

4

Medical Terminology and Abbreviations

essential terms

abdominopelvic cavity
anatomical position
anatomy
anterior
atoms
brachial
caudal
cells
combining vowel
coronal
cranial
deep
deoxyribonucleic acid (DNA)
diaphragm
distal
dorsal
electrolytes
femoral
frontal plane
inferior
lateral

medial
midsagittal plane
molecules
organelles
organism
organs
physiology
posterior
prefix
prone
proximal
ribonucleic acid (RNA)
sagittal plane
suffix
superficial
superior
supine
thoracic cavity
tissues
transverse plane
ventral
word root



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Learning Outcomes

- 4.1** Recognize medical prefixes, word roots, and suffixes to build commonly used medical terms.
- 4.2** Define common medical abbreviations.
- 4.3** Explain body position, direction, and parts using medical terms.

Related NAACLS Competencies

- 1.1** Demonstrate knowledge of the healthcare delivery system and medical terminology.
- 1.8** Use common medical terminology.
- 3.1** Demonstrate basic understanding of the anatomy and physiology of body systems and anatomical terminology in order to relate major areas of the clinical laboratory to general pathologic conditions associated with the body systems.

Introduction

This chapter presents the basics of how medical words are formed. It emphasizes anatomical and medical terminology as well as abbreviations that phlebotomists are likely to encounter in the healthcare setting.

4.1 Medical Language

Medical terminology can often look like a foreign language because its complex-looking terms, rarely used in most of our everyday dialogues, are formed from Greek and Latin words. However, healthcare professionals use this terminology daily when communicating with colleagues. Medical terminology allows healthcare professionals to identify diseases and affected areas of the body much more precisely than if they used our everyday language. To learn medical terminology, you will need to understand the basic word parts and how to build and decode terms in order to “read” them.

Let’s start with the root of a word. All medical words have a **word root** that contains their base meaning. Many words also have a **suffix** at the end that alters the meaning of the word root. See Table 4-1 for some examples. Because the meanings of the word parts stay consistent, it is easier to learn new terms containing already known word parts—for example:

- *Appendectomy*—the word root *append* refers to “appendix” and the suffix *-ectomy* means “surgical removal.” So *appendectomy* means “surgical removal of the appendix.”
- *Hysterectomy*—the word root *hystero* means “uterus.” Given that *-ectomy* means “surgical removal,” *hysterectomy* means “surgical removal of the uterus.”

Some words also contain a **prefix**, which comes at the beginning of the word and, like a suffix, alters its meaning. In defining words, the general rule is to start with the suffix, then add the prefix (if present), and finally

TABLE 4-1 Medical Terminology Word Parts

Word Part	Description	Term Using Word Part	Term Meaning
Word root	Base meaning of the word	<u>Colostomy</u>	<i>Colo-</i> = colon; <i>-stomy</i> = to cut (or create) a new opening <i>Colostomy</i> = to cut a new opening for the colon
Suffix	Ending of the word; alters the meaning of the word root	<u>Hematology</u>	<i>Hemat-</i> = blood; <i>-ology</i> = study of <i>Hematology</i> = study of the blood
Prefix	Beginning of the word; alters the meaning of the word root	<u>Tachycardia</u>	<i>Tachy-</i> = rapid; <i>cardi-</i> = heart; <i>-ia</i> = condition of <i>Tachycardia</i> = condition of rapid heart(beat)
Combining vowel	Placed between the word root and suffix to ease pronunciation	<u>Cardiologist</u>	<i>Cardi-</i> = heart; <i>o-</i> = combining vowel to ease pronunciation; <i>-logist</i> = specialist in knowledge of <i>Cardiologist</i> = specialist in the knowledge of the heart

the word root(s). The terms *premenstrual* and *postmenstrual* are broken down as follows:

- The suffix *-al* means “pertaining to.”
- The prefix *pre-* means “before.”
- The prefix *post-* means “after.”

The word root *menstru* refers to “menstrual period”; therefore *premenstrual* means “pertaining to before the menstrual period” and *postmenstrual* is “pertaining to after the menstrual period.”

For terms whose suffix begins with a consonant, a **combining vowel** (often *o*) is used between the word root and the suffix to ease pronunciation—for example:

- *Gastroparesis*—The word root *gastr* (“stomach”) is joined to the suffix *-paresis* (“paralysis”). Here, the letter *o* is inserted between the two to make pronunciation easier. Unlike prefixes and suffixes, combining vowels do not change the term’s meaning.

Medical terms are built just like a puzzle, using the prefix, the word root, and the suffix. Don’t forget the combining vowel when needed.

Figure 4-1 shows the building of some common medical terms.

Phlebotomy Terminology

Once you understand how medical terms are built from word parts, you will begin to develop your own medical terminology vocabulary. As a phlebotomist, you must recognize and use medical terms every day. Many of these important terms are identified as essential terms at the beginning of each chapter and then bolded throughout the text. The *Prefixes, Suffixes, and Word Roots in Commonly Used Medical Terms* appendix contains a list of the prefixes, suffixes, and word roots most commonly used in the language of medicine. In addition, Table 4-2 provides a list of some common prefixes, word roots, suffixes, and terms used in phlebotomy.

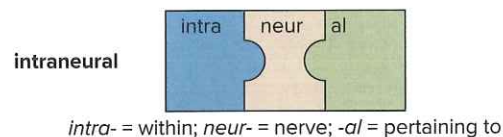
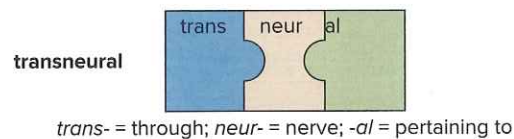
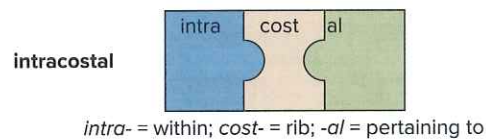
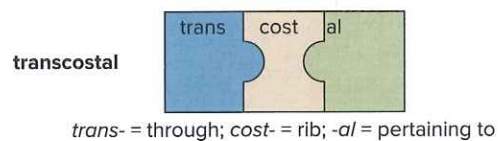
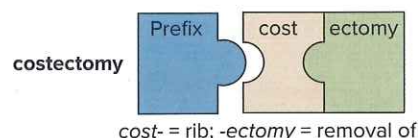
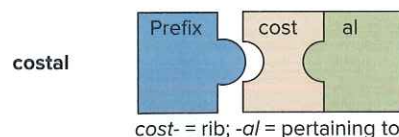
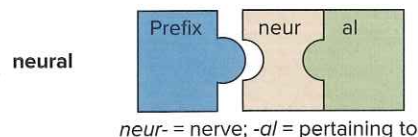
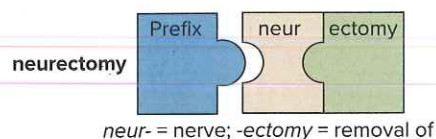
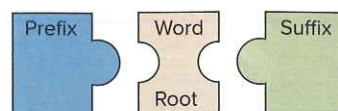


Figure 4-1 Word parts are put together like puzzle pieces to create medical terms.

