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CHAPTER

1

Introduction to the Human Body



Module 1

Body Orientation

CHAPTER OUTLINE

Selected Key Terms

1.1 Anatomy and Physiology

1.2 Levels of Organization

1.3 Directional Terms

1.4 Body Regions

1.5 Body Planes and Sections

1.6 Body Cavities

1.7 Abdominopelvic Subdivisions

1.8 Maintenance of Life

Clinical Insights and Critical Thinking

SELECTED KEY TERMS

Anatomy (ana = apart; tom = to cut) The study of the structure of living organisms.

Appendicular (append = to hang) Pertaining to the upper and lower limbs.

Axial (ax = axis) Pertaining to the longitudinal axis of the body.

Body region (regio = boundary) A portion of the body with a special identifying name.

Directional term (directio = act of guiding) A term that references how the position of a body part relates to the position of another body part.

Effector (efet = result) A structure that functions by performing an action that is directed by an integrating center.

Homeostasis (homeo = same; sta = make stand or stop)

Maintenance of a relatively stable internal environment.

Integrating center (integratus = make whole) A structure that functions to interpret information and coordinate a response.

Metabolism (metabole = change) The sum of the chemical reactions in the body.

Parietal (paries = wall) Pertaining to the wall of a body cavity.

Pericardium (peri = around; cardi = heart) The membrane surrounding the heart.

Peritoneum (ton = to stretch) The membrane lining the abdominal cavity and covering the abdominal organs.

Physiology (physio = nature; logy = study of) The study of the function of living organisms.

Plane (planum = flat surface) Imaginary two-dimensional flat surface that marks the direction of a cut through a structure.

Pleura (pleura = rib) The membrane lining the thoracic cavity and covering the lungs.

Receptor (recipere = receive) A structure that functions to collect information.

Section (sectio = cutting) A flat surface of the body produced by a cut through a plane of the body.

Serous membrane (serum = watery fluid; membrana = thin layer of tissue) A two-layered membrane that lines body cavities and covers the internal organs.

Visceral (viscus = internal organ) Pertaining to organs in a body cavity.

1.1 Anatomy and Physiology

Learning Objective

1. Define anatomy and physiology.

1. Write the terms that match the phrases in the spaces at the right.

a) The study of tissues

b) The study of body organization and structure

c) The study of body functions

Microanatomy or histology

Human anatomy

Human physiology

1.2 Levels of Organization

Learning Objectives

2. Describe the levels of organization in the human body.

3. List the major organs and functions for each organ system.

1. List the levels of organization from the most complex to the simplest.

a) Organ system

b) Organ

c) Tissue

d) Cells

e) Organelle

f) Molecules

2. Write the terms that match the phrases in the spaces at the right.

a) A coordinated group of organs.

b) Structural and functional units of the body.

c) An aggregation of similar cells.

Organ system

Cells

Tissue

3. Match the names of the organ systems with the phrases.

Cardiovascular

Digestive

Endocrine

Female Reproductive

Integumentary

Lymphoid

Male Reproductive

Muscular

Nervous

Respiratory

Skeletal

Urinary

a) Stomach, liver, intestines.

b) Brain, spinal cord, nerves.

c) Secretes hormones.

d) Skin, hair, nails.

e) Returns lymph to blood; provides immunity.

f) Bones, ligaments, cartilages.

g) Contraction enables movement.

h) Transports materials to and from cells.

Digestive

Nervous

Endocrine

Integumentary

Lymphoid

Skeletal

Muscular

Cardiovascular

- i) Kidneys, ureters, urinary bladder.
- j) Testes, penis, prostate.
- k) Ovaries, uterine tubes, uterus, vagina.
- l) Blood, heart, arteries, veins.
- m) Supports the body.
- n) Secretes hormones that regulate functions.
- o) Regulates volume of body fluids.
- p) Protects underlying tissues.
- q) Rapid coordination of body functions.
- r) Digests food and absorbs nutrients.
- s) Gas exchange between air and blood.
- t) Larynx, trachea, bronchi, and lungs.

 Urinary

 Male reproductive

 Female reproductive

 Cardiovascular

 Skeletal

 Endocrine

 Lymphoid

 Integumentary

 Nervous

 Digestive

 Respiratory

 Respiratory

1.3 Directional Terms

Learning Objective

4. Use directional terms to describe the locations of body parts.

1. Provide the term that correctly completes each statement.

- a) The head is _____ to the neck.
- b) The hand is _____ to the wrist.
- c) The skin is _____ to the muscles.
- d) The mouth is _____ to the nose.
- e) The elbow is _____ to the wrist.
- f) The ear is on the _____ surface of the head.
- g) The umbilicus is on the _____ body surface.
- h) The hip is on the _____ body surface.
- i) The buttocks are on the _____ body surface.

