

ATLAS

A

General Orientation to Human Anatomy

Anatomical Position 30

Anatomical Planes 31

Directional Terms 31

Surface Anatomy 32

- Axial Region 32
- Appendicular Region 36

Body Cavities and Membranes 36

- Dorsal Body Cavity 36
- Ventral Body Cavity 36

Organ Systems 38

A Visual Survey of the Body 39

Chapter Review 52

Anatomical Position

Anatomical position is a stance in which a person stands erect with the feet flat on the floor, arms at the sides, and the palms, face, and eyes facing forward (fig. A.1). This position provides a precise and standard frame of reference for anatomical description and dissection. Without such a frame of reference, to say that a structure such as the sternum, thymus, or aorta is “above the heart” would be vague, since it would depend on whether the subject was standing, lying face down, or lying face up. From the

perspective of anatomical position, however, we can describe the thymus as *superior* to the heart, the sternum as *anterior* or *ventral* to the heart, and the aorta as *posterior* or *dorsal* to it. These descriptions remain valid regardless of the subject’s position.

Unless stated otherwise, assume that all anatomical descriptions refer to anatomical position. Bear in mind that if a subject is facing you in anatomical position, the subject’s left will be on your right and vice versa. In most anatomical illustrations, for example, the left atrium of the heart appears toward the right side of the page, and while the appendix is located in the right lower quadrant of the abdomen, it appears on the left side of most illustrations.

The forearm is said to be **supine** when the palms face up or forward and **prone** when they face down or rearward (fig. A.2). The difference is particularly important to descriptions of anatomy of this region. In the supine position, the two forearm bones (radius and ulna) are parallel and the radius is lateral to the ulna. In the prone position, the radius and ulna cross; the radius is lateral to the ulna at the elbow but medial to it at the wrist. Descriptions of nerves, muscles, blood vessels, and other structures of the forearm assume that the forearm is supine. (*Supine* also means lying face up and *prone* also means lying face down.)



Figure A.1 Anatomical Position. The feet are flat on the floor and close together, the arms are held downward and supine, and the face is directed forward.

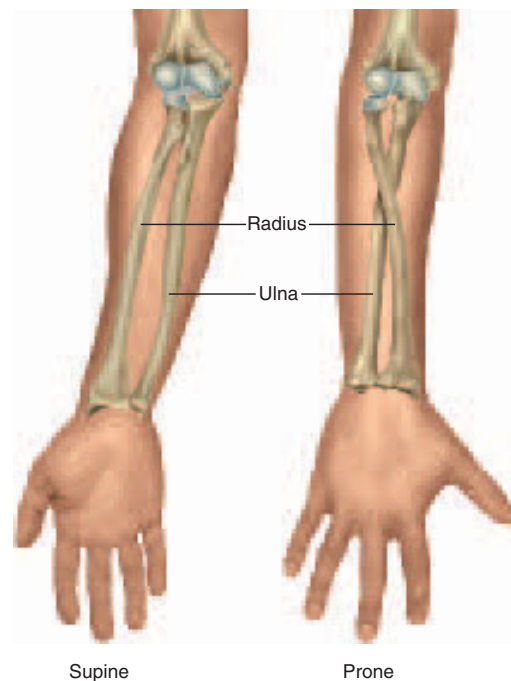


Figure A.2 Positions of the Forearm. When the forearm is supine, the palm faces forward; when prone, it faces rearward. Note the differences in the relationship of the radius to the ulna.

Anatomical Planes

Many views of the body are based on real or imaginary “slices” called *sections* or *planes*. “Section” implies an actual cut or slice to reveal internal anatomy, whereas “plane” implies an imaginary flat surface passing through the body. The three major anatomical planes are *sagittal*, *frontal*, and *transverse* (fig. A.3).

A **sagittal**¹ (SADJ-ih-tul) **plane** passes vertically through the body or an organ and divides it into right and left portions. The sagittal plane that divides the body or organ into equal halves is also called the **median (mid-sagittal) plane**. The head and pelvic organs are commonly illustrated on the median plane (fig. A.4a).

A **frontal (coronal) plane** also extends vertically, but it is perpendicular to the sagittal plane and divides the body into anterior (front) and posterior (back) portions. A frontal section of the head, for example, would divide it into one portion bearing the face and another bearing the back of the head. Contents of the thoracic and abdominal cavities are most commonly shown in frontal section (fig. A.4b).

¹sagitta = arrow

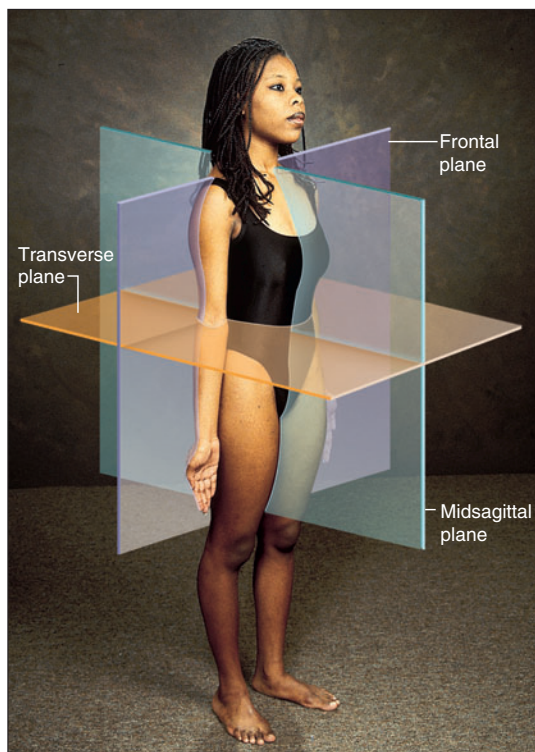
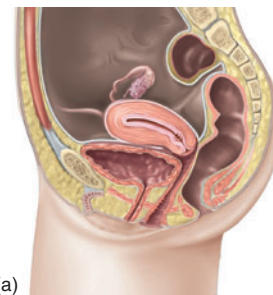


Figure A.3 Anatomical Planes of Reference. What is the other name for the particular sagittal plane shown here?

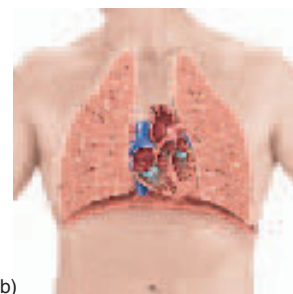
A **transverse (horizontal) plane** passes across the body or an organ perpendicular to its long axis (fig. A.4c); therefore, it divides the body or organ into superior (upper) and inferior (lower) portions. CT scans are typically transverse sections (see fig. 1.17, p. 24).

Directional Terms

Table A.1 summarizes frequently used terms that describe the position of one structure relative to another. Intermediate directions are often indicated by combinations of



(a)



(b)



(c)

Figure A.4 Views of the Body in the Three Primary Anatomical Planes. (a) Sagittal section of the pelvic region. (b) Frontal section of the thoracic region. (c) Transverse section of the head at the level of the eyes.

Table A.1 Directional Terms in Human Anatomy

Term	Meaning	Examples of Usage
Ventral	Toward the front* or belly	The aorta is <i>ventral</i> to the vertebral column.
Dorsal	Toward the back or spine	The vertebral column is <i>dorsal</i> to the aorta.
Anterior	Toward the ventral side*	The sternum is <i>anterior</i> to the heart.
Posterior	Toward the dorsal side*	The esophagus is <i>posterior</i> to the trachea.
Superior	Above	The heart is <i>superior</i> to the diaphragm.
Inferior	Below	The liver is <i>inferior</i> to the diaphragm.
Medial	Toward the median plane	The heart is <i>medial</i> to the lungs.
Lateral	Away from the median plane	The eyes are <i>lateral</i> to the nose.
Proximal	Closer to the point of attachment or origin	The elbow is <i>proximal</i> to the wrist.
Distal	Farther from the point of attachment or origin	The fingernails are at the <i>distal</i> ends of the fingers.
Superficial	Closer to the body surface	The skin is <i>superficial</i> to the muscles.
Deep	Farther from the body surface	The bones are <i>deep</i> to the muscles.

*In humans only; definition differs for other animals.

these terms. For example, one structure may be described as *dorsolateral* to another (toward the back and side).

Because of the bipedal, upright stance of humans, some directional terms have different meanings for humans than they do for other animals. *Anterior*, for example, denotes the region of the body that leads the way in normal locomotion. For a four-legged animal such as a cat, this is the head end of the body; for a human, however, it is the area of the chest and abdomen. Thus, *anterior* has the same meaning as *ventral* for a human but not for a cat. *Posterior* denotes the region of the body that comes last in normal locomotion—the tail end of a cat but the dorsal side (back) of a human. These differences must be kept in mind when dissecting other animals for comparison to human anatomy.

Surface Anatomy

Knowledge of the external anatomy and landmarks of the body is important in performing a physical examination and many other clinical procedures. For purposes of study, the body is divided into two major regions called the *axial* and *appendicular regions*. Smaller areas within the major regions are described in the following paragraphs and illustrated in figure A.5.

Axial Region

The **axial region** consists of the **head**, **neck** (*cervical*² *region*), and **trunk**. The trunk is further divided into the

thoracic region above the diaphragm and the **abdominal region** below it.

One way of referring to the locations of abdominal structures is to divide the region into quadrants. Two perpendicular lines intersecting at the umbilicus (navel) divide the abdomen into a **right upper quadrant (RUQ)**, **right lower quadrant (RLQ)**, **left upper quadrant (LUQ)**, and **left lower quadrant (LLQ)** (fig. A.6a, b). The quadrant scheme is often used to describe the site of an abdominal pain or abnormality.

The abdomen also can be divided into nine regions defined by four lines that intersect like a tic-tac-toe grid (fig. A.6c, d). Each vertical line is called a **midclavicular line** because it passes through the midpoint of the clavicle (collarbone). The superior horizontal line is called the **subcostal**³ **line** because it connects the inferior borders of the lowest costal cartilages (cartilage connecting the tenth rib on each side to the inferior end of the sternum). The inferior horizontal line is called the **intertubercular**⁴ **line** because it passes from left to right between the tubercles (*anterior superior spines*) of the pelvis—two points of bone located about where the front pockets open on most pants. The three lateral regions of this grid, from upper to lower, are the **hypochondriac**,⁵ **lateral (lumbar)**, and **inguinal**⁶ (**iliac**) **regions**. The three medial regions from upper to lower are the **epigastric**,⁷ **umbilical**, and **hypogastric (pubic)** regions.