TABLE 4-2 Examples of Common Phlebotomy Terminology

Prefix	Definition	Example
<i>a-, an-</i>	Without	Asepsis— <i>without</i> sepsis (an infectious disease) Anoxia— <i>without</i> oxygen
<i>angi-</i>	Vessel	Angiogram—X-ray recording of a blood vessel
<i>ante-</i>	Before	Antecubital— <i>before</i> or in front of the elbow
<i>anti-</i>	Against	Anticoagulant—substance that works <i>against</i> coagulation (clotting)
<i>bacter-</i>	Bacteria	Bacteremia—condition of bacteria in the blood
<i>bio-</i>	Life	Biology—the study of <i>life</i>

(continued)

TABLE 4-2 Examples of Common Phlebotomy Terminology (*Continued*)

Prefix	Definition	Example
<i>cyan-</i>	Blue	Cyanosis—a condition of blueness of the skin
<i>dia-</i>	Through	Dialysis—cleansing the blood by passing it <i>through</i> a special machine
<i>dis-</i>	Separation, taking apart	Dissection—to <i>take apart</i> a body after death for study
<i>endo-</i>	Internal, within	Endothelial cells—cells that line the lumen (<i>inside</i> surface) of the blood vessels
<i>epi-</i>	On, above	Epidermis—the outer layer of skin, which is on or <i>above</i> the dermis
<i>erythro-</i>	Red	Erythrocyte— <i>red</i> blood cell
<i>hyper-</i>	Increased	Hypertension— <i>increased</i> blood pressure
<i>hypo-</i>	Below	Hypodermic—an area <i>below</i> the skin
<i>inter-</i>	Between	Intercellular—located <i>between</i> cells
<i>leuk-</i>	White	Leukemia—increased <i>white</i> blood cells in the blood
<i>micro-</i>	Small	Microscope—instruments used to view <i>small</i> objects
<i>mono-</i>	One, single	Monocyte—a white blood cell with a <i>single</i> characteristic nucleus
<i>per-</i>	Through	Percutaneous— <i>through</i> the skin
<i>peri-</i>	Around	Pericardium—membrane <i>around</i> the heart
<i>poly-</i>	Many	Polymorphonuclear—white blood cell that appears to have <i>many</i> nuclei
<i>post-</i>	After	Postprandial— <i>after</i> a meal
<i>pre-</i>	Before	Prenatal— <i>before</i> delivery of an infant
<i>sub-</i>	Below, under	Subcutaneous— <i>under</i> the skin
<i>tachy-</i>	Rapid	Tachycardia— <i>rapid</i> heartbeat
Word Root	Definition	Example
<i>abdomin/o</i>	Abdomen	Abdominal—pertaining to the <i>abdomen</i>
<i>arteri/o</i>	Artery	Arterial—pertaining to an <i>artery</i>
<i>bil/i</i>	Bile	Bilirubin—substance formed during breakdown of hemoglobin
<i>cardi/o</i>	Heart	Pericardial—pertaining to around the <i>heart</i>
<i>cephal/o</i>	Head	Cephalic vein—the vein that runs along the lateral side of the arm to the head
<i>cubit/i</i>	Elbow	Antecubital—pertaining to in front of the <i>elbow</i>
<i>cyt/o</i>	Cell	Cytology—study of <i>cells</i>
<i>derm/o</i>	Skin	Dermis—inner layer of skin
<i>estr/o</i>	Female	Estrogen— <i>female</i> hormone
<i>gastr/o</i>	Stomach	Gastritis—inflammation of the <i>stomach</i>
<i>hem/o</i>	Blood	Hemolysis—the breakdown of red <i>blood</i> cells
<i>hemat/o</i>	Blood	Hematoma—an accumulation of <i>blood</i> beneath the skin
<i>gluc/o</i>	Sugar, glucose	Glucose—the <i>sugar</i> in a patient's blood
<i>glyc/o</i>	Sugar, glucose	Glycemia—increased amount of <i>glucose</i> in the blood
<i>hepat/o</i>	Liver	Hepatitis—inflammation of the <i>liver</i>
<i>lip/o</i>	Fat	Lipemic—appears to have an increased amount of <i>fat</i>
<i>onc/o</i>	Tumor	Oncogenic—producing a <i>tumor</i>
<i>path/o</i>	Disease	Pathogen—produces <i>disease</i>
<i>ped/o</i>	Child	Pediatric—referring to <i>children</i>
<i>phleb/o</i>	Vein	Phlebitis—inflammation of a <i>vein</i>
<i>ren/o</i>	Kidney	Renal—pertaining to the kidney

Word Root	Definition	Example
<i>scler/o</i>	Hard	Sclerosis—a state of <i>hardness</i>
<i>thromb/o</i>	Clot	Thrombocyte—a cell involved in <i>clotting</i>
<i>ven/o</i>	Vein	Venipuncture—puncture of a <i>vein</i>
Suffix	Definition	Example
<i>-al</i>	Pertaining to	Abdominal—pertaining to the abdomen
<i>-algia</i>	Pain	Neuralgia—nerve <i>pain</i>
<i>-ase</i>	Enzyme	Lipase—an <i>enzyme</i> that breaks down lipids (fats)
<i>-asthenia</i>	Weakness	Myasthenia gravis—disease characterized by muscle weakness
<i>-clast</i>	Break	Osteoclast—type of bone cell that breaks down bone tissue
<i>-cyte</i>	Cell	Leukocyte—white blood <i>cell</i>
<i>-emia</i>	Blood	Hypoglycemia—low <i>blood</i> sugar
<i>-ism</i>	Condition, disease	Dwarfism—condition of short stature
<i>-ist</i>	One who specializes in	Phlebotomist—one who <i>specializes in</i> phlebotomy
<i>-itis</i>	Inflammation of	Arteritis— <i>inflammation</i> of an artery
<i>-logist</i>	Specialist	Microbiologist— <i>specialist</i> who studies microorganisms
<i>-logy</i>	Study of	Etiology— <i>study</i> of the cause of a disease
<i>-lysis</i>	Breakdown, destruction	Glycolysis— <i>breakdown</i> of glucose
<i>-oma</i>	Tumor	Neuroma—tumor on a nerve
<i>-osis</i>	Condition of	Ecchymosis— <i>condition</i> of skin discoloration
<i>-ous</i>	Having	Infectious— <i>having</i> infection
<i>-pathy</i>	Disease	Myopathy— <i>disease</i> of the muscles
<i>-stasis</i>	Stoppage	Hemostasis— <i>stoppage</i> of blood or bleeding
<i>-stomy</i>	Opening	Colostomy—an opening into the colon
<i>-tomy</i>	Cutting into	Phlebotomy— <i>cutting</i> into a vein
<i>-ule</i>	Small	Venule—a <i>small</i> vein

1. When determining the meaning of an unknown medical term, in what order would you generally decipher the meaning of the word root, combining vowel, prefix, and suffix?
2. What is the purpose of a combining vowel?
3. Referring to the appendix *Prefixes, Suffixes, and Word Roots in Commonly Used Medical Terms*, build a word that means low blood sugar level.
4. What does the word *cyanosis* mean?

Checkpoint Questions 4.1

4.2 Medical Abbreviations

In healthcare, medical abbreviations and symbols—sometimes derived from Greek or Latin terms—help shorten the time and space needed to record medical information. As a phlebotomist, you should be able to recognize common abbreviations and symbols related to specimens and to the laboratory tests that you perform. These are used in

- medical records
- prescriptions

- medical orders
- bills for medical procedures

You may have seen a sign in a patient's hospital room that said "NPO," which stands for "nil per os," or "nothing by mouth." Some abbreviations consist of the letters of the words they represent. This type of abbreviation is called an *acronym*. For example, "ABG" is the acronym for "arterial blood gases." With most medical abbreviations related to the body systems, a good rule to follow is "When in doubt, spell it out." For your reference, the *Abbreviations and Symbols Commonly Used in Medical Notations* appendix contains common abbreviations and symbols that are used in medical practice.