 superior (cephalic)

 distal

 superficial (external)

 inferior

 proximal

 lateral

 anterior (ventral)

 lateral

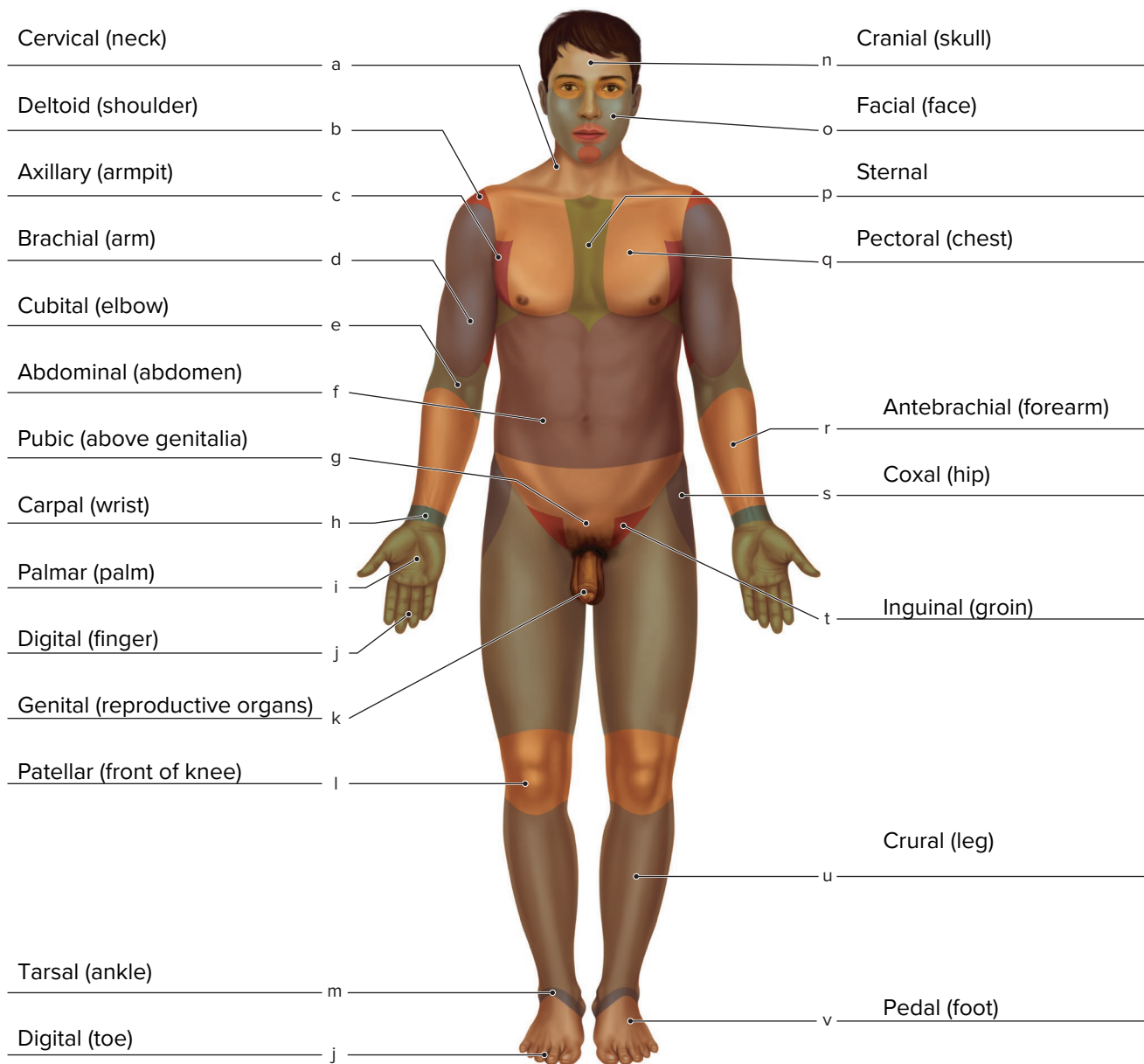
 posterior (dorsal)