³sub = below + cost = rib

⁴inter = between + tubercul = little swelling

⁵hypo = below + chondr = cartilage

⁶inguin = groin

⁷epi = above, over + gastr = stomach

²cervic = neck

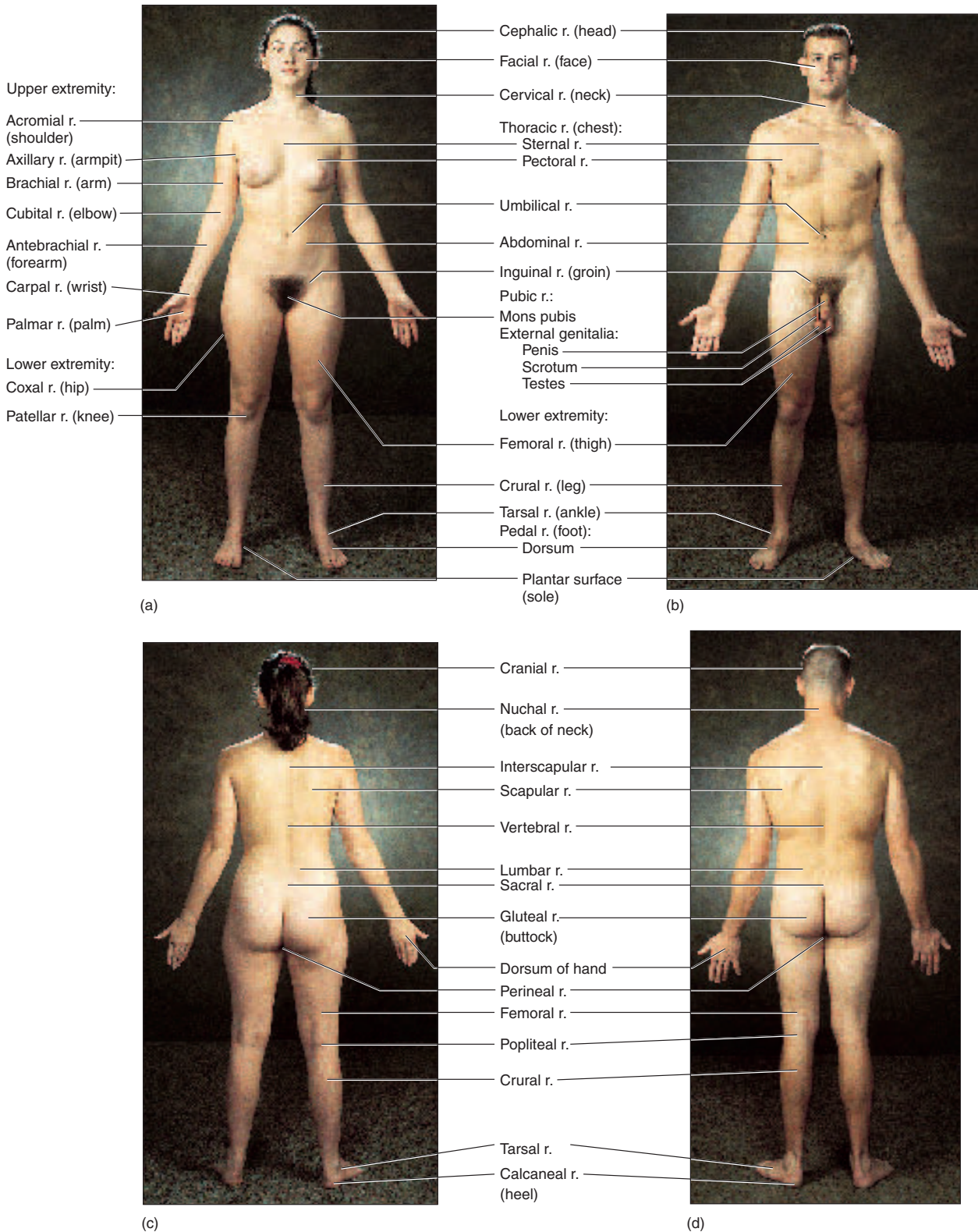


Figure A.5 The Adult Female and Male Bodies. (a and b) Ventral aspect (c and d) dorsal aspect (r. = region).

34 Part One Organization of the Body

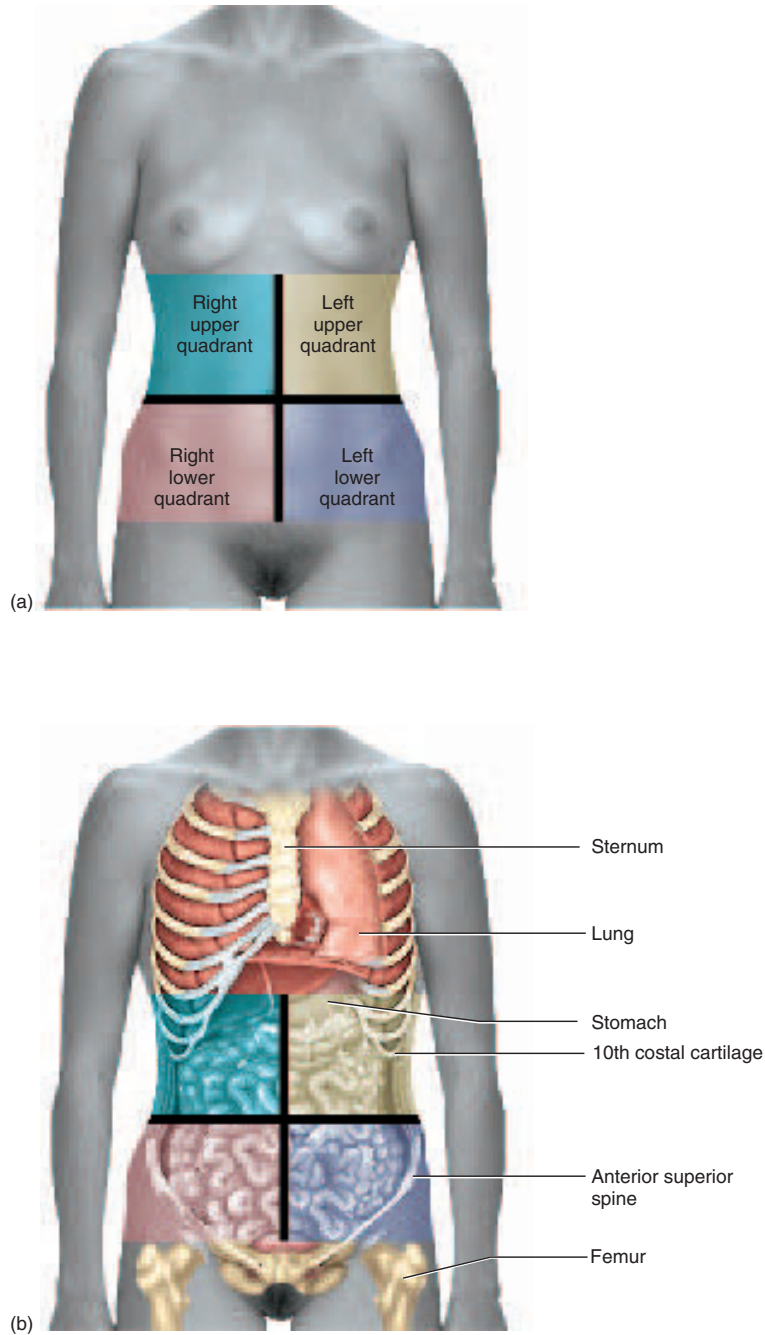


Figure A.6 Four Quadrants and Nine Regions of the Abdomen. (a) External division into four quadrants. (b) Internal anatomy correlated with the four quadrants.

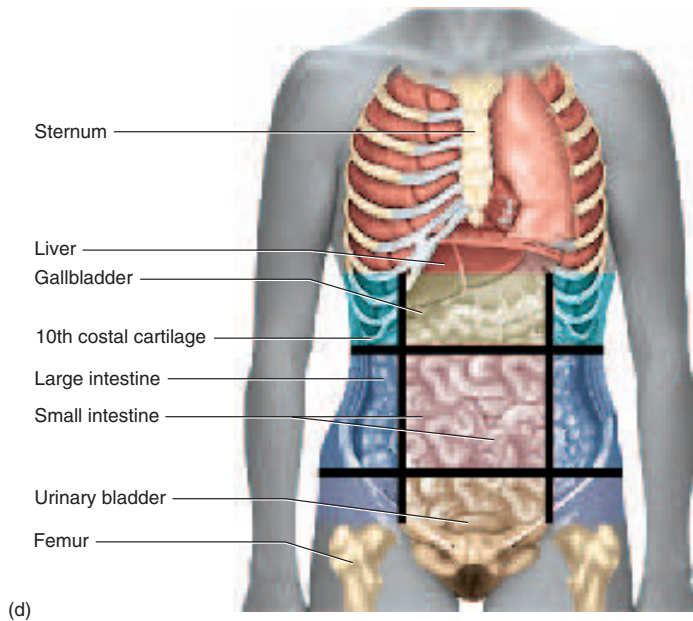
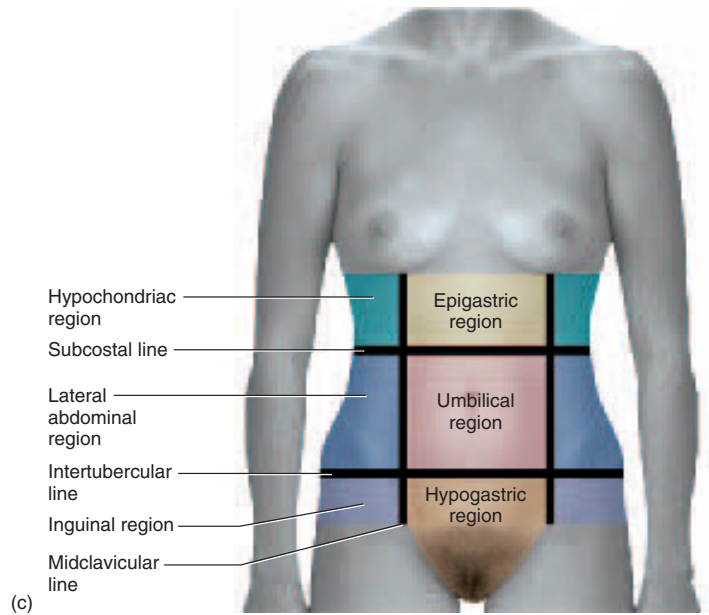


Figure A.6 Four Quadrants and Nine Regions of the Abdomen (continued). (c) External division into nine regions. (d) Internal anatomy correlated with the nine regions.

