CHAPTER

10

Body Organs and Parts

OBJECTIVES

After completing this chapter and the exercises, the student should be able to:

1. Identify the parts of a cell and the specialized functions of tissues.
2. Identify the body systems.
3. Describe the functions of the body systems and how they work together.
4. Define the anatomic positions of the body and directional terms used to indicate them.
5. List the body cavities and the organs contained within them.
6. Identify nine body regions.
7. Use appropriate medical terms when describing locations of various parts of the body.

This chapter focuses on the way medical terms that you have previously learned relate to the body as a whole. To accurately understand and communicate data from medical reports, medical personnel use topographic anatomy. *Topographic* refers to the surface landmarks of the body. They are used as guides to the internal structures that lie beneath them, as well as the major regions of the body and their locations.

To describe the position of a structure or locate one structure in relation to another, medical professionals start with a position called the anatomical position. In this position, a person is standing erect, facing you, with hands at sides and palms forward, and feet and head pointed straight ahead. This is the position you will use to find the landmarks of the body. We begin with a discussion of cells, the structural and functional unit of all living matter.

ALLIED HEALTH PROFESSIONS

Dietitians and Dietetic Technicians

Dietitians are professionals trained in applying the principles of nutrition to food selection and meal preparation. They help prevent and treat illnesses by promoting healthy eating habits, scientifically evaluating clients' diets, and suggesting diet modifications. They counsel individuals and groups; set up and supervise food service systems for institutions such as schools, hospitals, and prisons; promote sound eating habits through education; and conduct research. Major areas of specialization include clinical, management, community, business and industry, and consultant dietetics. Dietitians also work as educators and researchers.

A dietetic technician, registered (DTR), works as a member of the food service, management, and healthcare team, independently or in consultation with a registered dietitian. The dietetic technician supervises support staff, monitors cost-control procedures, interprets and implements quality assurance procedures, counsels individuals or small groups, screens patients/clients for nutritional status, and develops nutrition care plans. The dietetic technician helps to supervise food production and service; plans menus; tests new products for use in the facility; and selects, schedules, and conducts orientation programs for personnel. The technician may also be involved in selecting personnel and providing on-the-job training. The dietetic technician obtains, evaluates, and uses dietary histories to plan nutritional care for patients. Using this information, the technician guides families and individuals in selecting food, preparing it, and planning menus based on nutritional needs. The dietetic technician has an active part in calculating nutrient intakes and dietary patterns.

INQUIRY

The Academy of Nutrition and Dietetics: www.eatright.org

Data from Stanfield, Peggy S., Cross, Nanna, and Hui, Y.H. *Introduction to the Health Professions*, 6th ed. Burlington, MA: Jones & Bartlett Learning; 2012.

LESSON ONE Materials to Be Learned

STRUCTURAL UNITS OF THE BODY

TABLE 10-1

Unit	Pronunciation	Definition
Cells		
cell	sel	minute protoplasmic masses making up organized tissue, consisting of the nucleus surrounded by cytoplasm enclosed in a cell or plasma membrane. Fundamental, structural, and functional unit of living organisms. Each cell performs functions necessary for its own life. Cells multiply by dividing; this is called mitosis
nucleus	nu-kle-us	cell nucleus; a spheroid body within a cell, consisting of a thin nuclear membrane and genes or chromosomes
chromosomes	kroh´-moh-sohms	thread-like structures in the cell nucleus that control growth, repair, and reproduction of the body
cytoplasm	si-to-plasm	the protoplasm of a cell exclusive of that of the nucleus (nucleoplasm)
cell membrane	sel mem-bran	a thin layer of tissue, serving as the wall of a cell; selectively allows substances to pass in and out of the cell, and refuses passage to others

TABLE 10-1 (*continued*)