Some abbreviations, symbols, and acronyms are prone to misinterpretation and have resulted in a significant number of errors. For this reason, The Joint Commission (TJC) and the Institute for Safe Medication Practices (ISMP)—two healthcare organizations whose mission includes the promotion of patient safety—have identified abbreviations that should not be used. An example of an error-prone abbreviation is U (for "unit"). When handwritten, U can be mistaken for a zero. Another example is the abbreviation "q1d," which means "every day," versus "q.i.d.," which means "four times a day." These and other abbreviation mistakes have unfavorable effects on patient care. To help prevent mistakes, healthcare facilities have approved abbreviation lists that do not include those identified by TJC and ISMP. All employees must follow these rules to ensure consistency. For a complete list of error-prone abbreviations, visit the ISMP online at www.ismp.org.

Laboratory tests also regularly use abbreviations in orders and in reports. Table 4-3 shows some examples of laboratory test abbreviations. The appendix *Medical Laboratory Tests* contains a detailed list of laboratory tests, their abbreviations, specimen requirements, and the laboratory section responsible for performing each test.

Checkpoint Questions 4.2

1. If you receive an order to draw blood for testing Na, Ca, K, and Cl, what tests will be performed on the blood?
2. A patient has come in to have her blood drawn for a fasting test, but the patient drank a soft drink before coming to the laboratory. How can the word *glucose* be abbreviated in the notes to the lab staff concerning this?
3. A job advertisement states that a "PRN" phlebotomist position is available. What does this mean? (Use the appendix *Prefixes, Suffixes, and Word Roots in Commonly Used Medical Terms* as a reference.)

4.3 Anatomical Terminology

Anatomy is the scientific study of body *structure*. Anatomically, you would describe the heart as a hollow, cone-shaped organ that is an average of 14 centimeters long and 9 centimeters wide. Understanding anatomy also allows you to comprehend the normal position of body structures. The term **physiology** refers to the study of the *function* of the body's organs and other structures. For example, the function of blood vessels is to transport blood throughout the body. Anatomy and physiology are commonly studied together because they are always related. *Pathophysiology*, or the study of a disordered function, is important to the phlebotomist. This knowledge will help you understand the procedures you will perform as a phlebotomist.

TABLE 4-3 Examples of Laboratory Test Abbreviations*

CBC	Complete blood count test includes <ul style="list-style-type: none"> • RBC (red blood cell count) • HCT (hematocrit) • Hgb (hemoglobin) • WBC (white blood cell count) • MCV (mean corpuscular volume) • MCH (mean corpuscular hemoglobin) • MCHC (mean corpuscular hemoglobin concentration) • PLT (platelet count)
BMP	Basic metabolic panel blood test includes <ul style="list-style-type: none"> • Glu (glucose or sugar) • Na (sodium) • K (potassium) • Ca (calcium) • Cl (chloride) • CO₂ (carbon dioxide) • HCO₃ (bicarbonate) • BUN (blood urea nitrogen) • Creat (creatinine)
CK	<ul style="list-style-type: none"> • Creatine kinase (<i>Part of blood enzyme test. Tested with troponin to check for muscle breakdown.</i>) • CKMB (<i>Creatine kinase MB: a type of CK that is tested with troponin and myoglobin as indicators of cardiac muscle damage.</i>)
Lipid panel	Blood lipids (fats) test includes <ul style="list-style-type: none"> • Chol (total cholesterol) • LDL (low-density lipoprotein or “bad” cholesterol) • HDL (high-density lipoprotein or “good” cholesterol) • VLDL (very-low-density lipoprotein) • Trig (triglycerides)
UA	Urinalysis test of the urine includes <ul style="list-style-type: none"> • pH (measure of acidity or basicity) • Sp Gr (specific gravity or density) • Prot (protein) • Glu (glucose or sugar) • Ket (ketones) • Nit (nitrite) • Leuk (leukocytes or white blood cells) • Blood/hemoglobin • Bilirubin • Urobilinogen

*See the appendix *Medical Laboratory Tests*, for additional information and examples.

Organization of the Body

The human body is complex in its structure and function. It is organized from the chemical level (the simplest level) all the way up to the organism (whole body) level. Figure 4-2 illustrates the organization of the human body from the simplest to the most complex level.

At the chemical level, the body comprises billions of atoms and molecules that make up chemicals such as acids, proteins, and sugars. **Atoms** are the simplest units of all matter. Matter is anything that takes up space and has weight—any solid, liquid, or gas. The four most common atoms in the human body are carbon, hydrogen, oxygen, and nitrogen. **Molecules** are units of matter formed from at least two atoms. Proteins and carbohydrates are examples of molecules that consist of hundreds of atoms. Molecules join together to form **organelles**, which are essentially cell parts. Organelles have various functions. See Figure 4-3 and Table 4-4.