Appendicular Region

The **appendicular** (AP-en-DIC-you-lur) **region** of the body consists of the appendages (also called *limbs* or *extremities*): the **upper limbs** and the **lower limbs**. The upper limb includes the **brachium** (BRAY-kee-um) (arm), **antebrachium**⁸ (AN-teh-BRAY-kee-um) (forearm), **carpus** (wrist), **manus** (hand), and **digits** (fingers). The lower limb includes the **thigh**, **crus** (leg), **tarsus** (ankle), **pes** (foot), and **digits** (toes).

In strict anatomical terms, “arm” refers only to that part of the upper limb between the shoulder and elbow. “Leg” refers only to that part of the lower limb between the knee and ankle.

Body Cavities and Membranes

The body is internally divided into two major **body cavities**, dorsal and ventral (fig. A.7). The organs within them are called the **viscera** (VISS-er-uh) (singular, *viscus*⁹). Various membranes line the cavities, cover the viscera, and hold the viscera in place (table A.2).

Dorsal Body Cavity

The **dorsal body cavity** has two subdivisions: (1) the **cranial** (CRAY-nee-ul) **cavity**, which is enclosed by the cranium (braincase) and contains the brain, and (2) the **verte-**

bral canal, which is enclosed by the vertebral column (backbone) and contains the spinal cord. The dorsal body cavity is lined by three membrane layers called the **meninges** (meh-NIN-jeez). Among other functions, the meninges protect the delicate nervous tissue from the hard protective bone that encloses it.

Ventral Body Cavity

During embryonic development, a space called the **coelom** (SEE-loam) forms within the trunk and eventually gives rise to the **ventral body cavity**. This cavity later becomes partitioned by a muscular sheet, the **diaphragm**, into a superior **thoracic cavity** and an inferior **abdominopelvic cavity**. The thoracic and abdominopelvic cavities are lined with thin **serous membranes**. These membranes secrete a lubricating film of moisture similar to blood serum (hence the name *serous*).

Thoracic Cavity

The thoracic cavity is divided into right, left, and medial portions by a partition called the **mediastinum**¹⁰ (ME-dee-ass-TY-num) (fig. A.7). The right and left sides contain the lungs and are lined by a two-layered membrane called the **pleura**¹¹ (PLOOR-uh) (fig. A.8a). The outer layer, or **parietal**¹² (pa-RY-eh-tul) **pleura**, lies against the inside of the

⁸ante = fore, before + brachi = arm

⁹viscus = body organ

¹⁰mediastinum = in the middle

¹¹pleur = rib, side

¹²pariet = wall

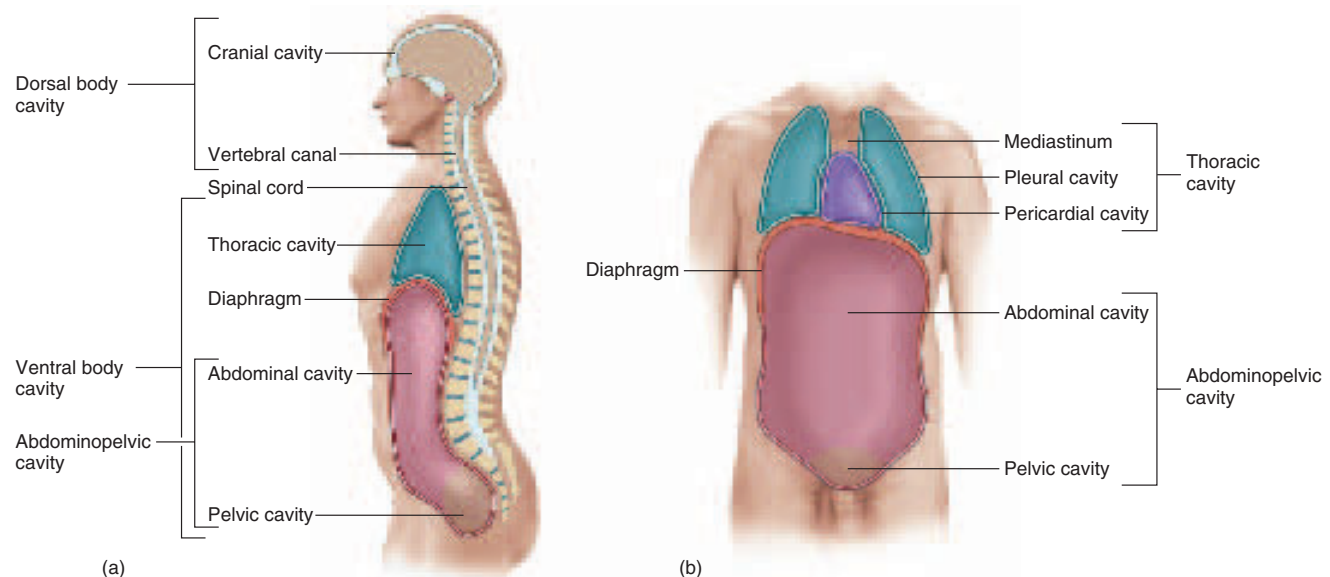
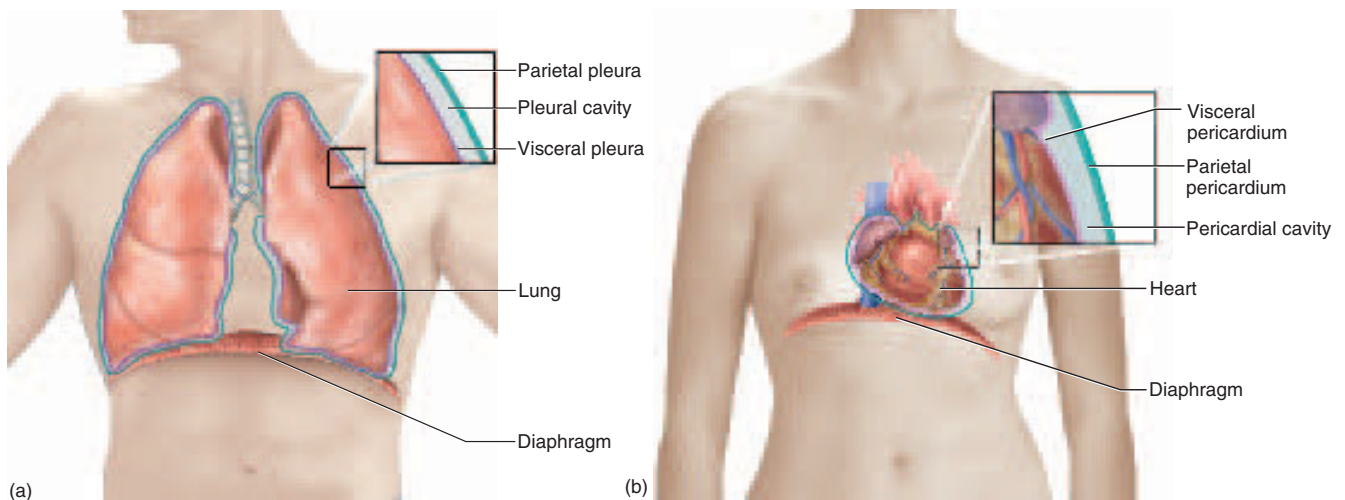


Figure A.7 The Major Body Cavities. (a) Left lateral view; (b) anterior view of the ventral body cavity.

Table A.2 Body Cavities and Membranes

Name of Cavity	Associated Viscera	Membranous Lining
Dorsal Body Cavity		
Cranial cavity	Brain	Meninges
Vertebral canal	Spinal cord	Meninges
Ventral Body Cavity		
<i>Thoracic Cavity</i>		
Pleural cavities (2)	Lungs	Pleurae
Pericardial cavity	Heart	Pericardium
<i>Abdominopelvic Cavity</i>		
Abdominal cavity	Digestive organs, spleen, kidneys	Peritoneum
Pelvic cavity	Bladder, rectum, reproductive organs	Peritoneum

**Figure A.8** Parietal and Visceral Layers of Double-Walled Membranes. (a) The pleura; (b) the pericardium.

rib cage; the inner layer, or **visceral** (VISS-er-ul) **pleura**, forms the external surface of the lung. The narrow, moist space between the visceral and parietal pleurae is called the **pleural cavity** (see fig. A.19). It is lubricated by a slippery **pleural fluid**.

The medial portion, or mediastinum, is occupied by the esophagus and trachea, a gland called the thymus, and the heart and major blood vessels connected to it. The heart is enclosed by a two-layered membrane called the **pericardium**.¹³ The **visceral pericardium** forms the heart

surface, while the **parietal pericardium** is separated from it by a space called the **pericardial cavity** (fig. A.8b). This space is lubricated by **pericardial fluid**.

Abdominopelvic Cavity

The abdominopelvic cavity consists of the **abdominal cavity** above the brim of the pelvis and the **pelvic cavity** below the brim (see fig. A.16). The abdominal cavity contains most of the digestive organs as well as the kidneys and ureters. The pelvic cavity is markedly narrower and its lower end tilts posteriorly (see fig. A.7a). It contains the distal part of the large intestine, the urinary bladder and urethra, and the reproductive organs.

¹³peri = around + cardi = heart

38 Part One Organization of the Body

The abdominopelvic cavity contains a moist serous membrane called the **peritoneum**¹⁴ (PERR-ih-toe-NEE-um). The **parietal peritoneum** lines the walls of the cavity, while the **visceral peritoneum** covers the external surfaces of most digestive organs. The **peritoneal cavity** is the space between the parietal and visceral layers. It is lubricated by **peritoneal fluid**.

Some organs of the abdominal cavity lie between the peritoneum and dorsal body wall (outside of the peritoneal cavity), so they are said to have a **retroperitoneal**¹⁵ position (fig. A.9). These include the kidneys, ureters, adrenal glands, most of the pancreas, and abdominal portions of two major blood vessels—the aorta and inferior vena cava (see fig. A.15).

