

Anatomical Organization

This chapter will focus on the anatomical divisions and structural organization of the body. Because you'll be learning how to use directional and positional terms, basic skeletal anatomy will be introduced. The book will go into more detail on anatomy in later chapters.

Structural Organization

We can divide the body into four basic groups: cells, tissues, organs, and systems. Within each general group are more specialized structures with specific functions.

The Cell

The cell is the basic structure of all things. Cells can be found everywhere in the body, where they exist in specific organs and tissues. While the functions of cells differ based on their anatomical location, their basic anatomy is the same. Label the cell diagram in Figure 2.1 using the structures listed in Table 2.1.

Chemical Processes of the Cell

There are three basic processes that occur within a cell. They are as follows:

- Anabolism** Process of building up complex proteins from simpler substances.
- Catabolism** Process of breaking down complex foods into simpler substances.
- Metabolism** The total of the chemical processes in a cell: anabolism + catabolism.

Cell Types

There are many different types of cells in the body. Each has a specific function. Although the types share similar internal structures, their morphologies (shapes) differ (Figure 2.2).

TECH TIP 2.1 Did you know that the number of chromosomes is different from species to species? Some examples are as follows:

Humans:	46
Dogs:	78
Cats:	38
Horses:	64
Donkeys:	62
Cattle:	60
Sheep:	54
Goats:	60
Pigs:	38
Chickens:	20
Birds:	69

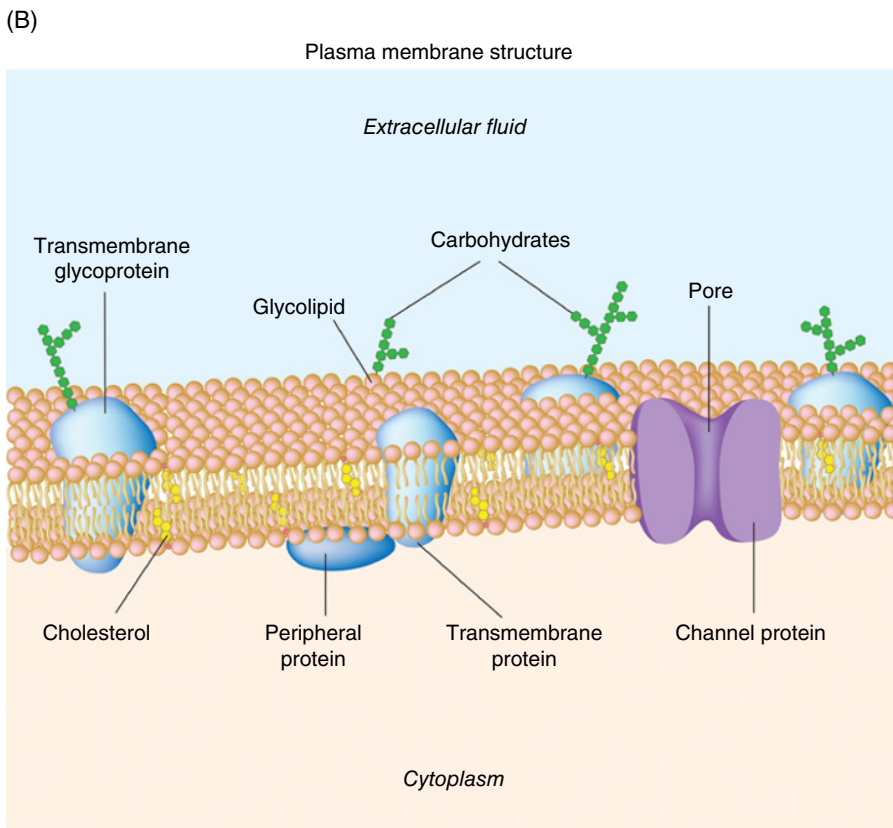
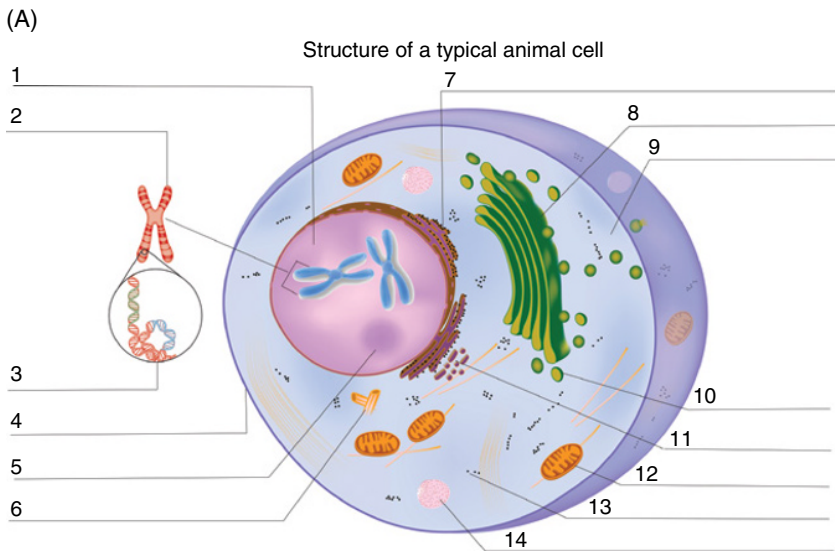