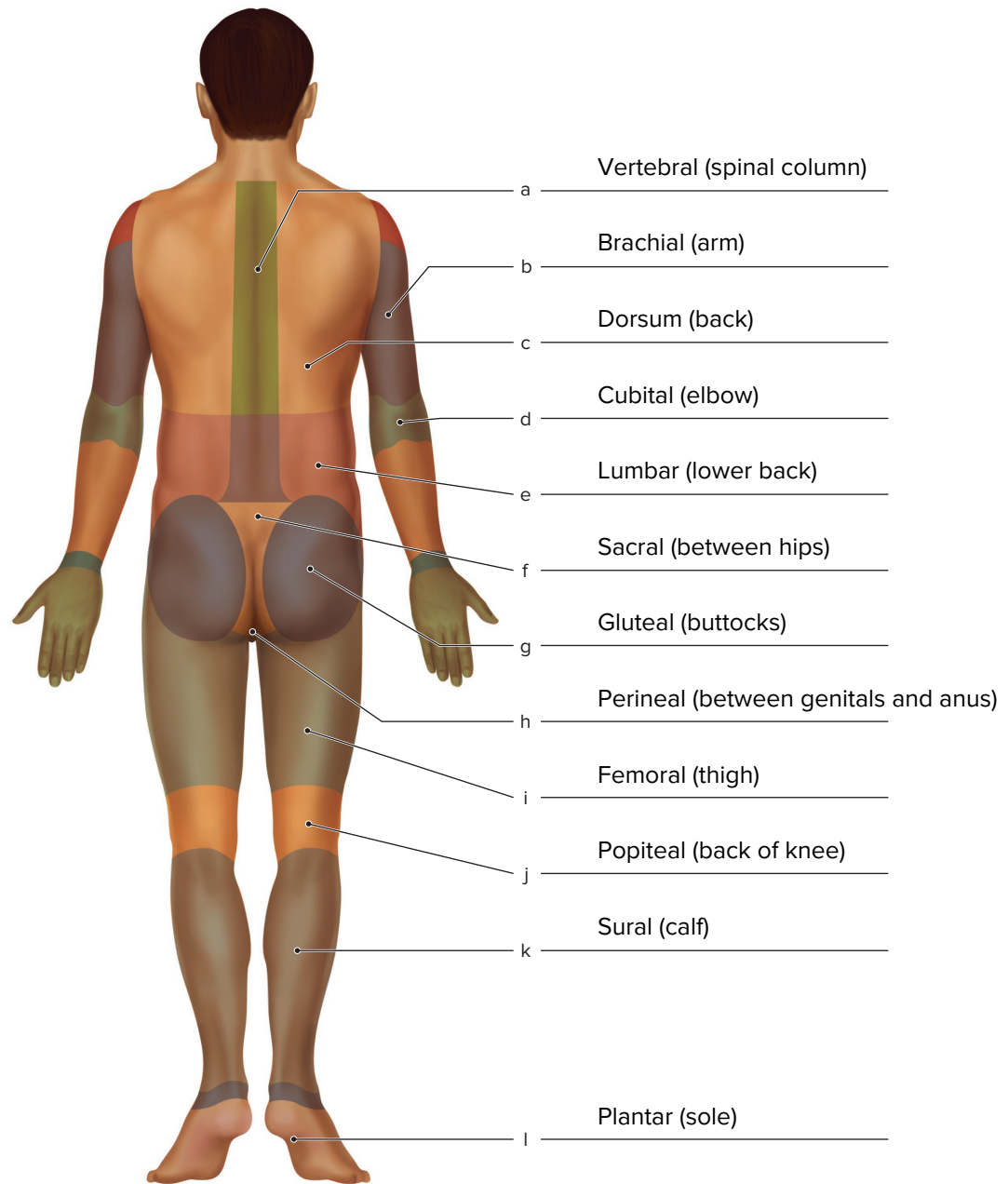
1.4 Body Regions

Learning Objective

5. Locate the major body regions on a diagram or anatomical model.

1. Label the body regions by placing the correct term in the space by the correct label. (See text figure 1.4 Major Regions of the Body.) **APR**





1.5 Body Planes and Sections

Learning Objective

6. Describe the three planes used in making sections of the body or body parts.

1. Name the planes that match the statements.
 - a) Divides the body into equal left and right halves.
 - b) Divides the body into superior and inferior portions.
 - c) Divides the body into left and right portions.
 - d) Divides the body into anterior and posterior portions.
 - e) Any cut along the longitudinal axis of a structure.
 - f) Any cut at a 90° angle to the longitudinal axis of a structure.
 - g) A plane between the longitudinal axis and a 90° angle of a structure.

Median

Transverse

Sagittal

Frontal (coronal)

