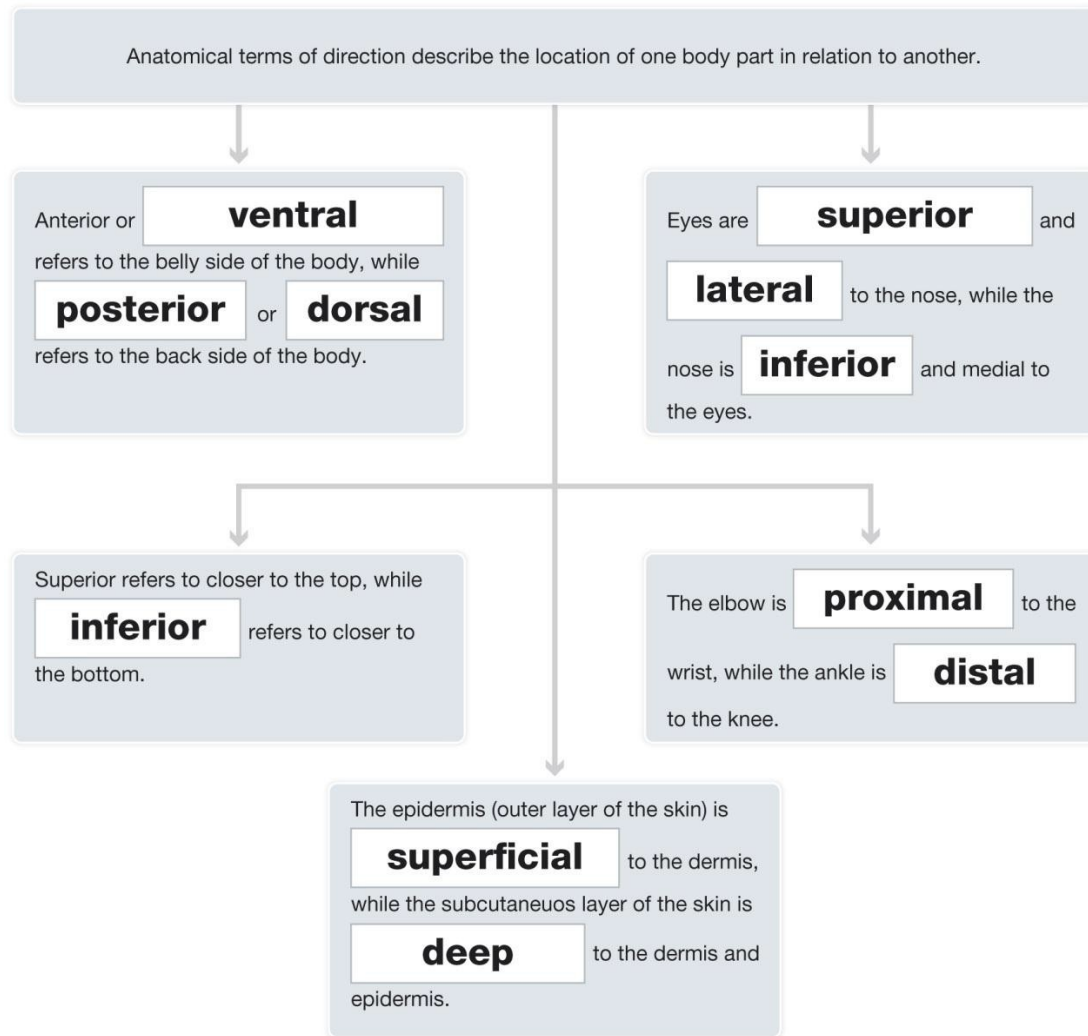
Discussion 3: Epidemiology

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 R_0 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.