Figure 2.1 (A) Anatomy of a cell. Source: Courtesy of shutterstock/Alila Sao Mai, Blamb, and SSCREATIONS. (B) Semipermeable cell membrane. Source: Courtesy of shutterstock/Alila Sao Mai.

Table 2.1 Cellular anatomy.

Cell membrane (4)	Semipermeable structure that surrounds and protects the cell
Centrioles (6)	Tubular structures that maintain the cell's shape and move chromosomes during mitosis
Chromosomes (2)	Rod-like structures containing regions of DNA called genes
Cytoplasm (9)	Material inside the cell membrane that surrounds the nucleus
DNA (3)	The basic structure of genes that directs cell activity and transmits genetic information; deoxyribonucleic acid
Endoplasmic reticulum	Protein factory where proteins are made from simple materials. (11) Smooth endoplasmic reticulum synthesizes lipids (7) Rough endoplasmic reticulum synthesizes proteins
Golgi apparatus (8)	Processing factory where proteins are stored, modified, and transported
Lysosome (14)	Site of intracellular digestion containing enzymes to disintegrate microorganisms and damaged tissue
Mitochondria (12)	Energy factory of the cell in which foods are burned for energy
Nucleoplasm	Material within the nucleus
Nucleus (1)	The control center of the cell that contains chromosomes
Nucleolus (5)	Site of RNA synthesis. Plural form is nucleoli
Protoplasm	Cell membrane, cytoplasm, and nucleus
Ribosomes (13)	Structures found in endoplasmic reticulum containing RNA, and the site of protein synthesis. Note the ribosomes also found on the rough endoplasmic reticulum (7)
Vacuole (10)	Fluid-filled cavity containing food, water, or waste products

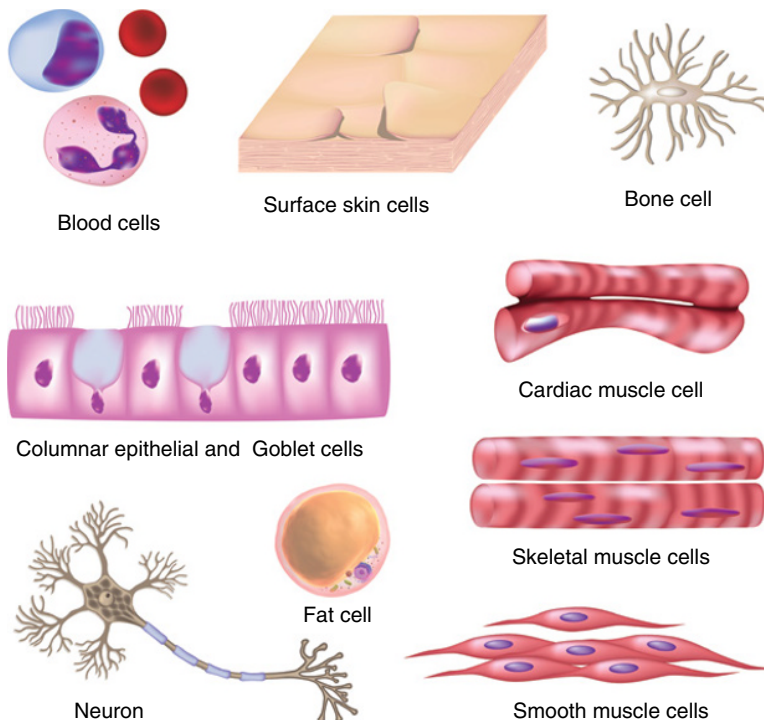


Figure 2.2 Cell and tissue types. Source: Courtesy of shutterstock/Alila Sao Mai.

Tissue

Tissues are groups of similar cells working together for a specific function. The following are examples of tissue types.

Adipose tissue	Collection of fat cells.
Connective tissue	Binds and supports various structures. Examples include fat, bone, blood, cartilage.
Epithelial tissue	Consists of epithelium , which lines external and internal body surfaces. Consists of endothelium , which lines organs and blood vessels. Consists of mesothelium , which lines cavities such as the peritoneum.
Muscle tissue	Skeletal muscle , which is striated, voluntary muscle controlling movement. Cardiac muscle , which is striated, involuntary muscle controlling the heart. Visceral muscle , which is smooth, involuntary muscle controlling the internal organs (viscera).
Nerve tissue	Cells that conduct electrical impulses all over the body.