The intestines are suspended from the dorsal abdominal wall by a translucent membrane called the **mesentery**¹⁶ (MESS-en-tare-ee), a continuation of the peritoneum. The membrane then wraps around the intestines and some other viscera, forming a moist membrane called the **serosa** (seer-OH-sa) on their outer surfaces (fig. A.10). The mesentery of the large intestine is called the **mesocolon**. The visceral peritoneum consists of the mesenteries and serosae.

A fatty membrane called the **greater omentum**¹⁷ hangs like an apron from the inferolateral margin of the

stomach and overlies the intestines (figs. A.10 and A.13). It is unattached at its inferior border and can be lifted to reveal the intestines. A smaller **lesser omentum** extends from the superomedial border of the stomach to the liver.

Organ Systems

The human body has 11 **organ systems** (fig. A.11) and an immune system, which is better described as a population of cells than as an organ system. These systems are classified in the following list by their principal functions, but this is an unavoidably flawed classification. Some organs belong to two or more systems—for example, the male urethra is part of both the urinary and reproductive systems; the pharynx is part of the respiratory and digestive systems; and the mammary glands can be considered part of the integumentary and female reproductive systems.

Protection, Support, and Movement

- Integumentary system
- Skeletal system
- Muscular system

Internal Communication and Integration

- Nervous system
- Endocrine system

¹⁴peri = around + tone = stretched
¹⁵retro = behind
¹⁶mes = in the middle + enter = intestine
¹⁷omentum = covering

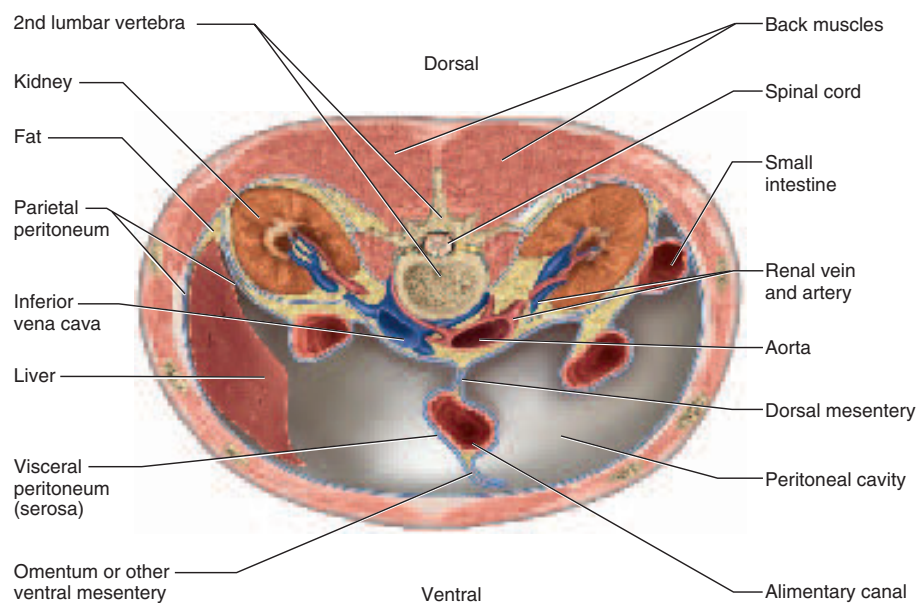


Figure A.9 Transverse Section Through the Abdomen. Shows the peritoneum, peritoneal cavity (with most viscera omitted), and some retroperitoneal organs.

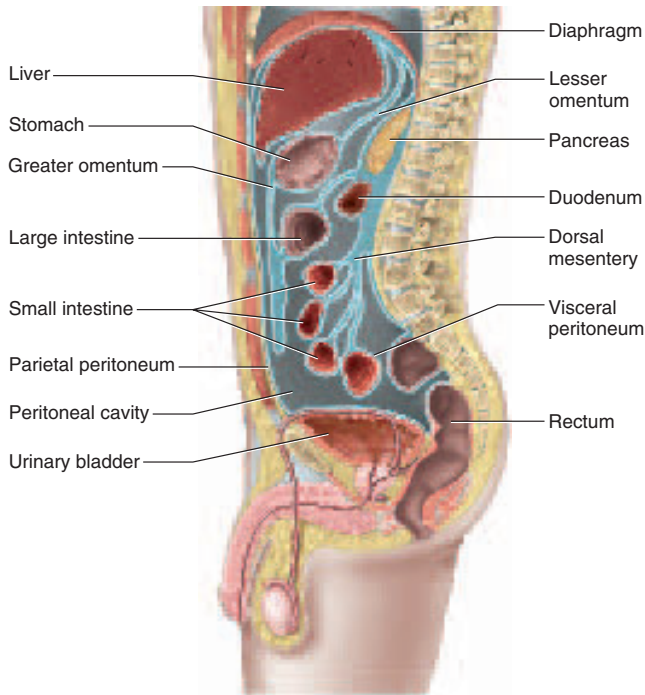


Figure A.10 Serous Membranes of the Abdominal Cavity. Sagittal section, left lateral view.

Is the urinary bladder in the peritoneal cavity?

Fluid Transport

Circulatory system

Lymphatic system

Defense

Immune system

Input and Output

Respiratory system

Urinary system

Digestive system

Reproduction

Reproductive system

A Visual Survey of the Body

Figures A.12 through A.16 provide an overview of the anatomy of the trunk and internal organs of the thoracic and abdominopelvic cavities. Figures A.17 through A.22 are photographs of the cadaver showing the major organs of the dorsal and ventral body cavities.

40 Part One Organization of the Body

Atlas A



A.11a Integumentary system

Principal organs: Skin, hair, nails, cutaneous glands

Principal functions: Protection, water retention, thermoregulation, vitamin D synthesis, cutaneous sensation, nonverbal communication



A.11b Skeletal system

Principal organs: Bones, cartilages, ligaments

Principal functions: Support, movement, protective enclosure of viscera, blood formation, electrolyte and acid-base balance



A.11c Muscular system

Principal organs: Skeletal muscles

Principal functions: Movement, stability, communication, control of body openings, heat production



A.11d Nervous system

Principal organs: Brain, spinal cord, nerves, ganglia

Principal functions: Rapid internal communication and coordination, sensation

Figure A.11 The Human Organ Systems.



A.11e Endocrine system

Principal organs: Pituitary gland, pineal gland, thyroid gland, parathyroid glands, thymus, adrenal glands, pancreas, testes, ovaries
Principal functions: Internal chemical communication and coordination



A.11f Circulatory system

Principal organs: Heart, blood vessels
Principal functions: Distribution of nutrients, oxygen, wastes, hormones, electrolytes, heat, immune cells, and antibodies; fluid, electrolyte, and acid-base balance



A.11g Lymphatic system

Principal organs: Lymph nodes, lymphatic vessels, thymus, spleen, tonsils
Principal functions: Recovery of excess tissue fluid, detection of pathogens, production of immune cells, defense



A.11h Respiratory system

Principal organs: Nose, pharynx, larynx, trachea, bronchi, lungs
Principal functions: Absorption of oxygen, discharge of carbon dioxide, acid-base balance, speech

Figure A.11 The Human Organ Systems (*continued*).

42 Part One Organization of the Body

Atlas A



A.11i Urinary system

Principal organs: Kidneys, ureters, urinary bladder, urethra
Principal functions: Elimination of wastes; regulation of blood volume and pressure; stimulation of red blood cell formation; control of fluid, electrolyte, and acid-base balance; detoxification



A.11j Digestive system

Principal organs: Teeth, tongue, salivary glands, esophagus, stomach, small and large intestines, liver, gallbladder, pancreas
Principal functions: Nutrient breakdown and absorption; liver functions include metabolism of carbohydrates, lipids, proteins, vitamins, and minerals, synthesis of plasma proteins, disposal of drugs, toxins, and hormones, and cleansing of blood



A.11k Male reproductive system

Principal organs: Testes, epididymides, spermatic ducts, seminal vesicles, prostate gland, bulbourethral glands, penis
Principal functions: Production and delivery of sperm



A.11l Female reproductive system

Principal organs: Ovaries, uterine tubes, uterus, vagina, vulva, mammary glands
Principal functions: Production of eggs, site of fertilization and fetal development, fetal nourishment, birth, lactation

Figure A.11 The Human Organ Systems (continued).