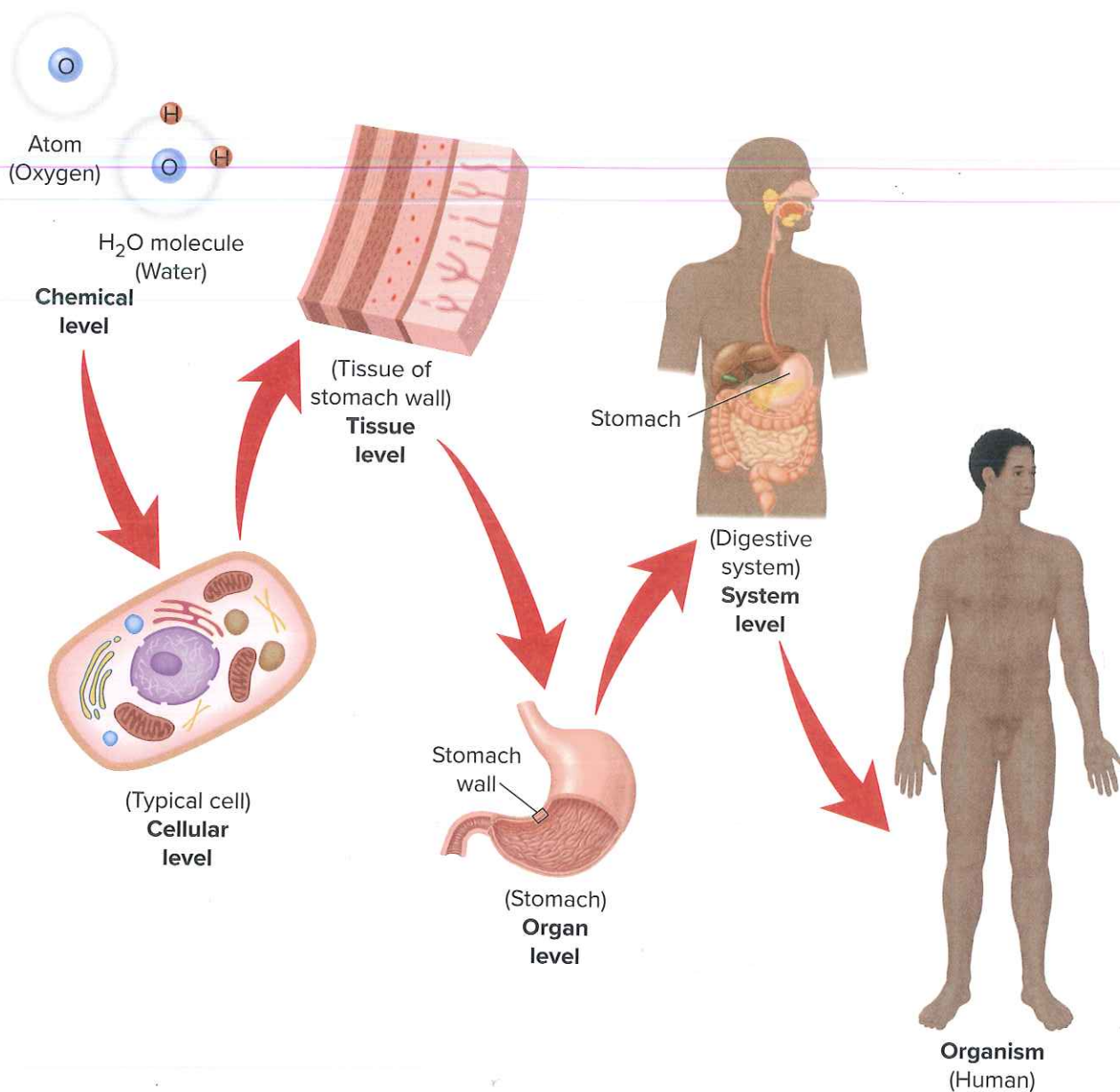


Figure 4-2 The human body is organized into levels, beginning with the chemical level and progressing through the cellular, tissue, organ, organ system, and organism (whole-body) levels.

Organelles such as nuclei, lysosomes, and mitochondria combine to build various types of cells, including:

- Leukocytes (white blood cells)
- Erythrocytes (red blood cells)
- Neurons (nerve cells)
- Adipocytes (fat cells)

Cells are considered to be the smallest living units in the body. When the same types of cells organize together, they form **tissue**. The four major types of body tissue are epithelial, connective, nervous, and muscle, and their functions are as follows:

- Epithelial tissue provides a covering for organs, such as the skin, and the linings of the body's various passages, such as the inside of the mouth.

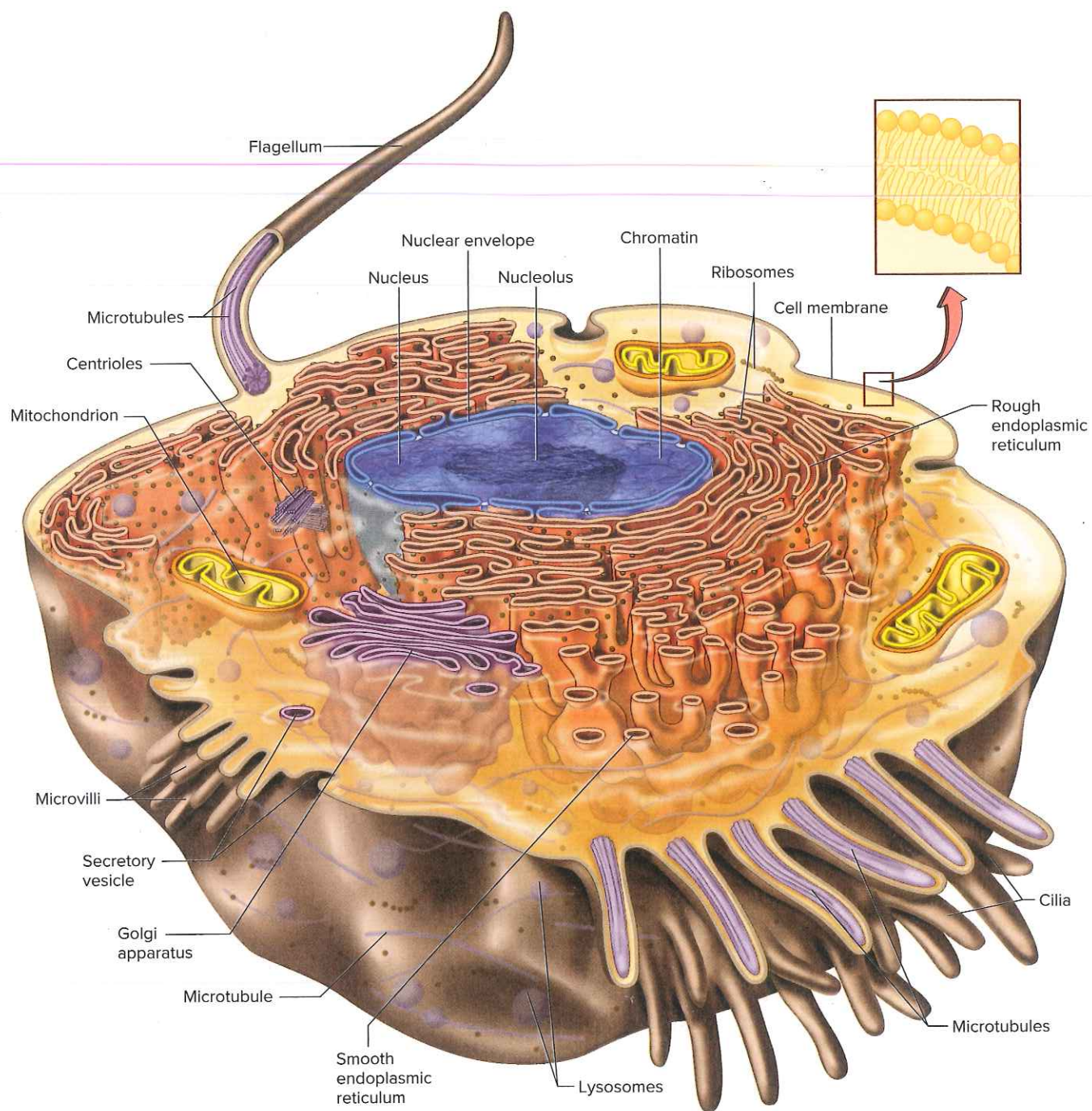


Figure 4-3 Structures found in many types of cells. Not all cells have all of these structures.

TABLE 4-4 Cell Parts and Their Functions

Centrioles	Essential for cell division
Cilia	Assist in propelling matter throughout the body tracts
Cytoplasm	Consumes and transforms energy and performs the cell's functions
Endoplasmic reticulum	Forms passageways to transport substances throughout the cytoplasm
Flagellum	Tail-like structure on sperm cell that provides swimming type of movement
Lysosomes	Perform the cell's digestive function
Mitochondria	Provide energy (known as the "powerhouse" of the cell)
Nucleus	Contains genetic material and controls cell division and reproduction (known as the brain of the cell)
Ribosomes	Responsible for protein synthesis in conjunction with RNA

- Connective tissue, found in bone and blood, supports other tissues and binds them together.
- Nervous tissue is made up of nerve cells; it carries “messages” to and from various parts of the body.
- Muscle tissue includes striated (voluntary) muscles that move the skeleton and smooth (involuntary) muscles that perform tasks automatically, such as the stomach muscle, which helps digest food.

Two or more tissue types combine to form **organs** and organs work together to function as organ systems. An **organism** (any plant or animal) is made up of organ systems essential to its survival. An organism works to maintain a state of balance to sustain life. This state of balance is known as **homeostasis**.

The human body is an organism. The organ systems of the human body, or body systems, carry out vital body functions. For example, the heart and blood vessels unite to form the cardiovascular system. The cardiovascular system’s organs circulate blood throughout the body to ensure that all body cells receive enough nutrients. There are 12 body systems in the human body: the integumentary, skeletal, muscular, lymphatic, immune, respiratory, digestive, nervous, endocrine, cardiovascular, urinary, and male and female reproductive systems.