Longitudinal

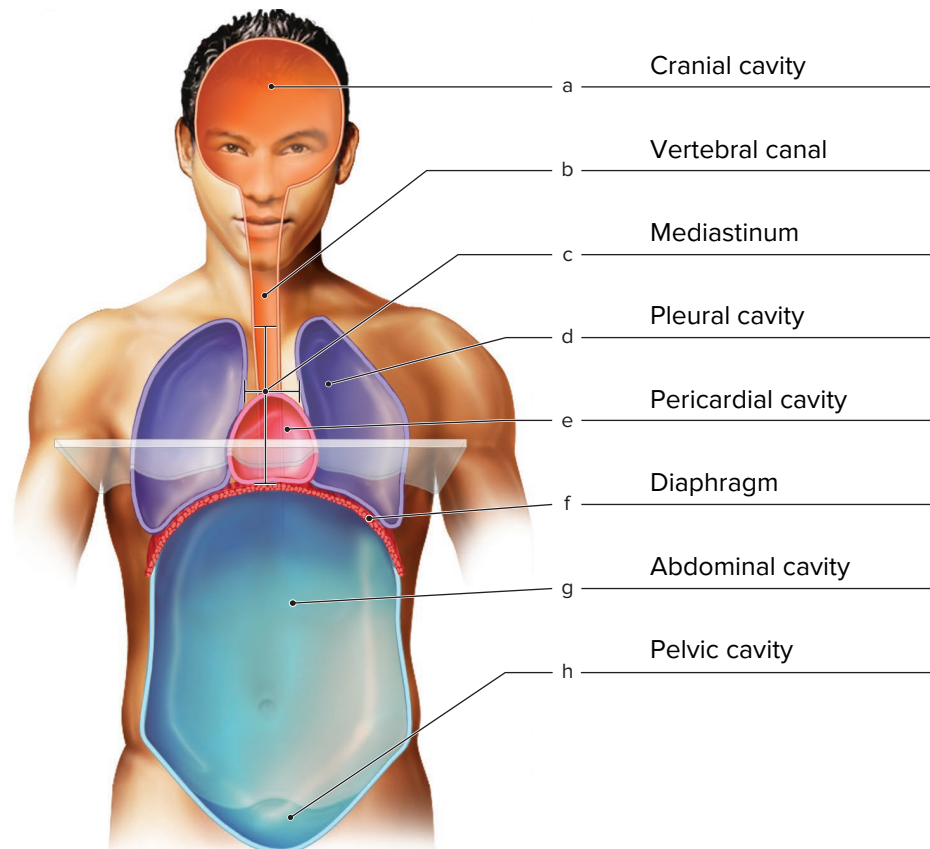
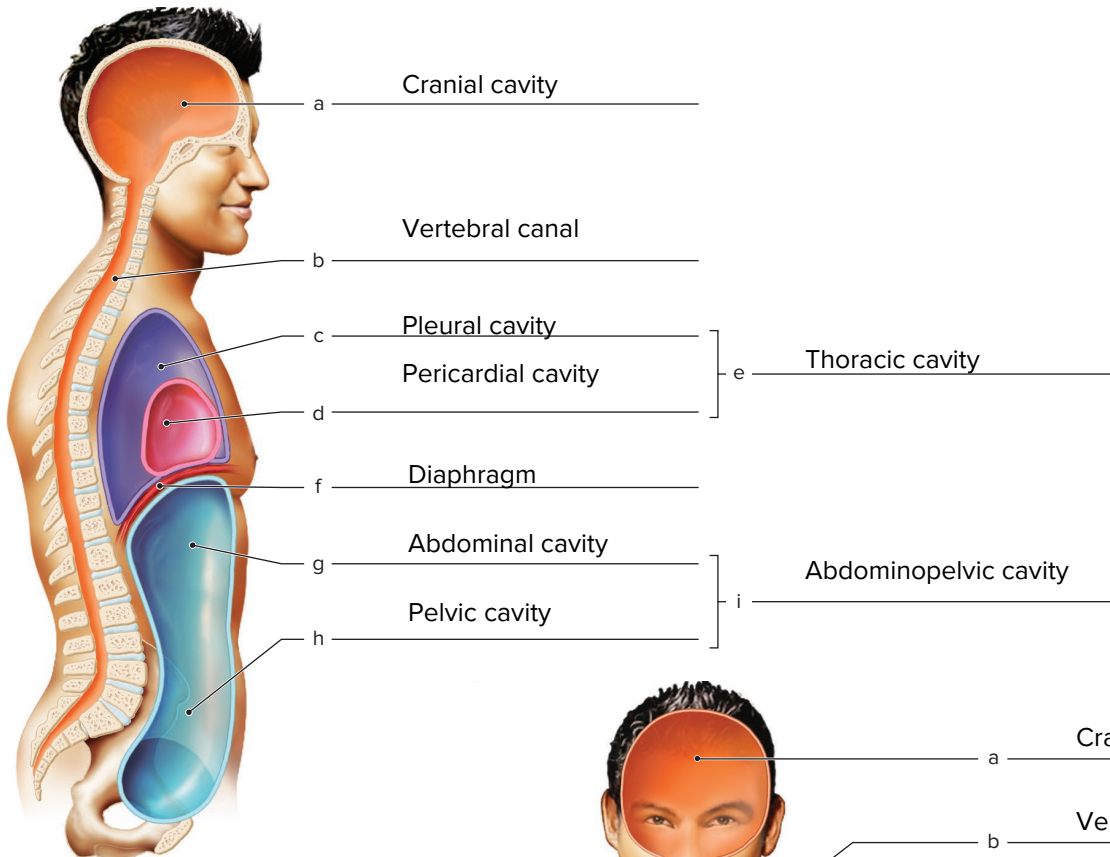
Cross section

Oblique

1.6 Body Cavities

Learning Objectives

7. Locate the body cavities and their subdivisions and membranes on a diagram.
 8. Name the organs located in each body cavity.
1. Label the body cavities and related structures by placing the correct term in the space by the correct label.
(See text figure 1.6 Body Cavities and Their Subdivisions.) **APR**