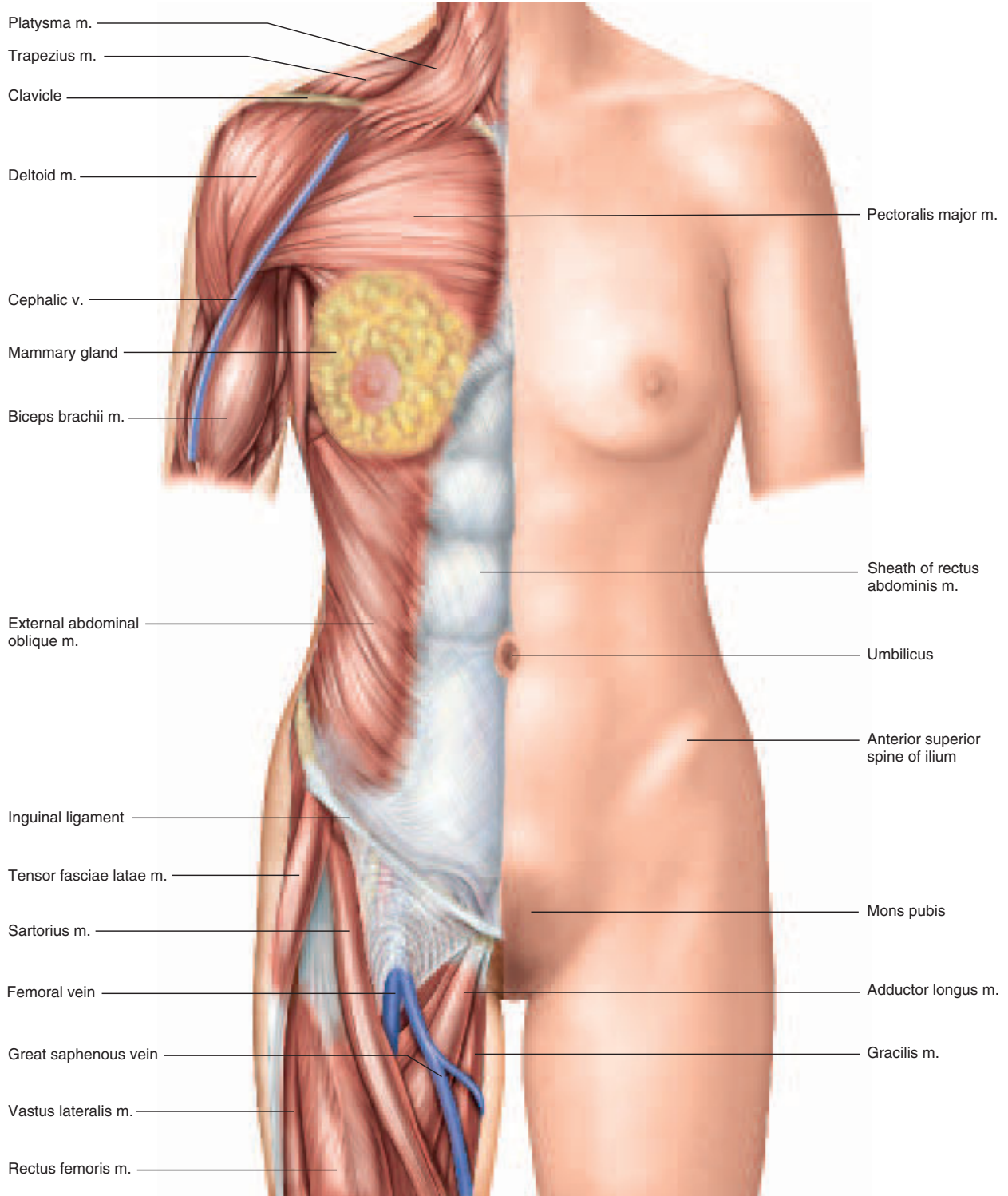


Figure A.12 Superficial Anatomy of the Trunk (female). Surface anatomy is shown on the anatomical left, and structures immediately deep to the skin on the right (*m.* = muscle; *v.* = vein).

44 Part One Organization of the Body

Atlas A

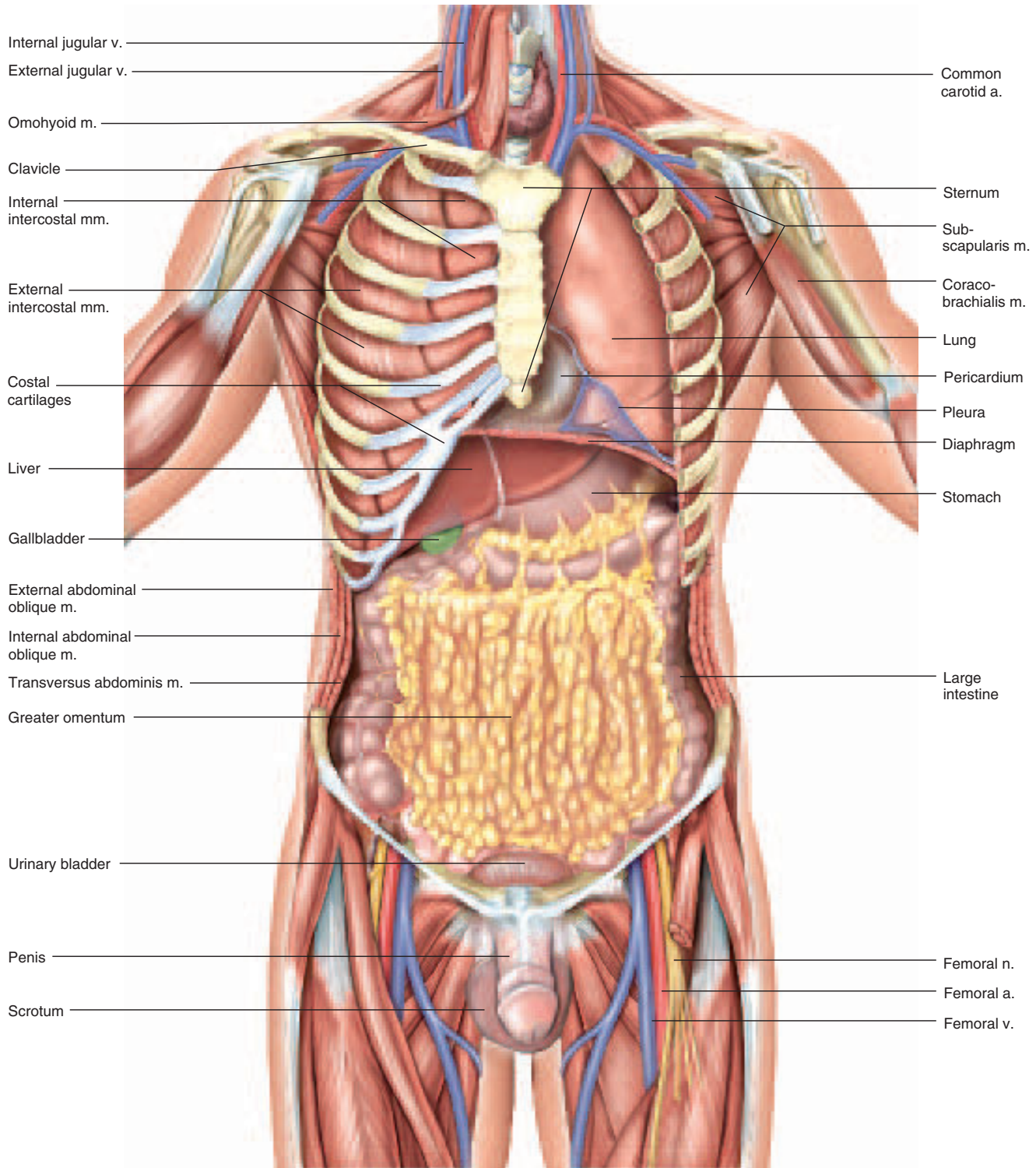


Figure A.13 Anatomy at the Level of the Rib Cage and Greater Omentum (male). The anterior body wall is removed, and the ribs, intercostal muscles, and pleura are removed from the anatomical left (*a.* = artery; *v.* = vein; *m.* = muscle; *n.* = nerve).

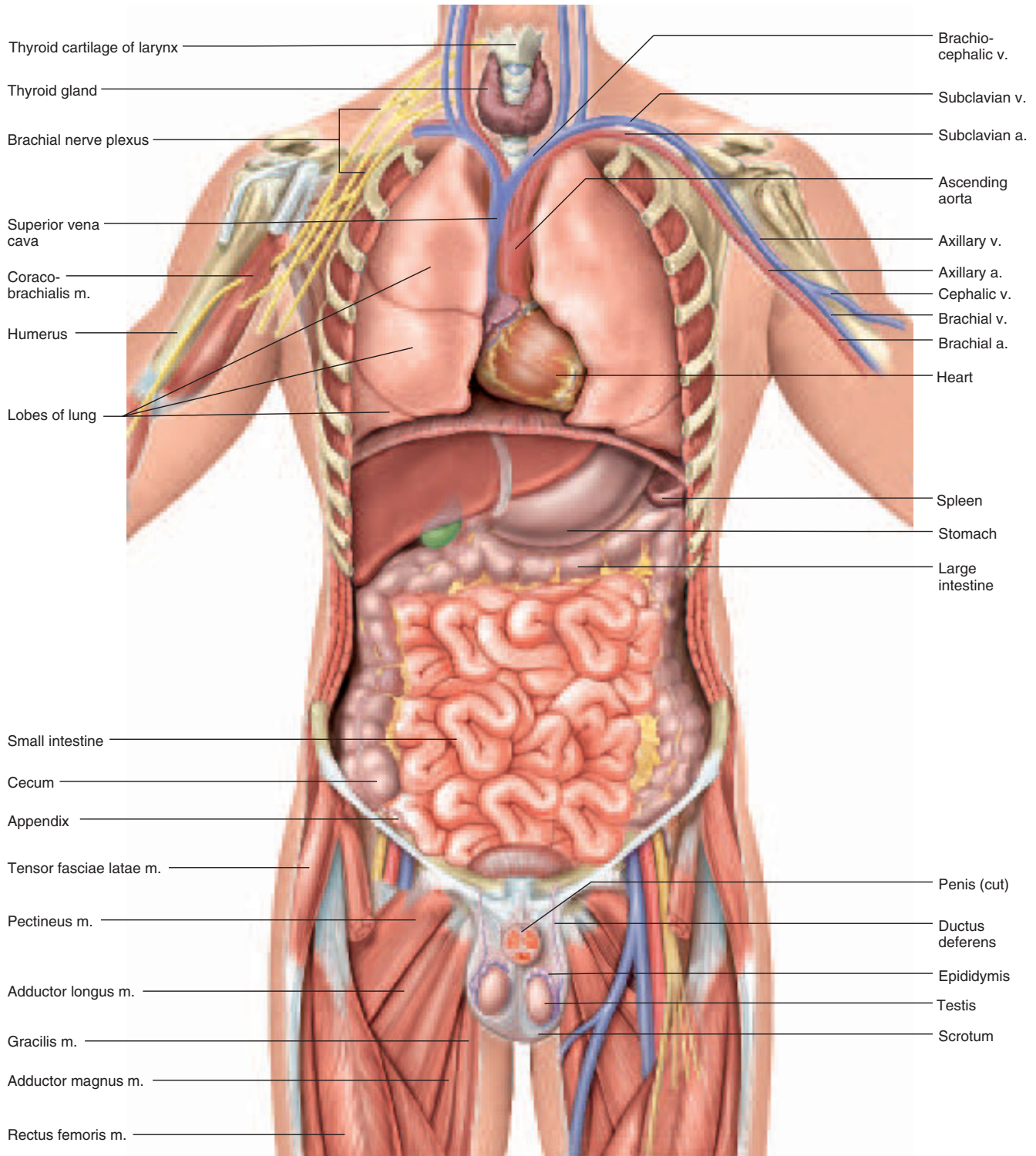


Figure A.14 Anatomy at the Level of the Lungs and Intestines (male). The sternum, ribs, and greater omentum are removed (*a.* = artery; *v.* = vein; *m.* = muscle)

Name several viscera that are protected by the rib cage.