Electrolytes

When put into water, some substances release ions, which are either positively or negatively charged particles. These substances are called **electrolytes**. For example, when you put NaCl in water, it releases two electrolytes: the sodium ion (Na^+) and the chloride ion (Cl^-).

Electrolytes are critical because the movement of ions into and out of body structures regulate or trigger many physiologic states and activities in the body. For example, electrolytes are essential to fluid balance, muscle contraction, and nerve impulse conduction. As a phlebotomist you may be asked to draw blood for “lytes” meaning electrolytes. These include the electrolytes such as carbon dioxide, chloride, potassium, and sodium.

Genetics

Deoxyribonucleic acid (DNA) and **ribonucleic acid (RNA)** are molecules that control the processes of human cell differentiation, growth, and development. DNA holds the genetic code that contains all the information needed for these body processes. RNA assists cells in translating DNA messages, prompting cells to carry out specific tasks. Genes are sequences of DNA and RNA that code for a type of protein or for an RNA chain that has a particular function in the body.

Laboratory testing for these genes or their function can determine paternity as well as genetic disorders. The Genetic Information Nondiscrimination Act of 2008 (GINA) protects people from genetic discrimination by insurance companies and employers. *Genetic discrimination* is the use of genetic information in order to exclude or discriminate against someone based on the genetic likelihood that the person may have or contract a specific disease or condition.

A genetic disorder is a disease caused by an altered form of a gene. Many cancers are caused by an alteration in a gene or a group of genes in a person’s cells. These alterations can occur randomly or as a result of an environmental exposure, such as cigarette smoke.

Certain genetic disorders are inherited. A mutated (altered) gene is passed down through a family and each generation of children may inherit the gene that causes the disease. One such genetic disorder is hemophilia. Other genetic disorders develop due to problems with the number of gene packages, called chromosomes. In Down syndrome, for example, there is an extra copy of chromosome 21.

Anatomical Terms

Anatomical terms are used to describe the locations of body parts and body regions. To use these terms correctly, assume that the body is in the **anatomical position**—standing upright and facing forward. The arms are at the sides of the body, and the palms of the hands are facing forward (see Figure 4-4). Even if patients are lying down, for consistency and correct communication when using anatomical terms, always refer to patients as if they were in the anatomical position. A patient lying on his back is in **supine** position, but not in anatomical position if his hands are not facing upward. A patient lying face down is in **prone** position.

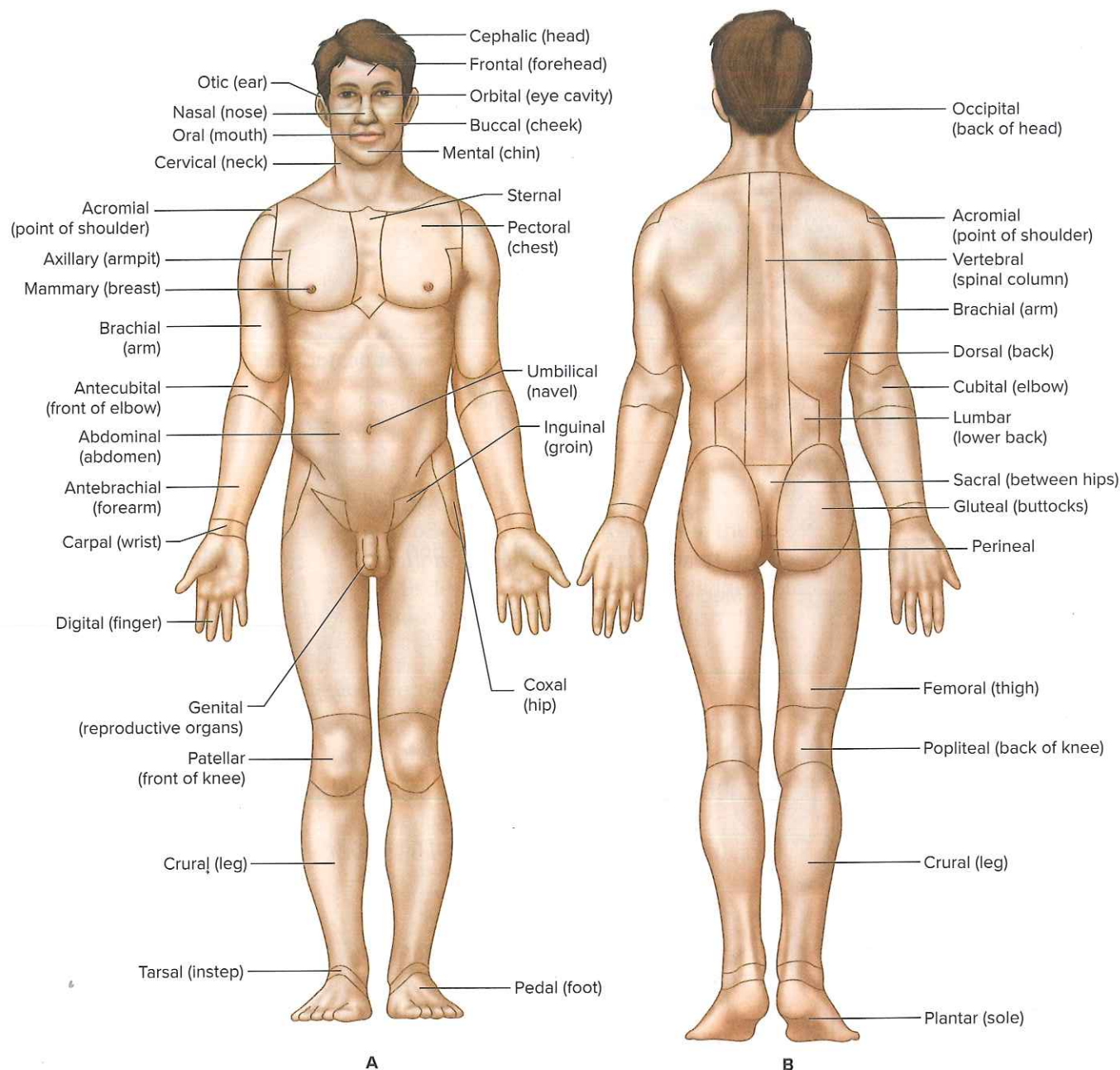


Figure 4-4 Numerous anatomical terms are used to describe regions of the body: (A) anterior view of anatomical position and (B) posterior view of anatomical position.

Directional Anatomical Terms

The directional anatomical terms are **cranial, caudal, ventral, dorsal, medial, lateral, proximal, distal, superficial, and deep**. They are used to identify the position of body structures compared to other body structures. You would say that the eyes are medial to (in the middle of) the ears but lateral to (at the side of) the nose. The skin is superficial and the heart is deep. See Table 4-5 and Figure 4-5 for an explanation and illustration of these important directional terms.

TABLE 4-5 Directional Anatomical Terms

Term	Definition	Example
Superior (cranial)	Above or close to the head	The thoracic cavity is superior to the abdominal cavity.
Inferior (caudal)	Below or closer to the feet	The neck is inferior to the head.
Anterior (ventral)	Toward the front of the body	The nose is anterior to the ears.
Posterior (dorsal)	Toward the back of the body	The brain is posterior to the eyes.
Medial	Close to the midline of the body	The nose is medial to the ears.
Lateral	Farther away from (or to the side of) the midline of the body	The ears are lateral to the nose.
Proximal	Close to a point of attachment or to the trunk of the body	The knee is proximal to the toes.
Distal	Farther away from a point of attachment or from the trunk of the body	The fingers are distal to the elbow.
Superficial	Close to the surface of the body	Skin is superficial to muscles.
Deep	More internal	Bones are deep to skin.