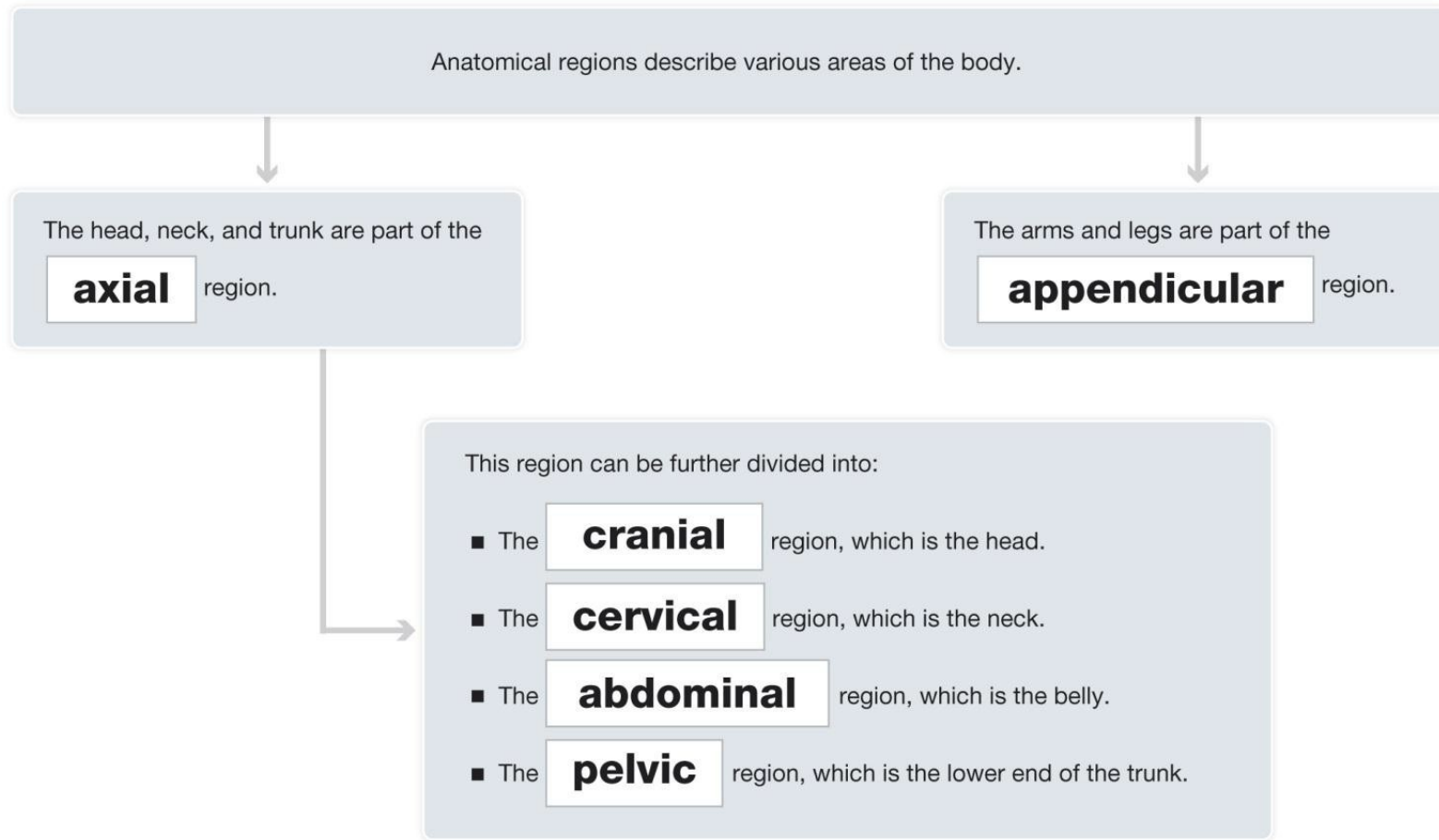
The new strain would spread faster due to the higher R_0 (transmissibility). Each infected individual will infect more people than if they had the original coronavirus. The disease would not be more severe. The same CFR means that the percentage of deaths will remain the same, but the actual number of deaths will increase because the number of infections has increased.