46 Part One Organization of the Body

Atlas A

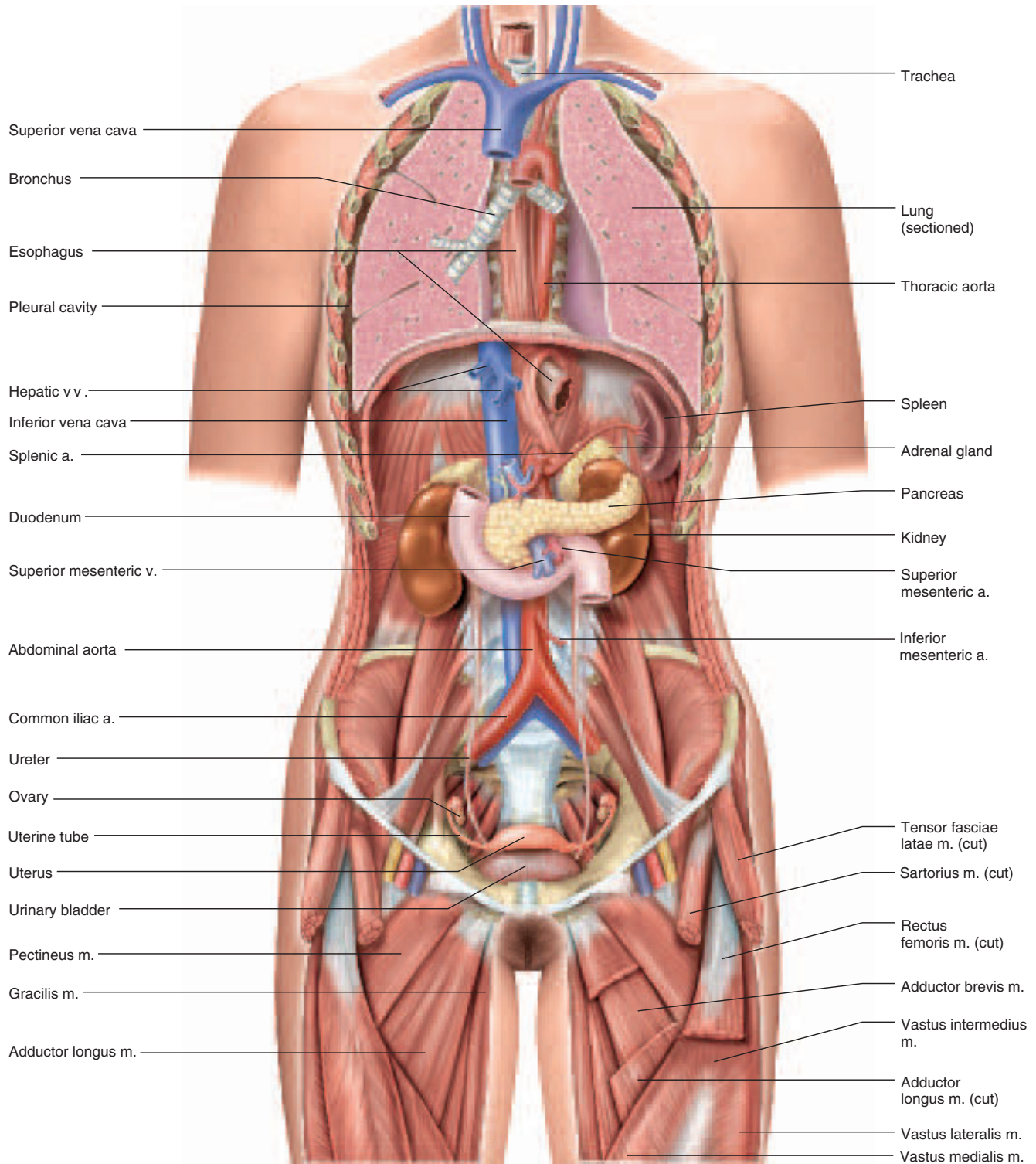
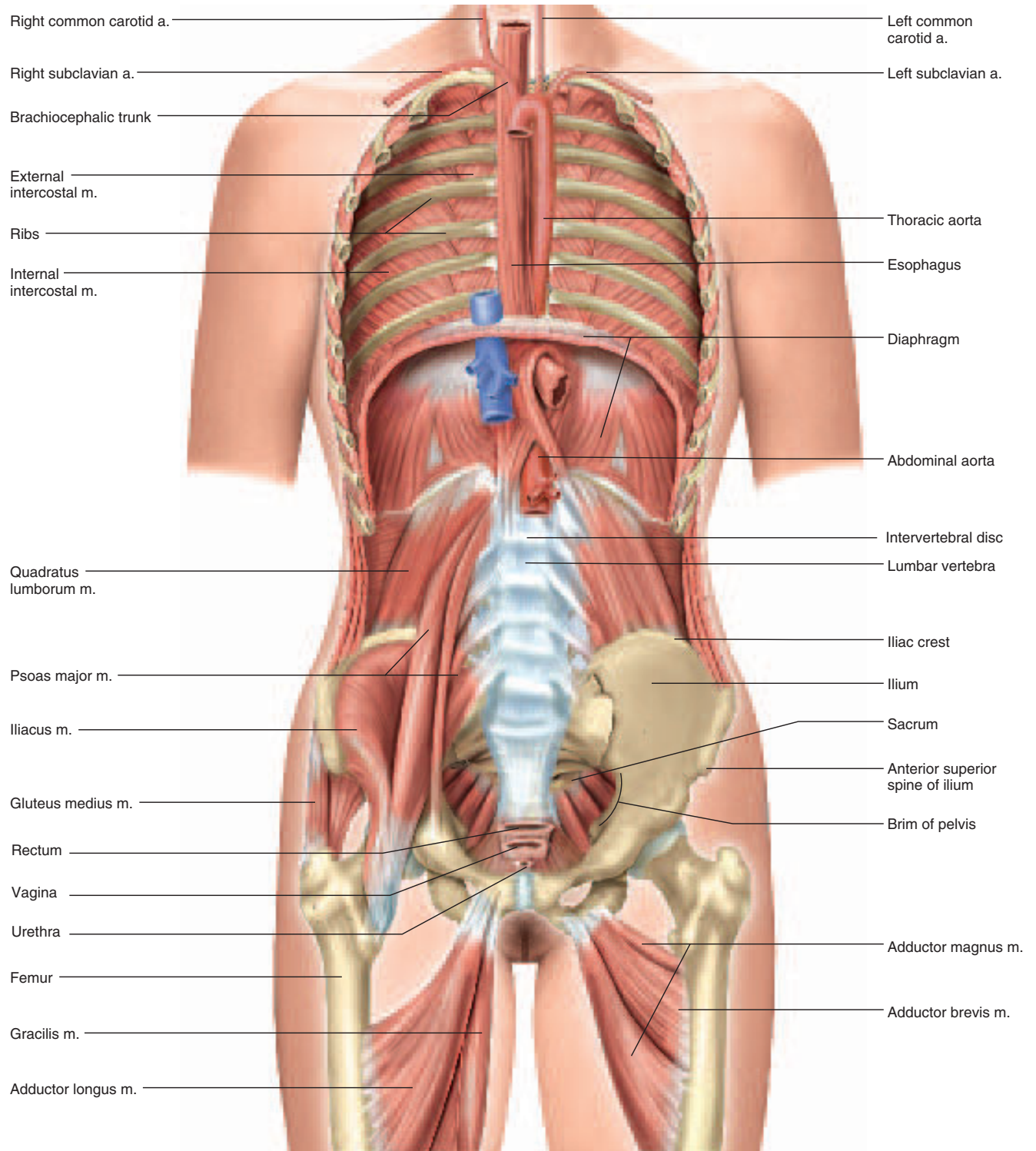


Figure A.15 Anatomy at the Level of the Retroperitoneal Viscera (female). The heart is removed, the lungs are frontally sectioned, and the viscera of the peritoneal cavity and the peritoneum itself are removed (*a.* = artery; *v.* = vein; *vv.* = veins; *m.* = muscle).



Atlas A

Figure A.16 Anatomy at the Level of the Dorsal Body Wall (female). The lungs and retroperitoneal viscera are removed (*a.* = artery; *m.* = muscle).