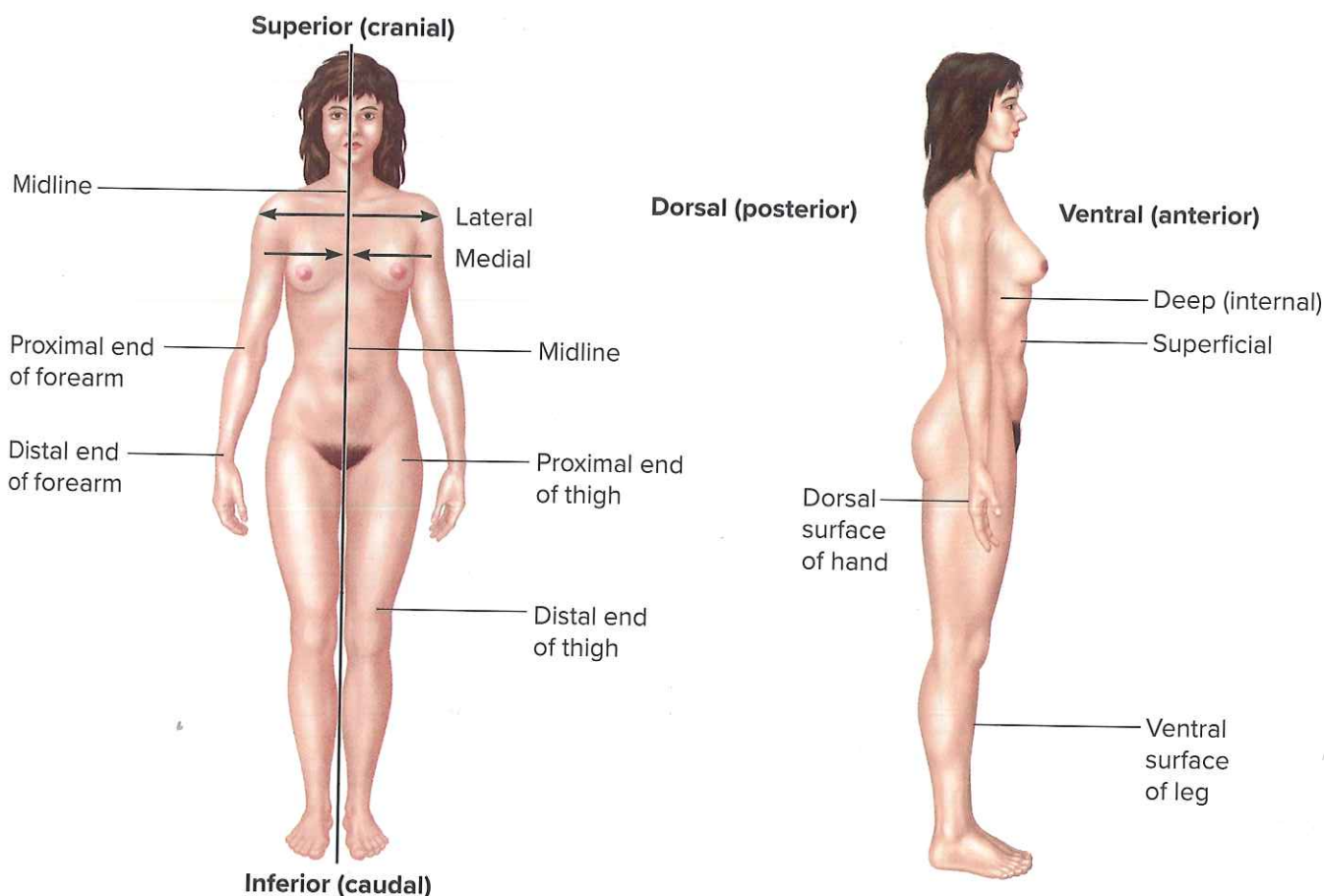


Figure 4-5 Directional terms provide mapping instructions for locating organs and body parts.

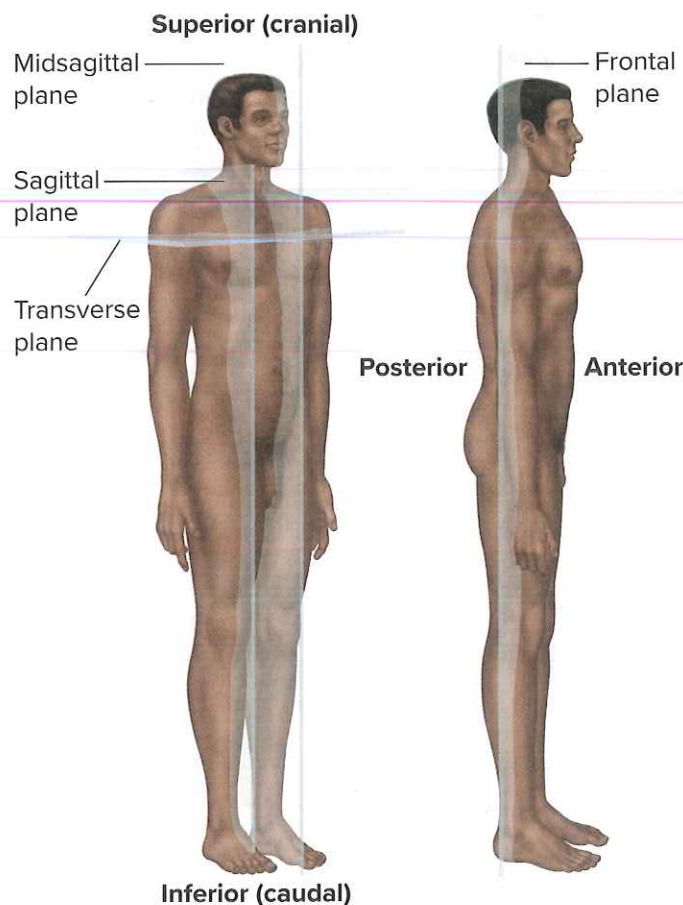


Figure 4-6 Spatial terms are based on imaginary planes dividing the body.

Anatomical Terms Used to Describe Body Sections

Sometimes, in order to study internal body parts, it helps to imagine the body as being divided into sections. Medical professionals often use terms such as *sagittal*, *transverse*, and *frontal* (*coronal*) to describe how the body is divided into sections. The following list outlines these terms, and Figure 4-6 illustrates the relevant planes:

- A **sagittal plane** divides the body into left and right portions.
- A **midsagittal plane** runs lengthwise down the midline of the body and divides it into equal left and right halves.
- A **transverse plane** divides the body into **superior** (upper) and **inferior** (lower) portions.
- A **frontal**, or **coronal**, **plane** divides the body into **anterior** (frontal) and **posterior** (rear) portions.

Anatomical Terms Used to Describe Body Parts

Many other anatomical terms are used to describe different regions or parts of the body. For example, the term **brachial** refers to the arm and the term **femoral** refers to the thigh. Figure 4-4 illustrates many of the common anatomical terms used to describe body parts.