2. Place the letter of the cavity where the organ is located in the blank beside the organ name. Answers may be used more than once.

a) Abdominal cavity	c) Mediastinum	e) Pleural cavity
b) Cranial cavity	d) Pelvic cavity	f) Vertebral canal
<u> b </u> Brain	<u> e </u> Lungs	<u> a </u> Stomach
<u> a </u> Gallbladder	<u> d </u> Rectum	<u> c </u> Thymus
<u> c </u> Heart	<u> a </u> Small intestine	<u> d </u> Urinary bladder
<u> a </u> Liver	<u> f </u> Spinal cord	

3. Write the names of the membranes that match the statements in the spaces at the right.

a) Covers the surface of the heart.	<u>Visceral pericardium</u>
b) Covers the surface of the stomach.	<u>Visceral peritoneum</u>
c) Lines the abdominal cavity.	<u>Parietal peritoneum</u>
d) Surrounds the brain.	<u>Meninges</u>
e) Lines the thoracic cavity.	<u>Parietal pleura</u>
f) Lines the vertebral canal.	<u>Meninges</u>
g) Covers the surface of the lungs.	<u>Visceral pleura</u>
h) Forms double-layered membrane sac around heart.	<u>Serous pericardium</u>
i) Double-layered membranes supporting abdominal organs.	<u>Mesenteries</u>

1.7 Abdominopelvic Subdivisions

Learning Objectives

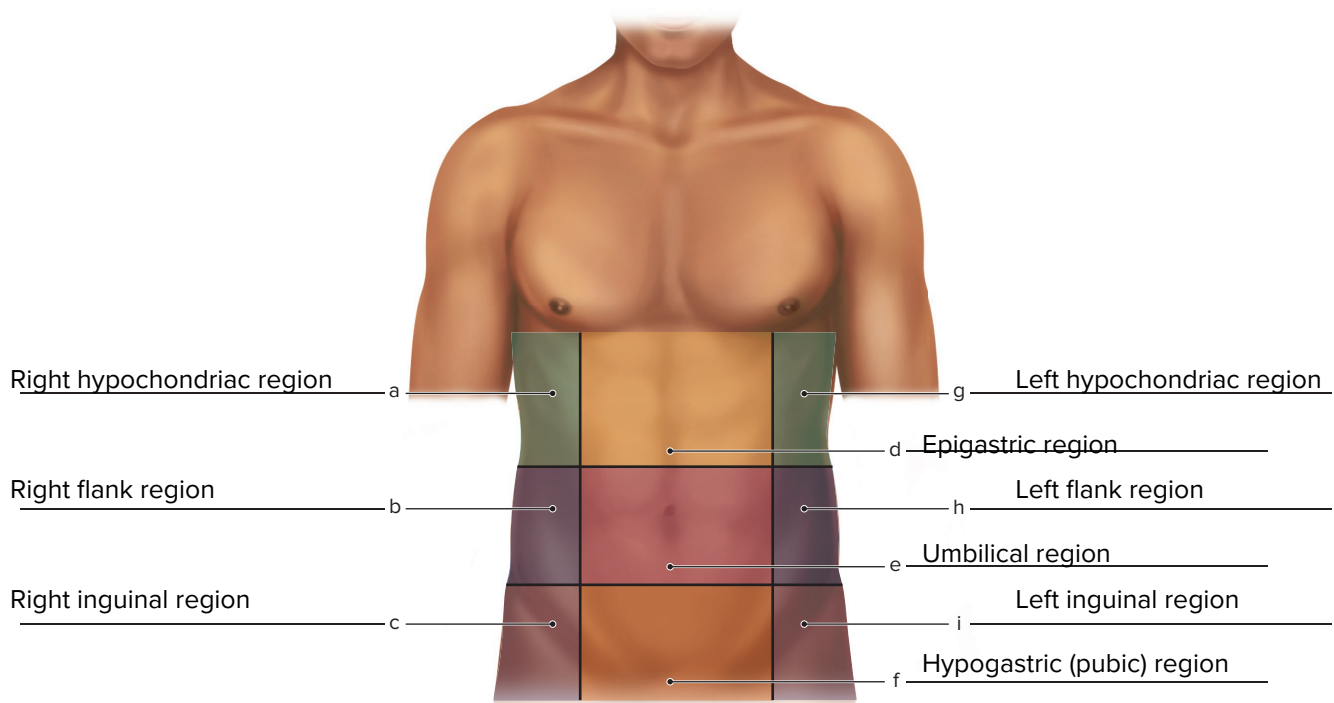
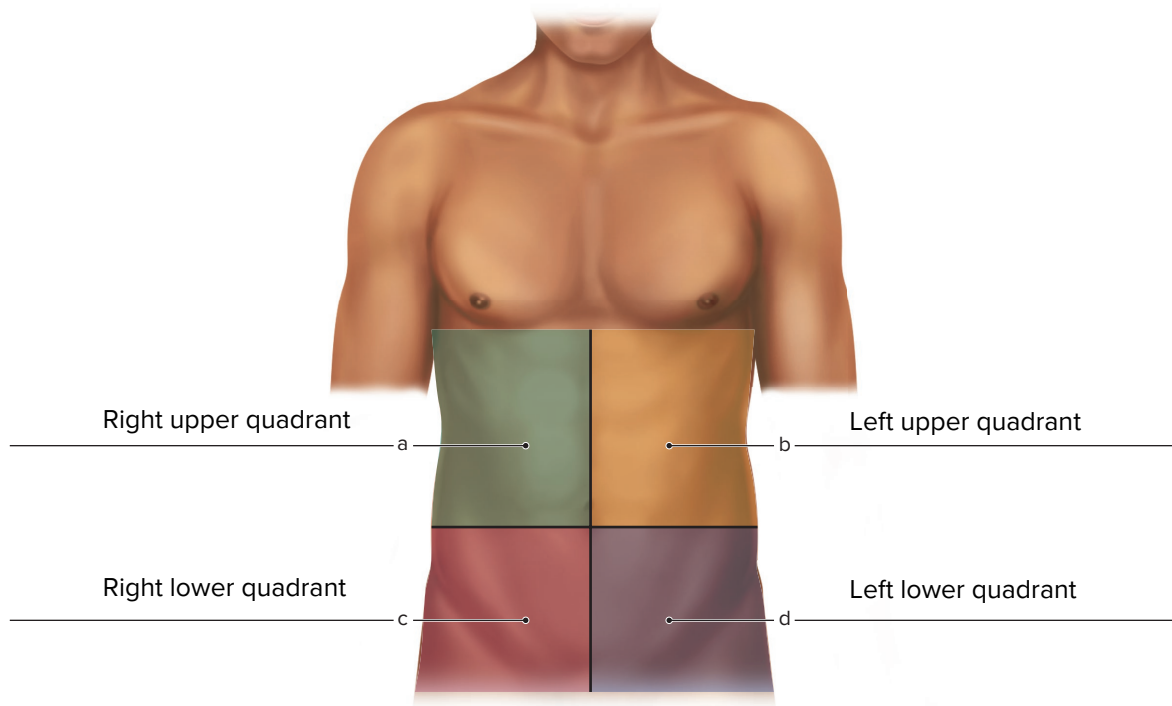
9. Name the abdominopelvic quadrants and regions.