Unit	Pronunciation	Definition
Tissues		
tissue	tish-u	a group of similarly specialized cells that together perform certain special functions
epithelial tissue	ep´-i-the-le-al tish-u	the skin and lining surfaces that protect, absorb, and excrete
connective tissue	ko-nek-tiv tish-u	the fibrous tissues of the body; that which binds together and is the ground substance of the various parts and organs of the body; examples are bones, tendons, and so on
muscle tissue	mus-el tish-u	tissue that contracts; consists of striated (striped), cardiac, and smooth muscle
nerve tissue	nerv tish-u	a collection of nerve fibers that conduct impulses that control and coordinate body activities
Organ		
organ	or-gan	tissues arranged together to perform a specific function; these internal structures are contained within the body cavities. Some examples include the heart, lungs, and organs of digestion, such as the liver and gallbladder, and the organs of reproduction
Systems		
system	sis-tem	a set of body organs that work together for a common purpose
integumentary system	in-teg´-u-men-ter-e sis-tem	skin serves as the external covering of the body; accessory organs of this system are nails, hair, and oil and sweat glands
musculoskeletal system	mus´-ku-lo-skel-e-tal sis-tem	skeleton and muscles: the 206 bones, the joints, cartilage, ligaments, and all of the muscles of the body
cardiovascular system	kar´-de-o-vas-ku-lar sis-tem	heart and blood vessels; blood pumped and circulated through the body
gastrointestinal system	gas´-tro-in-tes-ti-nal sis-tem	a long tube commonly called the GI tract: consists of mouth, esophagus, stomach, and intestines; accessory organs are pancreas, liver, gallbladder, and salivary glands
respiratory system	re-spi-rah-to´-re sis-tem	nose, pharynx, larynx, trachea, bronchi, and lungs; furnishes oxygen, removes carbon dioxide (respiration)
genitourinary system	jen´-i-to-u-re-ner´-e sis-tem	reproductive and urinary organs; also called urogenital system (GU or UG). The urinary organs are the kidneys, ureters, bladder, and urethra, and the reproductive organs are the gonads and various external genitalia and internal organs
endocrine system	en-do-krin sis-tem	glands and other structures that make hormones and release them directly into the circulatory system; ductless glands
nervous system	ner-vus sis-tem	brain and spinal cord make up the central nervous system (CNS); the autonomic nervous system (ANS), or peripheral nervous system, consists of 12 pairs of cranial nerves and 31 pairs of spinal nerves

BODY CAVITIES AND PLANES

Refer to **Figures 10–1**, **10–2**, and **10–3** when studying body cavities and planes. The body has two main large cavities that contain the internal body organs—the *ventral* and *dorsal* cavities. Each of these cavities is further divided into smaller cavities that contain specific organs. *Ventral* refers to the front or belly portion of the body, and *dorsal* refers to the back portion of the body.

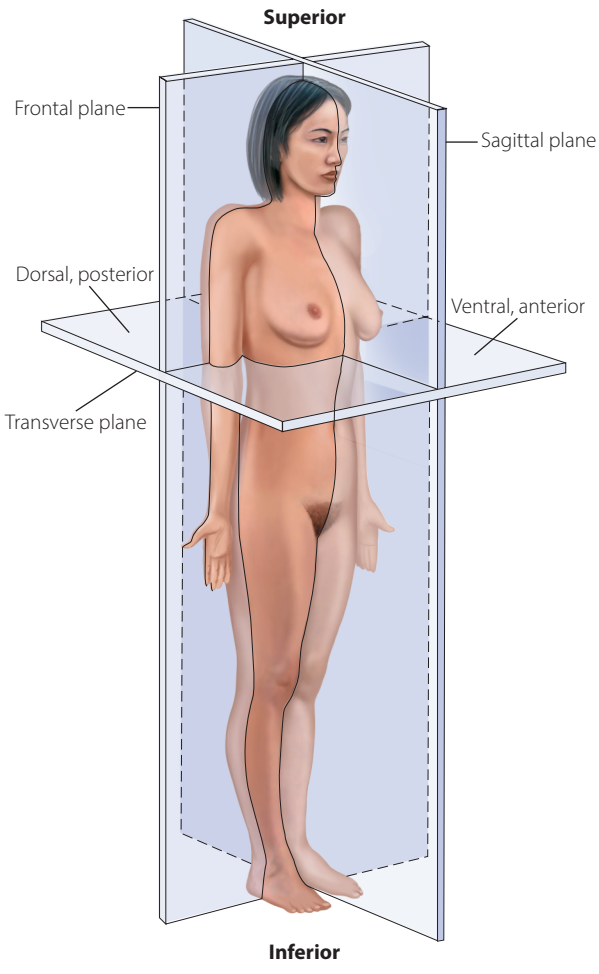

FIGURE 10–1 Body planes and directions

CONFUSING MEDICAL TERMINOLOGY

palpebrate Versus palpate Versus palpitate

palpebrate = blink or wink, e.g., palpebrate (pal-pee-brit) refers to winking

palpate = touch, e.g., palpate (pal-peyt) refers to the examination or exploring by touching (an organ or area of the body), usually as a diagnostic aid

palpitate = pulsate, quiver, throb, tremble, e.g., palpitate (pal-pi-teyt) as in "His heart palpitates wildly"