Body Cavities and Abdominal Regions

The largest body cavities are the dorsal cavity and the ventral cavity. The dorsal cavity is divided into the cranial cavity and the spinal cavity. The cranial cavity houses the brain and the spinal cavity contains the spinal cord. The ventral cavity is divided into the **thoracic cavity** and the **abdominopelvic cavity**. The muscle called the **diaphragm** separates the thoracic and abdominopelvic cavities. The lungs, heart, esophagus, and trachea are contained in the thoracic cavity. The abdominopelvic cavity is divided into a superior abdominal cavity and an inferior pelvic cavity. The stomach, small and large intestines, gallbladder, liver, spleen, kidneys, and pancreas are all located in the abdominal cavity. The bladder and internal reproductive organs are located in the pelvic cavity. Figure 4-7 depicts these cavities. The abdominal area can be further divided into nine regions or four quadrants, which are illustrated in Figure 4-8.

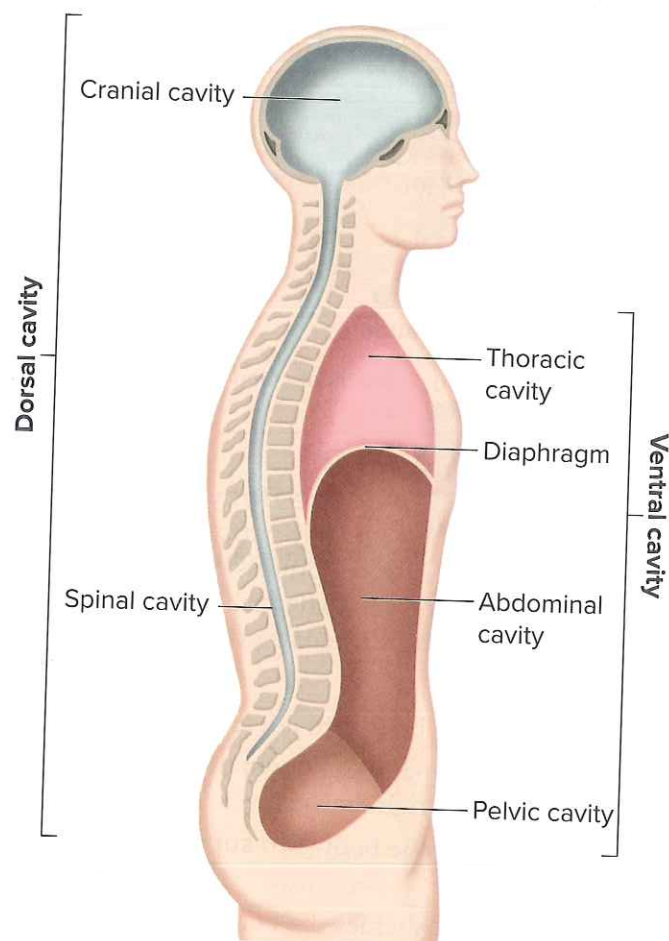


Figure 4-7 The two main body cavities are the dorsal and ventral cavities.

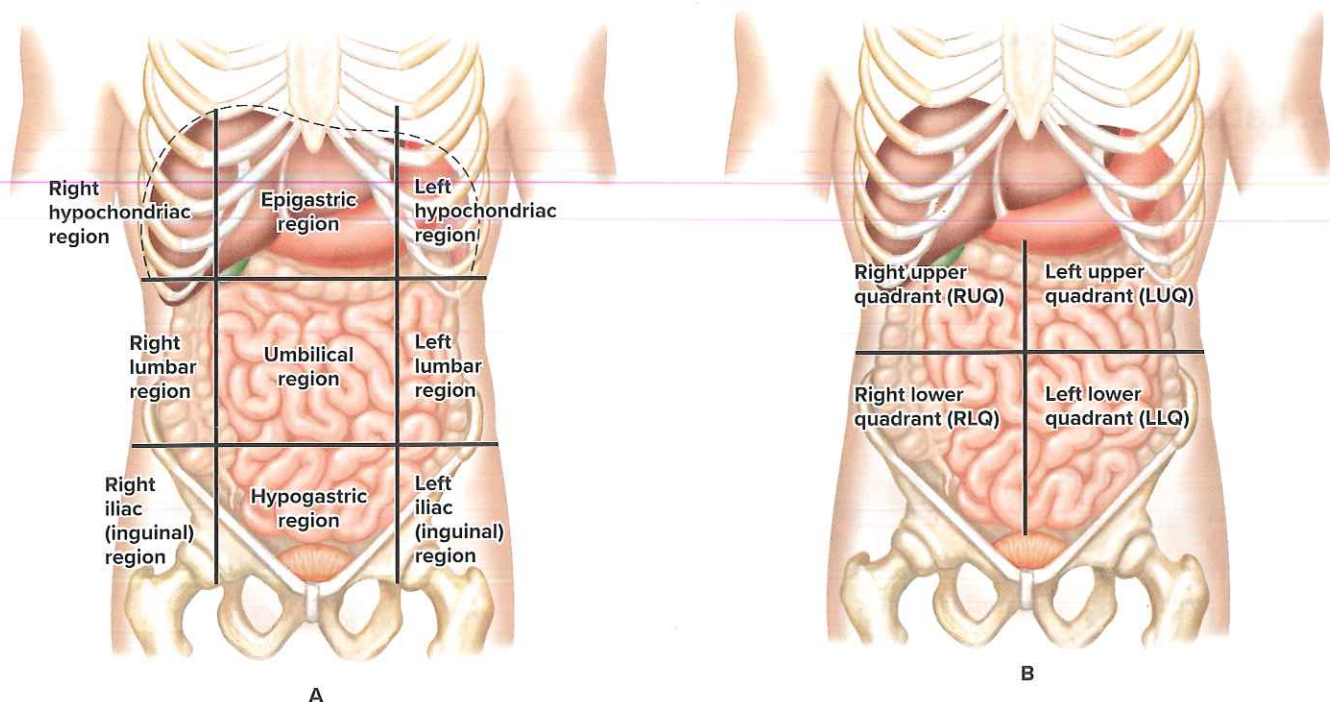


Figure 4-8 The abdominal area is divided into (A) nine regions or (B) four quadrants.

1. Describe the anatomical position.
2. Describe the major body cavities and list the organs contained in each.
3. How do the terms *deep* and *superficial* relate to phlebotomy?