Workbook Key Word Concept Maps

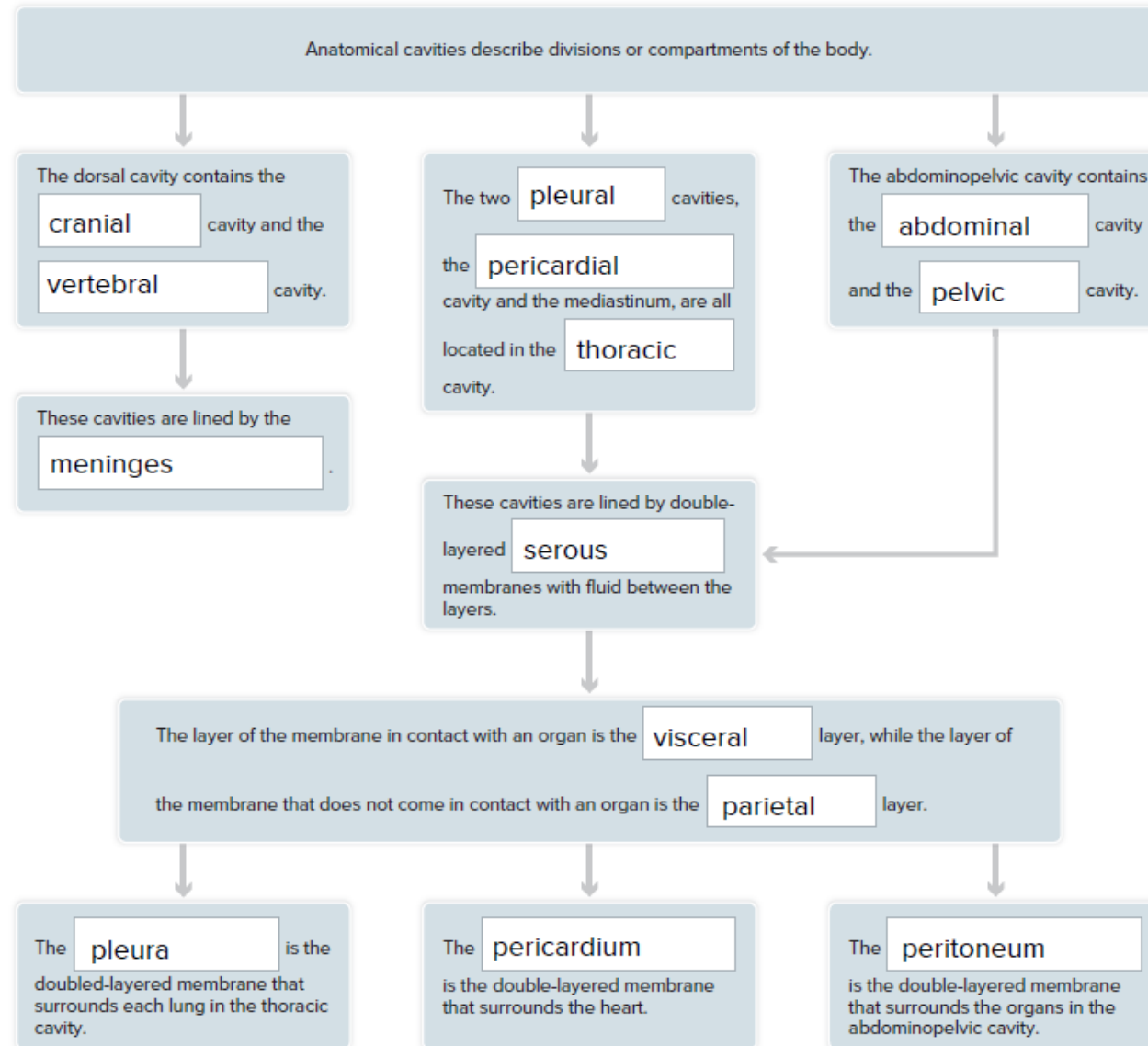
Anatomical terms, Figure 1.9



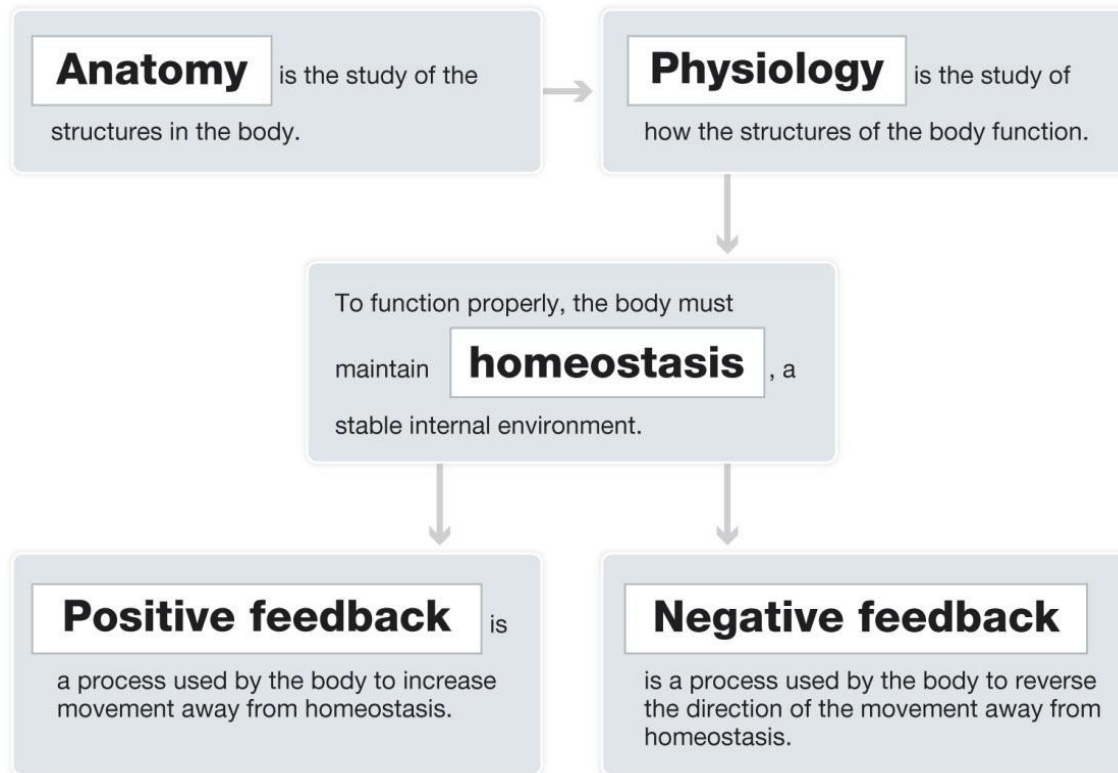
Anatomical regions, Figure 1.10



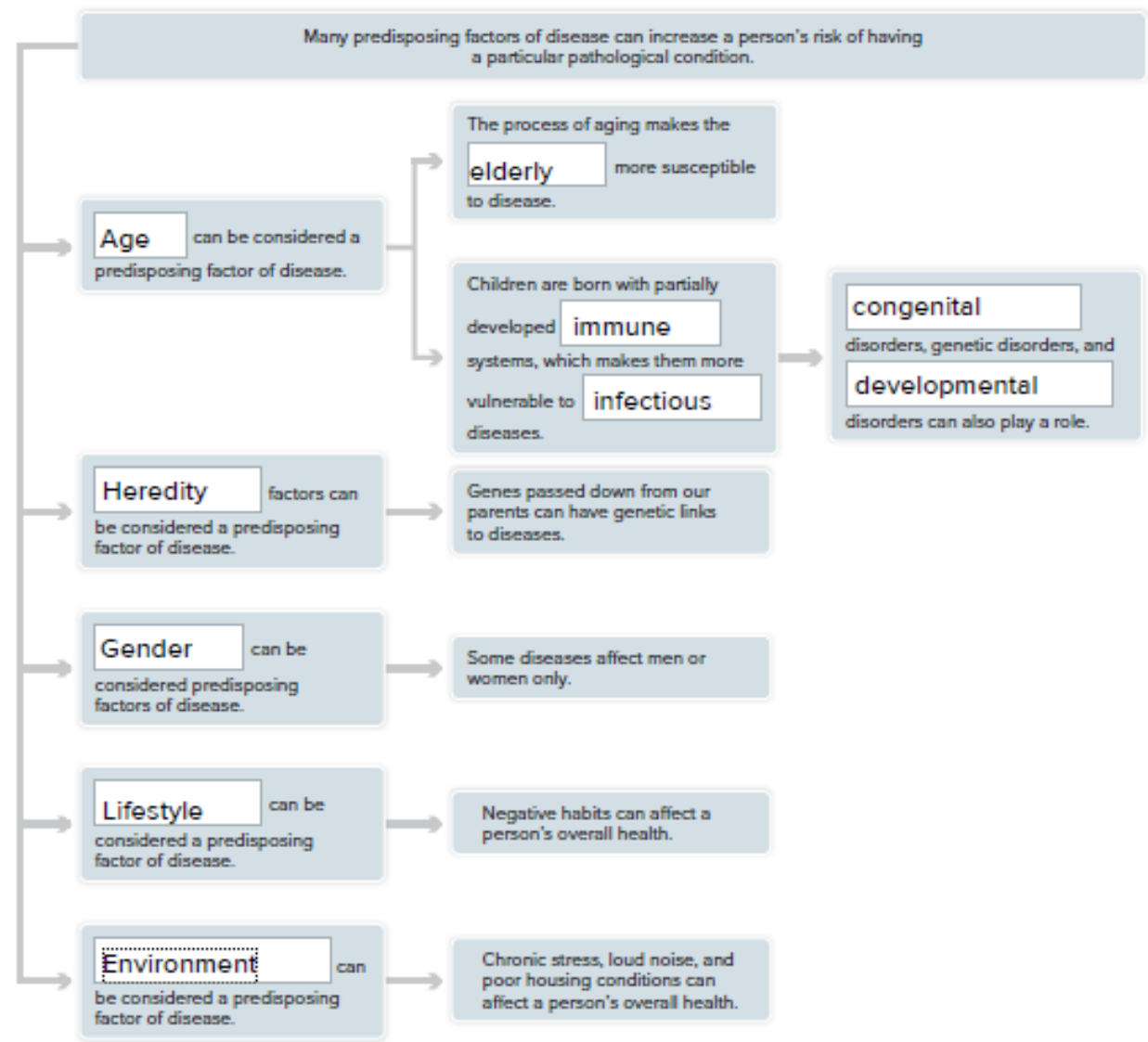
Anatomical cavities, Figure 1.11



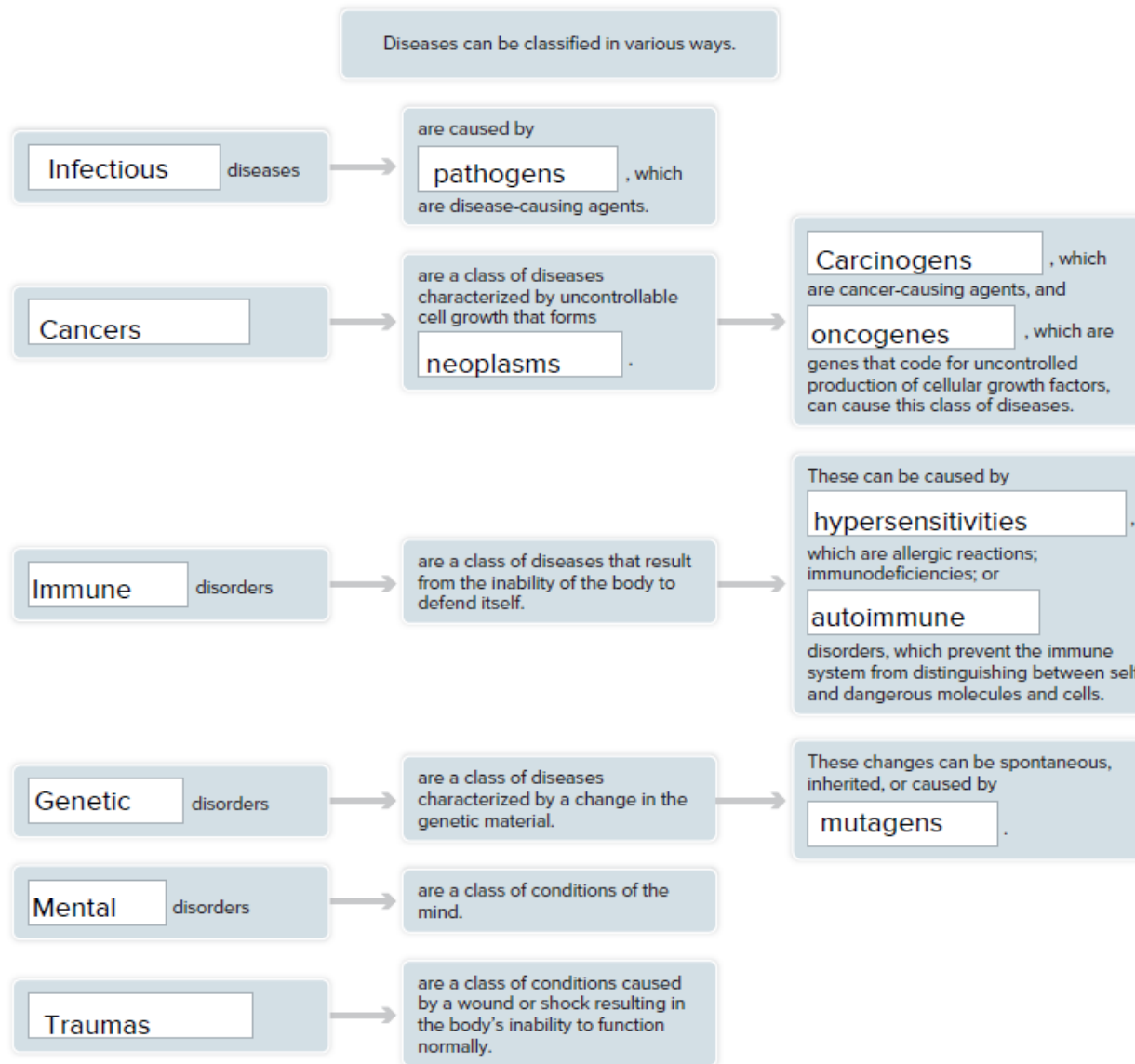
Homeostasis, Figure 1.12