Organs

Organs are different tissues working together for a specific function. For example, the organs of the abdomen and chest use nervous tissue, muscle tissue, and epithelial tissue to function. The medical term for internal organs is viscera. Examples of viscera include the heart, lungs, stomach, liver, and spleen.

System

A system is a group of different organs working together for a complex function

(Figure 2.3). For example, the respiratory system consists of the nose, throat, voice box, windpipe, and lungs working together to help an animal breathe. Table 2.2 is a list of the different systems of the body. The following chapters will focus on each system individually.

Cavities

The body can be divided into different areas that contain organs working together. Each area is referred to as a cavity. This book will discuss each body cavity in detail in the later chapters. This chapter introduces the body cavities (Figure 2.3).

Abdominal	Cavity containing organs such as the stomach, intestines, spleen, and pancreas.
Cranial	Cavity containing the brain.
Spinal	Cavity containing the spinal cord.
Thoracic	Cavity containing organs such as the heart, lungs, esophagus, and trachea.

Additional Terminology for Structural Organization

Anatomy	The form and structure of the body.
Benign	Not malignant, non-invasive; not spreading.
Cartilage	Flexible connective tissue attached to bones at a joint.
Diaphragm	Thin, muscular partition separating the thoracic and abdominal cavities.
Endocrine glands	Glands that secrete hormones directly into the bloodstream (Figure 2.4).
Exocrine glands	Glands that secrete chemicals through tubes everywhere in the body (Figure 2.4).
Larynx	Voice box (Figure 2.5).