48 Part One Organization of the Body

Atlas A

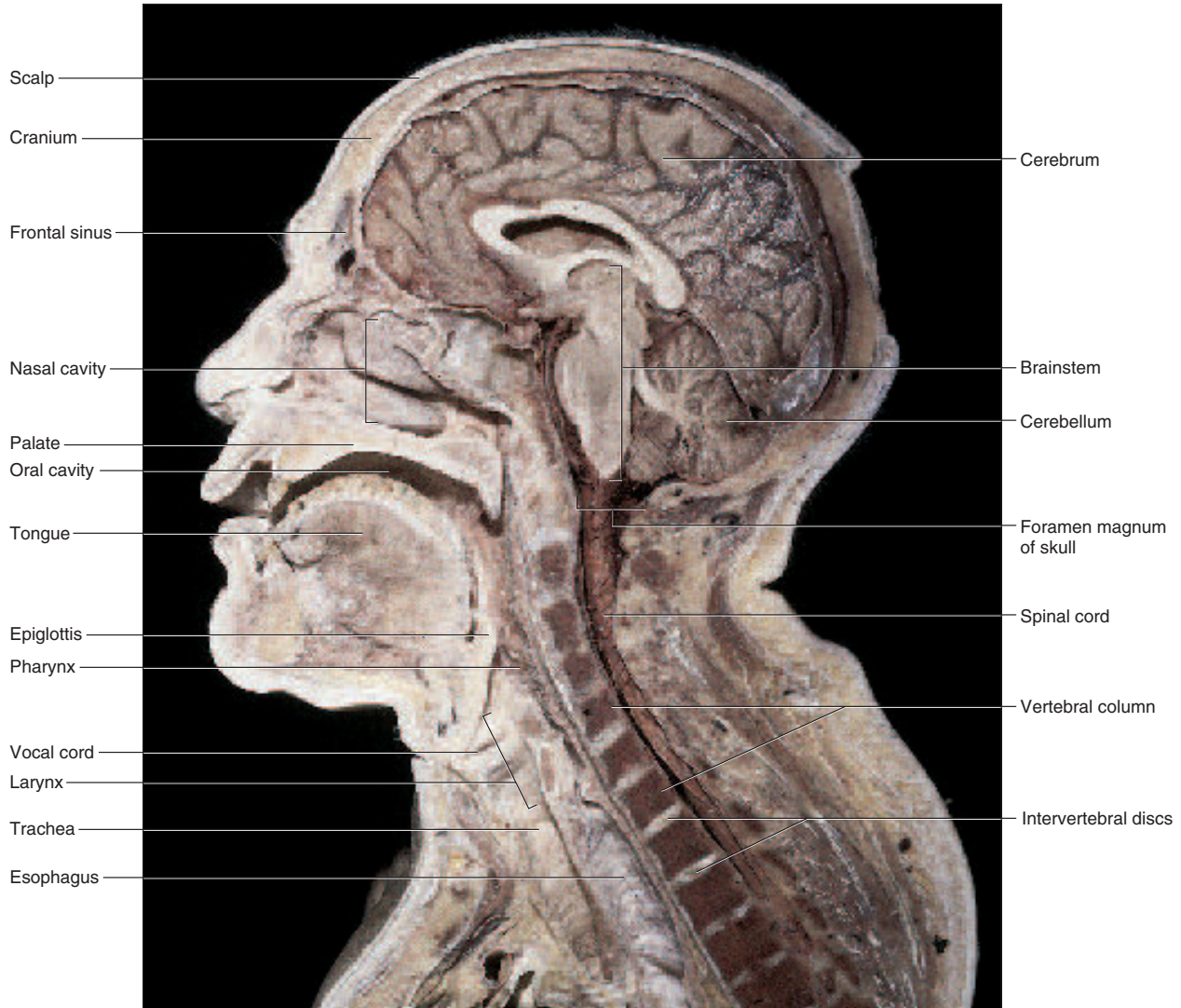


Figure A.17 Median Section of the Head. Shows contents of the cranial, nasal, and buccal cavities.

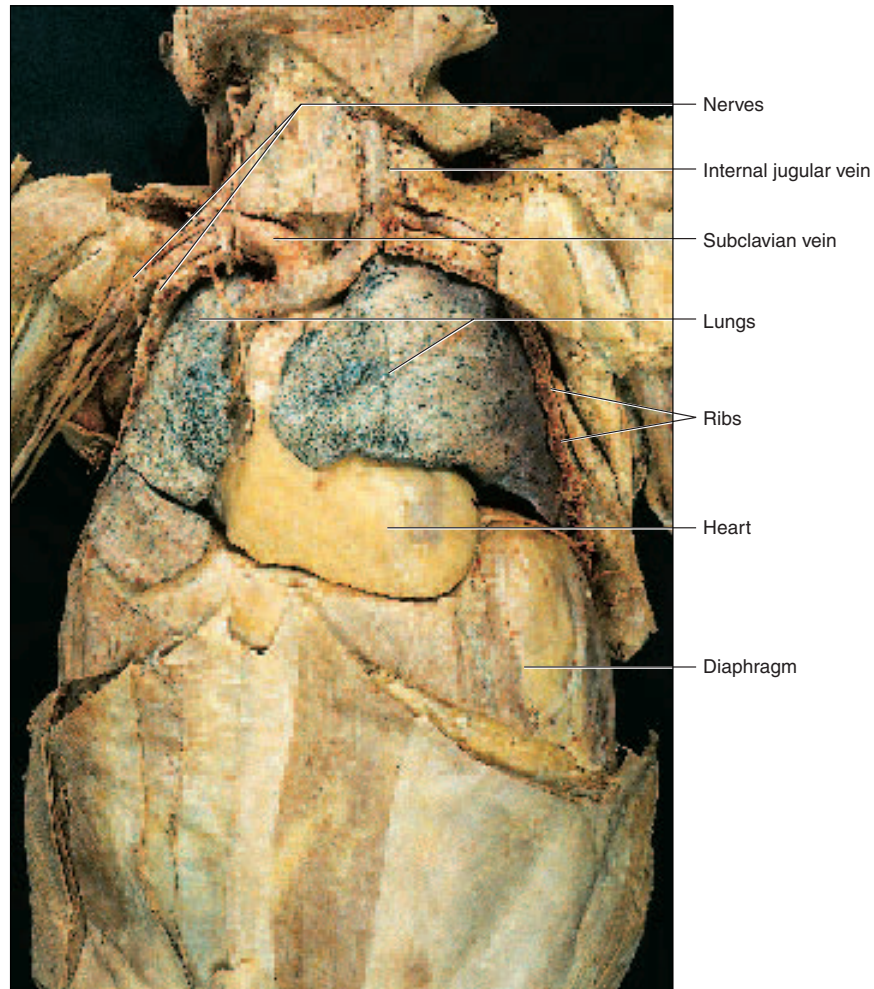


Figure A.18 Frontal View of the Thoracic Cavity.

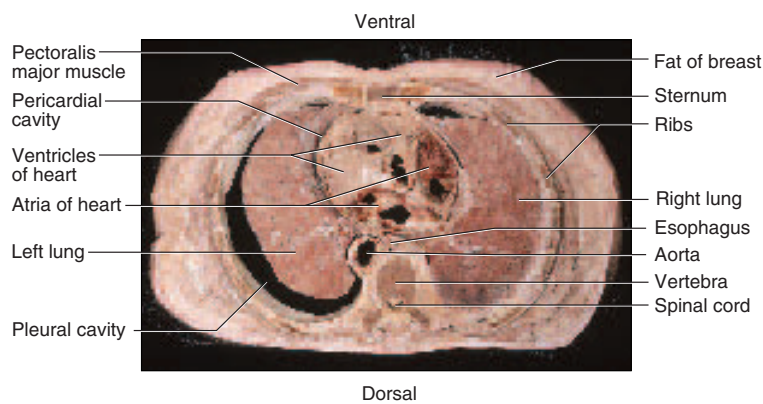


Figure A.19 Transverse Section of the Thorax. Section taken at the level shown by the inset and oriented the same as the reader's body. In this section, which term best describes the position of the aorta relative to the heart: posterior, lateral, inferior, or proximal?

50 Part One Organization of the Body

Atlas A

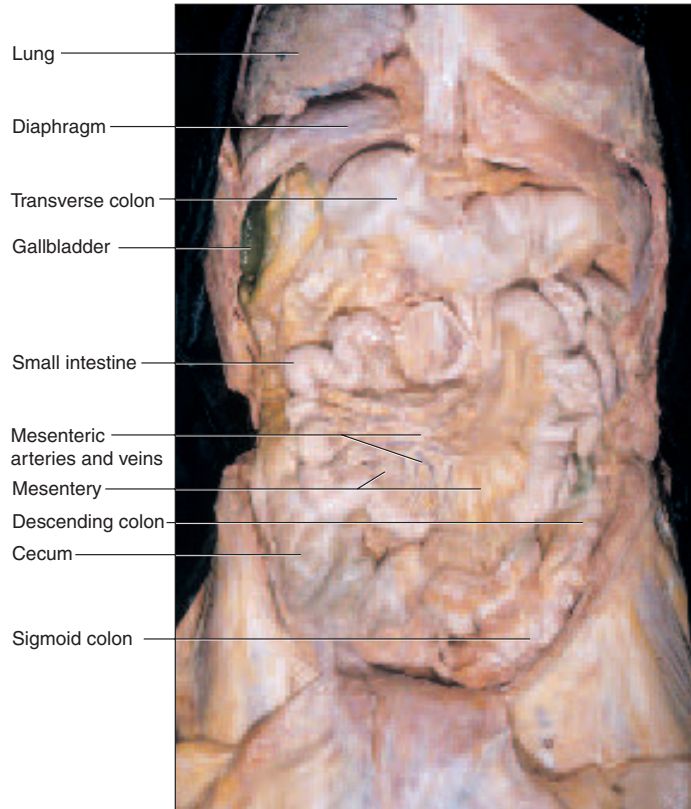


Figure A.20 Frontal View of the Abdominal Cavity.

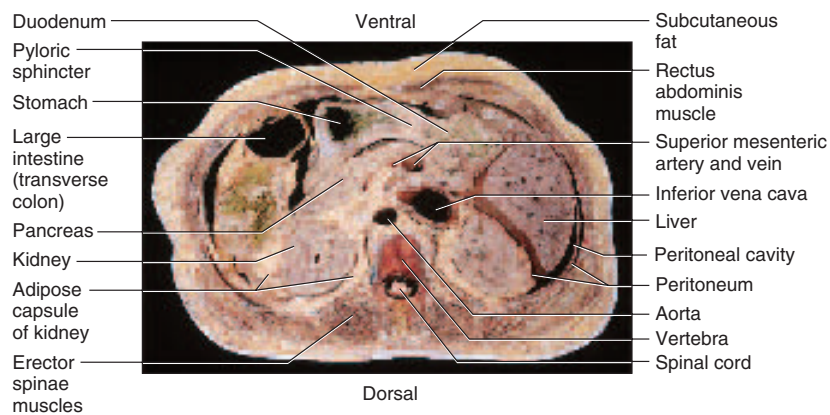


Figure A.21 Transverse Section of the Abdomen. Section taken at the level shown by the inset and oriented the same as the reader's body. What tissue in this photograph is immediately superficial to the rectus abdominis muscle?