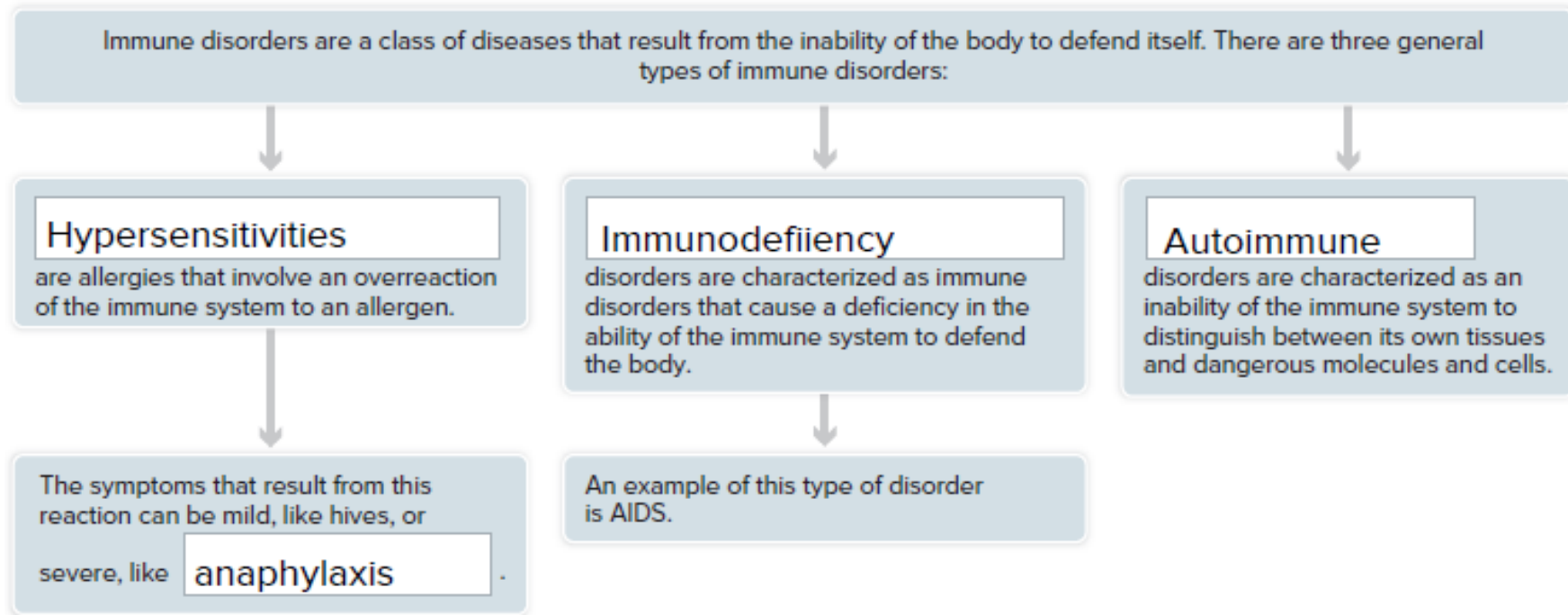
Predisposing factors of disease, Figure 1.13



Classification of disease, Figure 1.14



Immune disorders, Figure 1.15



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*

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?

IM Ch 1

- 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. *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 |
|--|---|

b, c 7. Performing a diagnostic test
normal range

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

 b, c 8. Performing a medical examination

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

 b, c 9. Performing a routine screening of that patient
indicate the

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

 d 10. Comparing results with normal findings

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.

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.

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...