Checkpoint Questions 4.3

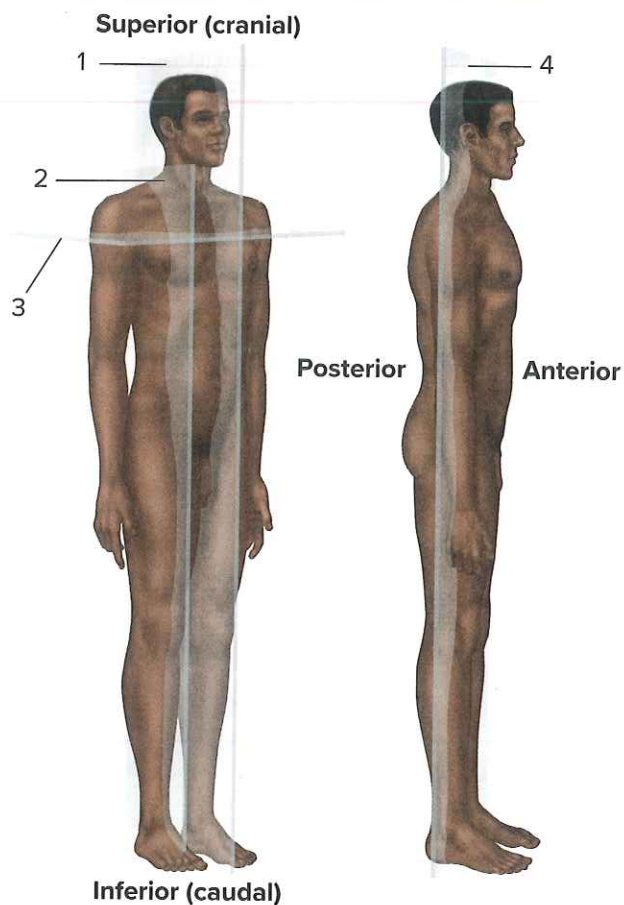
Chapter Summary

Learning Outcome	Key Concepts/Examples	Related NAACLS Competency
4.1 Recognize medical prefixes, word roots, and suffixes to build commonly used medical terms.	Many words in medical terminology come from Greek and Latin words. Medical words consist of a word root, a prefix and/or suffix, and sometimes a combining vowel. Building and decoding word parts will help you recognize and understand medical terminology.	1.1, 1.8
4.2 Define common medical abbreviations.	Abbreviations and symbols help shorten the time and space needed to record information in medical settings. Certain medical abbreviations are prone to errors and should not be used. Check the meaning of abbreviations carefully in practice. Some medical abbreviations are derived from Latin or Greek terms.	1.8
4.3 Explain body position, direction, and parts using medical terms.	Specific anatomical medical terms are used to identify body parts, planes, and positions. Knowing these terms will help the phlebotomist perform his or her job more efficiently.	1.1, 3.1

Chapter Review

A: Labeling

Label each body plane in the following figures.



1. [LO 4.3] _____
2. [LO 4.3] _____
3. [LO 4.3] _____
4. [LO 4.3] _____

B: Matching

Match each term with its definition. Refer to the appendix *Prefixes, Suffixes, and Word Roots in Commonly Used Medical Terms* as needed.

- | | |
|--------------------------|------------|
| _____ 5. [LO 4.1] adipo- | a. abdomen |
| _____ 6. [LO 4.1] aero- | b. across |
| _____ 7. [LO 4.1] ambi- | c. arm |

- | | |
|-------------------------------|--------------------|
| _____ 8. [LO 4.1] bracheo- | d. around |
| _____ 9. [LO 4.1] circum- | e. both |
| _____ 10. [LO 4.1] cryo- | f. brain |
| _____ 11. [LO 4.1] -ectomy | g. chest |
| _____ 12. [LO 4.1] encephalo- | h. cold |
| _____ 13. [LO 4.1] hypo- | i. cutting out |
| _____ 14. [LO 4.1] -itis | j. disease |
| _____ 15. [LO 4.1] laparo- | k. disintegration |
| _____ 16. [LO 4.1] -lysis | l. eye |
| _____ 17. [LO 4.1] oculo- | m. fat |
| _____ 18. [LO 4.1] ortho- | n. formation |
| _____ 19. [LO 4.1] -pathy | o. infection |
| _____ 20. [LO 4.1] -plasia | p. inflammation of |
| _____ 21. [LO 4.1] -sepsis | q. mouth |
| _____ 22. [LO 4.1] stomato- | r. straight |
| _____ 23. [LO 4.1] thoraco- | s. under |
| _____ 24. [LO 4.1] trans- | t. vessel |
| _____ 25. [LO 4.1] vaso- | u. with oxygen |

C: Fill in the Blank

Write in the word(s) to complete the statement.

26. [LO 4.1] Medical terminology is formed from _____ and _____ words.
27. [LO 4.1] The main part of a medical word is called the _____.
28. [LO 4.3] A molecule that contains genetic code is _____.
29. [LO 4.3] The smallest living unit is the _____.
30. [LO 4.3] Body _____ hold vital organs, such as the brain, lungs, and kidneys.

D: Sequencing

Place the level of structures that comprise the human body from simplest to most complex (from 1 to 7).

31. [LO 4.3] _____ cells
32. [LO 4.3] _____ chemicals
33. [LO 4.3] _____ organelles
34. [LO 4.3] _____ organism

35. [LO 4.3] _____ organs
36. [LO 4.3] _____ tissues
37. [LO 4.3] _____ organ system

E: Case Studies/Critical Thinking

38. [LO 4.2] An order for medication was written "q1d," but the person reading the order thought the order said "qid." What are the implications of this misinterpretation? How could this mistake have been avoided?
39. [LO 4.3] Just before you enter a patient's room to collect a specimen, the nurse asks you to make sure that when you leave the patient she is not supine. What does this mean?
40. [LO 4.2] When performing a venipuncture on a patient who has an intravenous (IV) line in his arm, you must always locate a site distal to the IV site. What does this mean?

F: Exam Prep

Choose the best answer for each question.

41. [LO 4.1] Which of the following is a prefix?
a. Aero
b. Itis
c. Osis
d. Tomy
42. [LO 4.1] Which of the following is a suffix?
a. Anti
b. Dys
c. Hypo
d. Pathy
43. [LO 4.1] This is used in the center of medical words to ease in their pronunciation.
a. Combining vowel
b. Prefix
c. Suffix
d. Word root
44. [LO 4.1] The study of body structures and their functions is
a. anatomy and pathology.
b. physiology and anatomy.
c. pathology and physiology.
d. anatomy and physiology.
45. [LO 4.3] You have been told to attempt your first blood draw in the most distal portion of the arm. Where would you look for a vein?
a. Elbow
b. Forearm
c. Wrist
d. Hand
46. [LO 4.3] Tissues are formed from
a. similar cells.
b. organs.
c. organelles.
d. molecules.
47. [LO 4.3] Which of the following is *not* one of the four major types of body tissue?
a. Connective
b. Nervous
c. Muscular
d. Vascular
48. [LO 4.3] Which set of words contains opposites?
a. Cranial and caudal
b. Dorsal and back
c. Lateral and outside
d. Proximal and close
49. [LO 4.3] Which plane divides the body into upper and lower sections?
a. Frontal
b. Midsagittal
c. Sagittal
d. Transverse
50. [LO 4.3] The frontal plane divides the body
a. from top to bottom.
b. from side to side.
c. from front to back.
d. down the middle.

51. [LO 4.3] Which of the following cavities is included in the dorsal cavity?
- Abdominal
 - Pelvic
 - Spinal
 - Thoracic
52. [LO 4.3] If a body structure is found in front of another body structure, it is said to be _____ to that structure.
- anterior
 - inferior
 - posterior
 - superior
53. [LO 4.3] When asked to draw blood from a vein inferior to the bend at the elbow, you would draw blood from a site _____ the bend at the elbow.
- above
 - below
 - behind
 - next to
54. [LO 4.1] The term *brachium* refers to the
- arm.
 - ear.
 - foot.
 - leg.
55. [LO 4.3] The diaphragm is a muscle that separates which two body cavities?
- Cranial and spinal
 - Dorsal and pelvic
 - Dorsal and ventral
 - Thoracic and abdominopelvic
56. [LO 4.3] The heart is found in the
- abdominal cavity.
 - dorsal cavity.
 - pelvic cavity.
 - thoracic cavity.
57. [LO 4.3] Organs that are found in the thoracic cavity include the
- stomach.
 - esophagus.
 - kidneys.
 - liver.
58. [LO 4.2] Which laboratory test is part of a CBC?
- Na
 - LDL
 - pH
 - WBC
59. [LO 4.2] Which laboratory test is part of a lipid panel?
- HDL
 - CBC
 - MCHC
 - K
60. [LO 4.3] Organs that are found in the abdominal cavity include all of the following *except* the
- spleen.
 - lungs.
 - kidneys.
 - intestines.



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