10. Locate the abdominopelvic quadrants and regions on a diagram.

1. Select the abdominopelvic quadrant and abdominopelvic region in which the following structures are located.

Quadrants	Regions	
a) Right upper	e) Epigastric	j) Right hypochondriac
b) Left upper	f) Left hypochondriac	k) Right inguinal
c) Right lower	g) Left inguinal	l) Right flank
d) Left lower	h) Left flank	m) Umbilical
	i) Pubic	
<u> a; j </u> Gallbladder	<u> b; e </u> Stomach	
<u> b; f </u> Spleen	<u> c; l </u> Cecum	
<u> d; f </u> Rectum	<u> c; d; i </u> Urinary bladder	
<u> a; j </u> Right kidney	<u> b; h </u> Left kidney	
<u> c; g </u> Appendix	<u> a; b; e </u> Pancreas	

2. Label the abdominopelvic quadrants and abdominopelvic regions by writing the correct terms in the spaces within the diagram. (See text figure 1.9 Abdominopelvic Subdivisions.) **APR**



1.8 Maintenance of Life

Learning Objectives

11. Define metabolism, anabolism, and catabolism.
12. List the five basic needs essential for human life.
13. Define homeostasis.
14. Explain how homeostasis relates to both healthy body functions and disorders.
15. Describe the general mechanisms of negative-feedback and positive-feedback.

1. Write the terms that match the statements in the spaces at the right.

a) Maintenance of a dynamic balance of substances
in body fluids.

Homeostasis

b) Breakdown of complex substances.

Catabolism

c) Synthesis of complex substances.

Anabolism

d) Mechanism regulating homeostasis.

Homeostatic mechanism

e) Sum of the chemical reactions that occur in the body.

Metabolism

f) List the five basic needs essential for human life.

Food

Water

Oxygen

Body temperature close to 36.8 degrees Celsius

Atmospheric pressure

g) Components of a negative-feedback mechanism.

Receptor

Integrating center

Effector

Clinical Insights and Critical Thinking

1. A patient complains of pain in the epigastric region. What organs may be involved? _____
The liver, pancreas, gallbladder, stomach, and portions of the small intestine and colon are all
in the epigastric region.
2. A patient complains of pain in the right lower quadrant. What organs may be involved? _____
Appendix, portions of the small and large intestine.
3. How is homeostasis related to health and disease? _____
Homeostasis is the maintenance of a stable internal environment,
which is necessary to maintain health. Often, disease is an inability to maintain homeostasis.
4. A hypoglycemic (low blood glucose level) patient is given orange juice to drink. Explain how this increases the
blood glucose level and the organ systems involved. _____
The orange juice contains sugar. It is ingested and absorbed via the digestive system.
The sugar is now in the blood of the cardiovascular system.