CONFUSING MEDICAL TERMINOLOGY

cyt/o Versus cyst/o

cyt/o = cell, e.g., cytoplasm (sahy-tuh-plaz-uhm) refers to gelatinous fluid outside the nucleus

cyst/o = bladder of a sac, urinary bladder, cyst, sac of fluid, e.g., cystoplasty (sis-to-plas-te) refers to plastic repair of the bladder

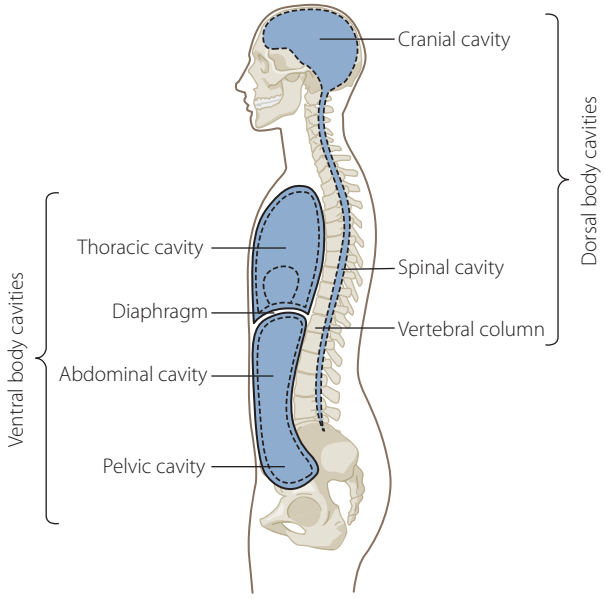

FIGURE 10–2 Sagittal section of the body, showing the dorsal and ventral body cavities

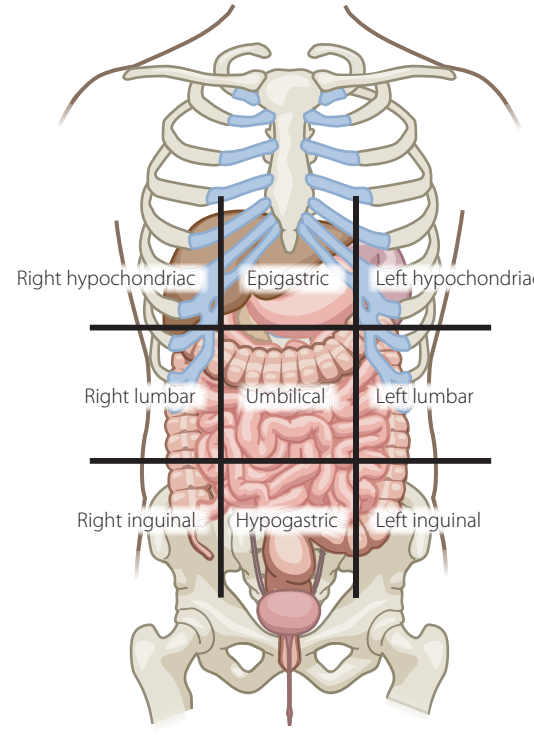

FIGURE 10–3 Abdominal regions

TABLE 10-2

Term	Pronunciation	Definition
Body Cavities		
body cavities		hollow spaces containing body organs
abdominal cavity	ab-dom-uh-nl kav-i-te	the cavity beneath the thoracic cavity that is separated from the thoracic cavity by the diaphragm; contains the liver, gallbladder, spleen, stomach, pancreas, intestines, and kidneys
pelvic cavity	pel-vik kav-i-te	the lower front cavity of the body located beneath the abdominal cavity; contains the urinary bladder and reproductive organs
pleural cavity	pleu´-ral kav-i-te	the thoracic cavity containing the lungs, trachea, esophagus, and thymus gland
thoracic cavity	tho-rass-ik kav-i-te	the chest cavity, which contains the lungs, heart, aorta, esophagus, and trachea
mediastinum	me´-de-ah-sti-num	the mass of tissues and organs separating the sternum in front and the vertebral column behind, containing the heart and its large vessels
peritoneal cavity	per´-i-to-ne-al kav-i-te	the space containing the stomach, intestines, liver, gallbladder, pancreas, spleen, reproductive organs, and urinary bladder