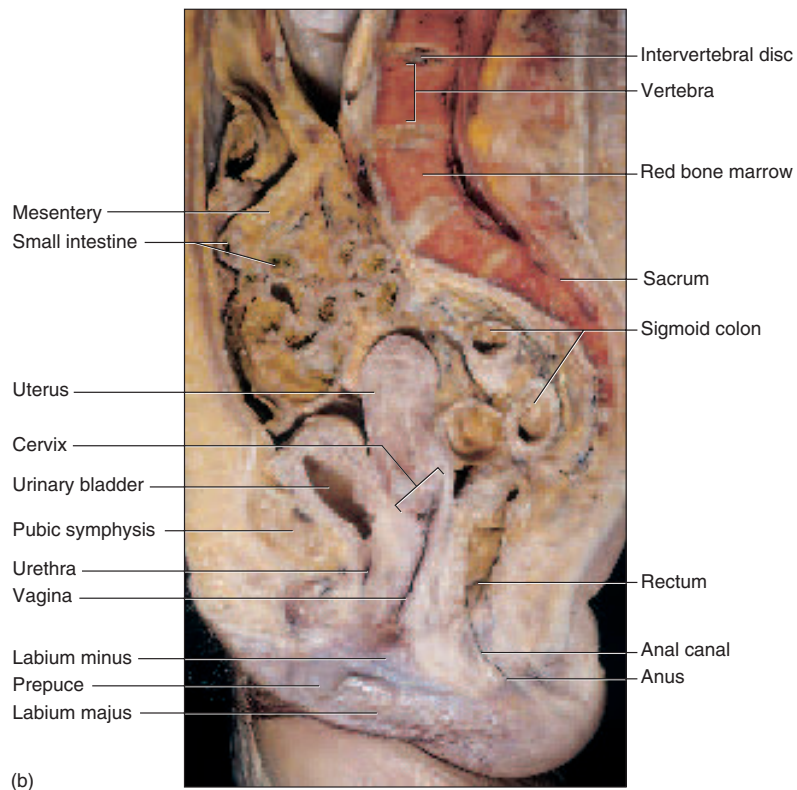
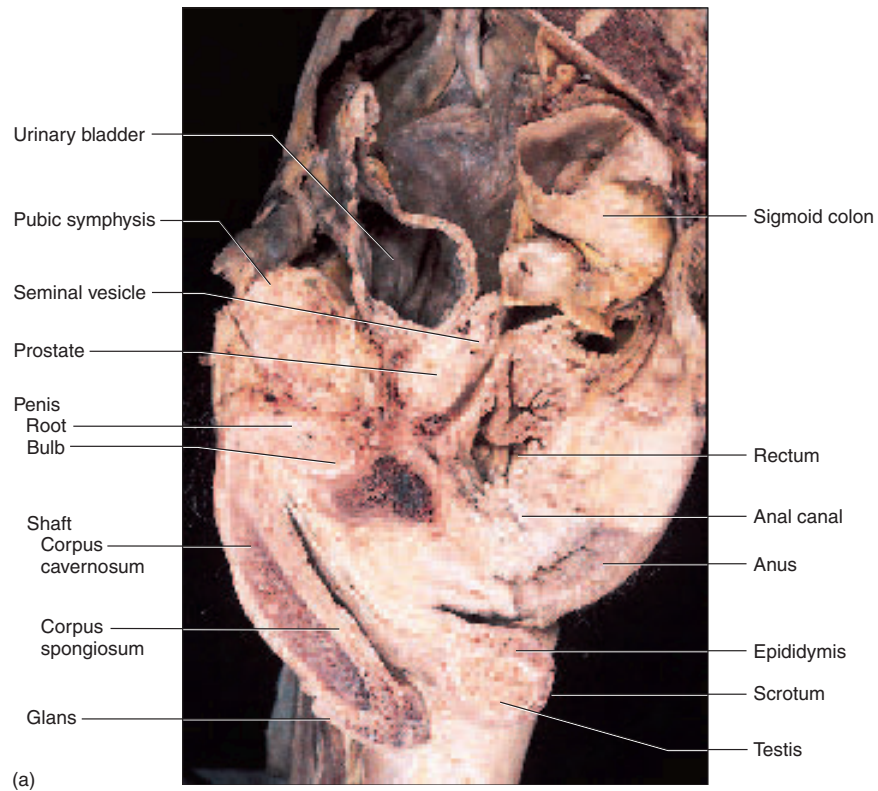


Figure A.22 Median Sections of the Pelvic Cavity. Viewed from the left. (a) Male, (b) Female.

Chapter Review

Review of Key Concepts

Anatomical Position (p. 30)

- Human anatomy is described with reference to a standard *anatomical position*, which avoids the ambiguity of terms that depend on the position of the body.

Anatomical Planes (p. 31)

- Internal structure is often depicted along one of three mutually perpendicular planes through the body: the *sagittal*, *frontal*, and *transverse planes*.

Directional Terms (p. 31)

- The position of one structure relative to another is often described by such pairs of terms as *superior-inferior*, *medial-lateral*, *proximal-distal*, and others (table A.1).

Surface Anatomy (p. 32)

- The body is divided into a central *axial region* (head, neck, trunk) and *appendicular region* (limbs).
- The abdomen can be divided into either four quadrants or nine regions for describing the locations of

structures, symptoms, or abnormal conditions (fig. A.6).

- Each limb is divided into five regions from proximal to distal.

Body Cavities and Membranes (p. 36)

- The body is internally divided into a *dorsal* and *ventral* body cavity. The organs in these cavities are called the *viscera*.
- The body cavities are lined with serous membranes: the *meninges* around the brain and spinal cord, *pleurae* around the lungs, *pericardium* around the heart, and *peritoneum* in the abdominal cavity.
- The last three of these membranes have outer and inner *parietal* and *visceral* layers, respectively, with lubricating fluid between the layers (*pleural*, *pericardial*, and *peritoneal fluid*).
- Retroperitoneal* organs such as the kidneys and pancreas lie between the peritoneum and body wall rather than within the peritoneal cavity.

- The peritoneum continues as a *mesentery* that suspends the intestines and other organs from the dorsal body wall, a *serosa* over the surface of some abdominal organs, and two *omenta* attached to the stomach.

Organ Systems (p. 38)

- The body has 11 organ systems: the *integumentary*, *skeletal*, and *muscular* systems for protection, support, and movement; the *nervous* and *endocrine* systems for internal communication; the *circulatory* and *lymphatic* systems for fluid transport; the *respiratory*, *urinary*, and *digestive* systems for input and output; and the *reproductive* system for producing offspring.
- The body also has an immune system for protection from disease, but this is not an organ system; it is a collection of cells that populate all the organ systems.

Selected Vocabulary

anatomical position 30
supine 30
prone 30
sagittal plane 31
frontal plane 31
transverse plane 31
ventral 32
dorsal 32
anterior 32

posterior 32
superior 32
inferior 32
medial 32
lateral 32
proximal 32
distal 32
superficial 32

deep 32
cervical region 32
thoracic region 32
abdominal region 32
viscera 36
serous membrane 36
mediastinum 36
pleural cavity 36

pericardial cavity 37
abdominal cavity 37
pelvic cavity 37
peritoneum 38
peritoneal cavity 38
retroperitoneal 38
mesentery 38
serosa 38

Testing Your Recall

- Which of the following is *not* an essential part of anatomical position?
 - eyes facing forward
 - feet flat on the floor
 - forearms supine
 - mouth closed
 - arms down to the sides
- A ring-shaped section of the small intestine would be a _____ section.
 - sagittal
 - coronal
 - transverse
 - frontal
 - median
- The tarsal region is _____ to the popliteal region.
 - medial
 - superficial
 - superior
 - dorsal
 - distal

4. The greater omentum is _____ to the small intestine.
 - a. posterior
 - b. parietal
 - c. deep
 - d. superficial
 - e. proximal
5. A _____ line passes through the sternum, umbilicus, and mons pubis.
 - a. central
 - b. proximal
 - c. midclavicular
 - d. midsagittal
 - e. intertubercular
6. The _____ region is immediately medial to the coxal region.
 - a. inguinal
 - b. hypochondriac
 - c. umbilical
 - d. popliteal
 - e. cubital
7. Which of the following regions is *not* part of the upper limb?
 - a. plantar
 - b. carpal
 - c. cubital
 - d. brachial
 - e. palmar
8. Which of these organs is within the peritoneal cavity?
 - a. urinary bladder
 - b. kidneys
 - c. heart
 - d. small intestine
 - e. brain
9. In which area do you think pain from the gallbladder would be felt?
 - a. umbilical region
 - b. right upper quadrant
 - c. hypogastric region
 - d. left hypochondriac region
 - e. left lower quadrant
10. Which organ system regulates blood volume, controls acid-base balance, and stimulates red blood cell production?
 - a. digestive system
 - b. lymphatic system
 - c. nervous system
 - d. urinary system
 - e. circulatory system
11. The forearm is said to be _____ when the palms are facing forward.
12. The superficial layer of the pleura is called the _____ pleura.
13. The right and left pleural cavities are separated by a thick wall called the _____.
14. The back of the neck is the _____ region.
15. The manus is more commonly known as the _____ and the pes is more commonly known as the _____.
16. The dorsal body cavity is lined by membranes called the _____.
17. Organs that lie within the abdominal cavity but not within the peritoneal cavity are said to have a _____ position.
18. The sternal region is _____ to the pectoral region.
19. The pelvic cavity can be described as _____ to the abdominal cavity in position.
20. The anterior pit of the elbow is the _____ region, and the corresponding (but posterior) pit of the knee is the _____ fossa.

Answers in Appendix B

True or False

Determine which five of the following statements are false, and briefly explain why.

1. A single sagittal section of the body can pass through one lung but not through both.
2. It would be possible to see both eyes in one frontal section of the head.
3. The knee is both superior and proximal to the tarsal region.
4. The diaphragm is ventral to the lungs.
5. The esophagus is in the dorsal body cavity.
6. The liver is in the lateral abdominal region.
7. The heart is in the mediastinum.
8. Both kidneys could be shown in a single coronal section of the body.
9. The peritoneum lines the inside of the stomach and intestines.
10. The sigmoid colon is in the lower right quadrant of the abdomen.

Answers in Appendix B

Testing Your Comprehension

1. Identify which anatomical plane—sagittal, frontal, or transverse—is the only one that could *not* show (a) both the brain and tongue, (b) both eyes, (c) both the hypogastric and gluteal regions, (d) both kidneys, (e) both the sternum and vertebral column, and (f) both the heart and uterus.
2. Laypeople often misunderstand anatomical terminology. What do you think people really mean when they say they have “planter’s warts”?
3. Name one structure or anatomical feature that could be found in each of the following locations relative to the ribs: medial, lateral, superior, inferior, deep, superficial, posterior, and anterior. Try not to use the same example twice.
4. Based on the illustrations in this atlas, identify an internal organ that

54 Part One Organization of the Body

is (a) in the upper left quadrant and retroperitoneal, (b) in the lower right quadrant of the peritoneal cavity,

(c) in the hypogastric region, (d) in the right hypochondriac region, and (e) in the pectoral region.

5. Why do you think people with imaginary illnesses came to be called hypochondriacs?

Answers at the Online Learning Center

Answers to Figure Legend Questions

A.3 Median (midsagittal)

A.10 No, it lies inferior to the peritoneum.

A.14 The lungs, heart, liver, stomach, and spleen, among others

A.19 Posterior

A.21 Fat

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The Online Learning Center provides a wealth of information fully organized and integrated by chapter. You will find practice quizzes, interactive activities, labeling exercises, flashcards, and much more that will complement your learning and understanding of anatomy and physiology.