5. Describe the location of the kneecap in as many ways as you can using directional terms. _____
The kneecap is inferior to the thigh. The kneecap is superior to the shin (crural region).
The kneecap is on the anterior surface of the body.
6. Describe where serous membranes are located in the body, name the three types of serous fluid, and explain the function of serous fluid. _____
Serous membranes line body cavities that are "closed" to the outside environment. Cavities include the pericardial cavity, which contains the serous fluid called pericardial fluid; the pleural cavity, which contains pleural fluid; and the peritoneal cavity, which contains peritoneal fluid. The fluid lubricates the parietal and visceral layers of the serous membranes.
7. Explain how negative-feedback mechanisms regulate homeostasis. _____
Negative-feedback mechanisms contain receptors, which detect changes, integrating centers, which determine what a normal range for a variable is, and effectors, which impact changes. Together, these work to minimize changes in the body and maintain a stable internal environment.

Corret Answers are located at the end of each chapter.

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

1) Gross anatomy can best be studied using a microscope.

- ☐ true
- ☐ false

2) Physiology can best be studied using dissections.

- ☐ true
- ☐ false

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

3) The term used to describe something pertaining to the internal organs is _____.

- A) visceral
- B) proximal
- C) peripheral
- D) deep

4) The term peripheral refers to a structure that is _____.

- A) toward the abdominal surface
- B) away from the body surface
- C) away from the center of the body
- D) to the left of the midline

5) The chin is _____ to the mouth, and the knee is _____ to the ankle.

- A) anterior; distal
- B) inferior; distal
- C) superior; proximal
- D) inferior; proximal

- 6) The integumentary system is made up of the _____.
A) bones, ligaments, and cartilage
B) hormone-producing glands
C) brain, spinal cord, and nerves
D) skin, hair, nails, and associated glands
- 7) A tissue is _____.
A) an organ with specific functions
B) organs grouped together
C) the structural and functional units of the body
D) a group of cells that perform similar functions
- 8) The lowest level of organization in the body is the _____ level.
A) organ
B) tissue
C) chemical
D) cellular
- 9) A(n) _____ consists of a group of tissues working together to perform specific functions.
A) organ
B) tissue
C) molecule
D) organelle
- 10) The simplest structures in which the processes of life occur are _____.
A) organs
B) tissues
C) molecules
D) cells

- 11) Blood, the heart, and blood vessels compose the _____ system.
- A) cardiovascular
 - B) pulmonary
 - C) lymphatic
 - D) endocrine
- 12) The study of the structure and organization of the human body is _____.
- A) histology
 - B) physiology
 - C) chemistry
 - D) anatomy
- 13) A feedback mechanism that returns the body to homeostasis is _____.
- A) positive feedback
 - B) negative feedback
 - C) hormone feedback
 - D) nervous feedback
- 14) A negative feedback mechanism contains what three components?
- A) A reflex, an effect, and a chemical signal
 - B) A receptor, a reflex, and a chemical signal
 - C) A receptor, an integration center, and an effector
 - D) A chemical signal, an integration center, and a reflex
- 15) A feedback mechanism that amplifies the stimulus is called _____.
- A) positive feedback
 - B) negative feedback
 - C) hormone feedback
 - D) nervous feedback

- 16) In anatomical terms, the forearm is the _____ region and the fingers are the _____ region.
- A) patellar; plantar
 - B) antecubital; palmar
 - C) antebrachial; digital
 - D) crural; tarsals
- 17) In anatomical terms, the elbow is the _____ region.
- A) axillary
 - B) cubital
 - C) brachial
 - D) pedal
- 18) The plane that divides the body into superior and inferior portions is the _____.
- A) sagittal
 - B) transverse (horizontal)
 - C) frontal (coronal)
 - D) paramedian
- 19) The plane that separates the body into the front and back, or anterior and posterior portions, is the _____ plane.
- A) frontal (coronal)
 - B) median
 - C) sagittal
 - D) transverse (horizontal)
- 20) A _____ plane is a plane that cut in between the longitudinal and cross-sectional axes.
- A) oblique
 - B) median
 - C) sagittal
 - D) transverse (horizontal)

- 21) Which body cavities are almost completely surrounded by bone?
- A) Abdominal and pelvic cavities
 - B) Thoracic and abdominal cavities
 - C) Cranial cavity and vertebral canal
 - D) Thoracic cavity and vertebral canal
- 22) The mediastinum, pleural, and pericardial cavities are contained within the_____.
- A) abdominal cavity
 - B) thoracic cavity
 - C) pelvic cavity
 - D) cranial cavity
- 23) Which quadrant is the stomach located within?
- A) Left upper quadrant
 - B) Lower left quadrant
 - C) Right upper quadrant
 - D) Right lower quadrant
- 24) All the chemical reactions within a cell or organism are known as_____.
- A) anabolic reactions
 - B) catabolic reactions
 - C) metabolism
 - D) maintenance
- 25) The survival needs of the human body include_____.
- A) food, water, and oxygen.
 - B) food, water, oxygen, body temperature, and atmospheric pressure.
 - C) food, water, and the appropriate atmosphere containing oxygen and adequate pressure.
 - D) food, water, oxygen, and the appropriate environmental conditions.