(*continues*)

TABLE 10-2 *(continued)*

Term	Pronunciation	Definition
cranial cavity	kra-ne-al kav-i-te	space enclosed by skull bones, containing the brain
spinal cavity	spi-nal kav-i-te	cavity containing the spinal cord
diaphragm	di-ah-fram	dome-shaped muscle separating the abdominal and thoracic cavities
Body Planes		
body planes		imaginary flat surfaces that divide (used in anatomic diagrams)
sagittal	saj-i-tal	a sagittal plane divides the body into right and left portions
midsagittal	mid-saj-i-tal	a plane that vertically divides the body, or some part of it, into equal right and left portions (medial)
coronal	ko-ro-nal	also called frontal; a plane that divides the body into anterior and posterior sections (front and back)
transverse	trans-vers	a plane that divides the body into superior and inferior sections (top and bottom)

METABOLISM AND HOMEOSTASIS

There are two important terms in medicine that have general application. They are described in Table 10-3.

TABLE 10-3

Term	Pronunciation	Definition
metabolism	me-tab-o-lizm	sum of the body's physical and chemical processes that convert food into elements for body growth, energy, building body parts (anabolism), and degrading body substances for recycling or excretion (catabolism)
homeostasis	ho´-me-o-sta-sis	a steady state: the tendency of stability in the normal physiologic systems of the organism to maintain a balance optimal for survival. Body temperature, osmotic pressure, normal cell division rate, and nutrient supply to cells are a few examples

CONFUSING MEDICAL TERMINOLOGY

perionychium Versus paronychia

perionychium = structure that surrounds the nail, e.g., perionychium (per-ee-oh-nik-ee-uhm) refers to the epidermis surrounding the base and sides of a fingernail or toenail

paronychia = infection of the nail e.g., paronychia (par-uh-nik-ee-uh) refers to inflammation of the epidermis (folds of skin) bordering a nail of a finger or toe, usually characterized by infection and pus formation

LESSON TWO Progress Check

SPELLING AND DEFINITION

Spell and *list* the parts of each of these body systems:

1. Serves as a covering:

_____ system. Consists of _____

_____

2. Pumps and circulates blood:

_____ system. Consists of _____

_____

3. Bones and muscles:

_____ system. Consists of _____

_____

4. A long tube for input of nutrients and excretion of solid wastes:

_____ system. Consists of _____

_____

5. Furnishes oxygen and removes carbon dioxide:

_____ system. Consists of _____

_____

6. Reproductive organs and liquid waste disposal:

_____ system. Consists of _____

_____

7. Makes hormones and releases them directly into the blood:

_____ system. Consists of _____

_____

8. Controls all thought and movement:

_____ system. Consists of _____

_____

FILL-IN

Fill in the blanks to make a complete, accurate sentence:

1. The _____ is the functional unit of all living organisms.

2. The function of the nucleus is to furnish _____ material.

3. Cell division is called _____.
4. When cells divide they are really _____.
5. The wall of the cell is called a(n) _____.
6. When groups of cells have specialized functions they are called _____.
7. The skin and lining surfaces that protect, absorb, and excrete are _____.
8. The fibrous bonds that are the ground substance of various parts are called _____.
9. Groups of cells that contract are _____.
10. Those fibers that conduct impulses are _____.
11. A body part that performs special functions is called a(n) _____.
12. When a set of body parts works together for a common purpose it is called _____.
13. The space that contains body organs is called a(n) _____.
14. Imaginary flat surfaces that divide the human anatomy are called _____.
15. The _____ separates the abdomen from the lungs.
16. Thread-like structures in the cell nucleus that control growth, repair, and reproduction are called _____.
17. Accessory organs of the GI tract are the _____, _____, _____, and _____.

DEFINITIONS

1. metabolism _____

_____

2. homeostasis _____

_____

SHORT ANSWER

1. Name the four types of specialized body tissues and one major function of each:
   - **a.** _____
   - **b.** _____
   - **c.** _____
   - **d.** _____
2. What is the function of a *cell membrane*? _____
3. Of what does a *cell nucleus* consist? _____