- 26) The sacral region of the body is located _____.
A) between the hips on the very lower back
B) above the thoracic region
C) directly below the cervical region
D) between the thoracic and lumbar regions
- 27) The diaphragm divides the _____.
A) pericardial and pleural cavities
B) abdominopelvic and thoracic cavities
C) abdominal and pelvic cavities.
D) thoracic cavity and mediastinum.
- 28) Which of the following is the anatomical term for the back of the knee?
A) Popliteal
B) Crural
C) Patellar
D) Perineal
- 29) Which of the following is the generic term for the anatomical term coxal?
A) Armpit
B) Thigh
C) Hip
D) Buttock
- 30) The cephalic region includes the _____.
A) the head and neck
B) the shoulders and arms
C) the cranial and facial regions
D) the cranial and cervical regions

- 31) The upper and lower limbs compose the _____ portion of the body.
- A) distal
 - B) proximal
 - C) axial
 - D) appendicular
- 32) A _____ plane divides the body into *equal* left and right portions.
- A) sagittal
 - B) median
 - C) coronal
 - D) transverse
- 33) In anatomical terms, the arm is the _____, and the wrist is the _____ region.
- A) antebrachium; cubital
 - B) brachium; carpal
 - C) brachial; cubital
 - D) antebrachium; carpal
- 34) The thoracic cavity contains which of the following cavities?
- A) Cranial, abdominal, pelvic
 - B) Pericardial and pleural
 - C) Cranial, spinal, pelvic
 - D) Thoracic, pleural, pelvic
- 35) The membrane lining the abdominal cavity and covering the surfaces of its organs is the _____.
- A) meninges
 - B) pleura
 - C) pericardium
 - D) peritoneum

- 36) The gallbladder is located in the _____ quadrant.
- A) right upper
 - B) right lower
 - C) left upper
 - D) left lower
- 37) The urinary bladder is located in the _____ region.
- A) left inguinal
 - B) epigastric
 - C) hypogastric
 - D) umbilical
- 38) Digestion breaks down complex molecules into simpler molecules. Select the term that best describes this process.
- A) Anabolism
 - B) Catabolism
 - C) Homeostasis
 - D) Negative Feedback
- 39) Homeostasis is maintained by self-regulating physiological processes. Select the process that is primarily responsible for maintaining homeostasis.
- A) Anabolism
 - B) Catabolism
 - C) Positive Feedback
 - D) Negative Feedback
- 40) The part of a cell that is most like our organs is the _____.
- A) organism
 - B) organic macromolecule
 - C) atom
 - D) organelle

- 41) An organ system that protects vital organs, produces blood cells, and stores minerals is the _____ system
- A) lymphatic
 - B) skeletal
 - C) cardiovascular
 - D) integumentary
- 42) The pericardium is located _____.
- A) in the center of the thoracic cavity, surrounding the heart
 - B) in the superior mediastinum, surrounding the cardiac vessels
 - C) in the abdominal cavity, surrounding the pancreas
 - D) in the abdominal cavity, surrounding the aorta
- 43) The covering of the lungs is the _____, and they are located in the _____ cavities.
- A) visceral pleura; pleural
 - B) parietal pleura; pleural
 - C) visceral pleura; peritoneal
 - D) parietal pleura; peritoneal
- 44) A lack of _____ would impair the body's ability to maintain homeostasis.
- A) food
 - B) water
 - C) oxygen
 - D) All items listed are necessary to maintain homeostasis.
- 45) A chronic obstructive pulmonary disorder impairs the ability of the body to obtain oxygen. Eventually, if the body cannot compensate, _____ will be lost.
- A) homeostasis
 - B) metabolism
 - C) equilibrium
 - D) energy

Answer Key

Test name: Chapter 01

- 1) FALSE
- 2) FALSE
- 3) A
- 4) C
- 5) D
- 6) D
- 7) D
- 8) C
- 9) A
- 10) D
- 11) A
- 12) D
- 13) B
- 14) C
- 15) A
- 16) C
- 17) B
- 18) B
- 19) A
- 20) A
- 21) C
- 22) B
- 23) A
- 24) C
- 25) B
- 26) A
- 27) B
- 28) A
- 29) C
- 30) C
- 31) D
- 32) B
- 33) B
- 34) B
- 35) D
- 36) A
- 37) C

- 38) B
- 39) D
- 40) D
- 41) B
- 42) A
- 43) A
- 44) D
- 45) A