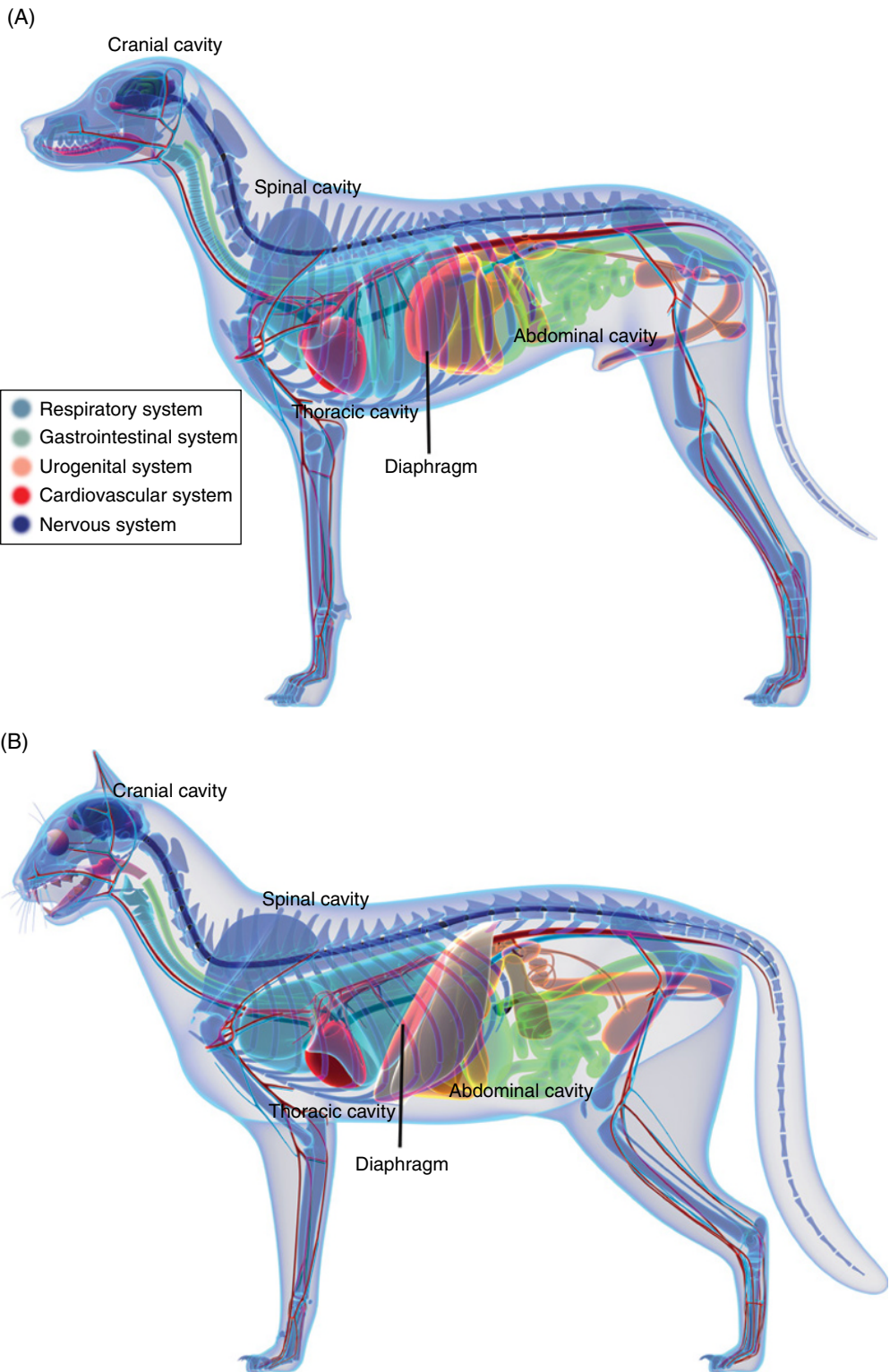


Figure 2.3 (A) Body systems of the dog. (B) Body systems of the cat. (C) Body systems of the horse. Source: Courtesy of shutterstock/decade3d.

(C)

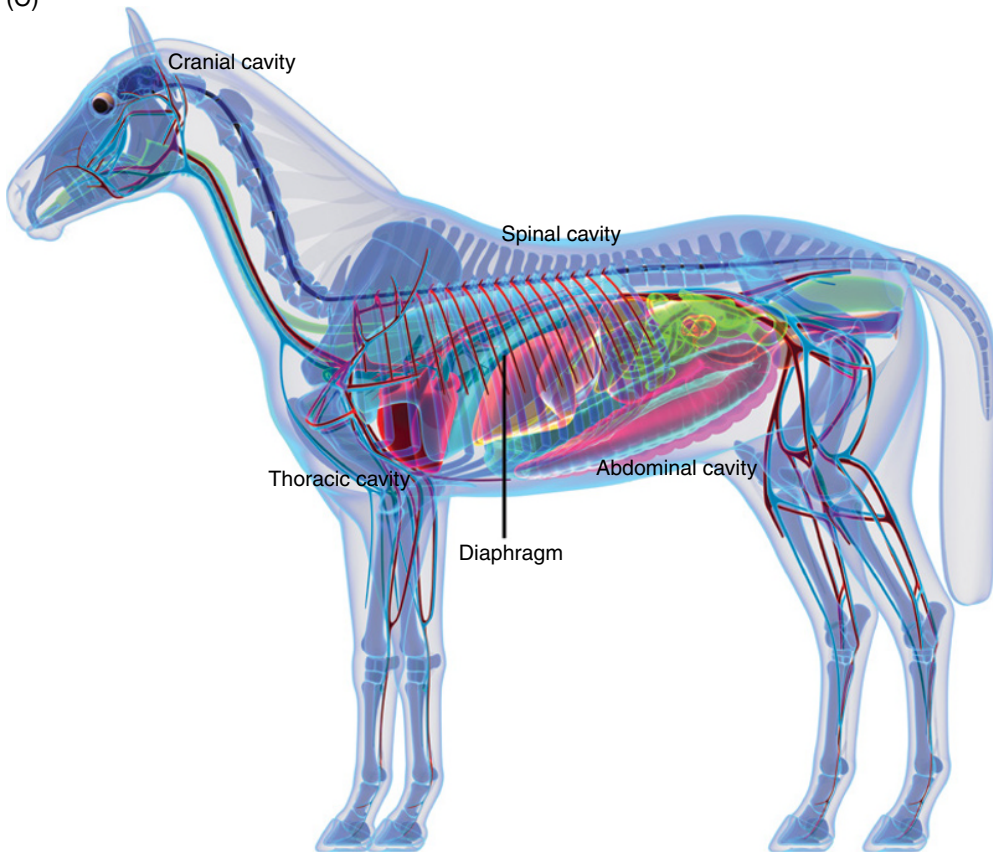


Figure 2.3 (Continued)

Table 2.2 Systems.

System	Definition
Cardiovascular	Consists of organs such as the heart, veins, arteries, capillaries, and spleen
Digestive	Consists of organs such as the mouth, throat, esophagus, stomach, intestines, pancreas, liver, and gallbladder
Endocrine	Consists of organs such as the pancreas, pituitary gland, thyroid gland, ovaries, testes, and adrenal glands
Integumentary	Consists of organs such as the skin, hair (fur), nails and glands
Musculoskeletal	Consists of organs such as the bones, muscle, and joints
Nervous	Consists of organs such as the brain and spinal cord
Reproductive	Consists of organs such as the ovaries, vagina, uterus, testes, and penis
Respiratory	Consists of organs such as the windpipe, lungs, and heart
Urogenital	Consists of organs such as the kidneys, ureters, urinary bladder, and urethra

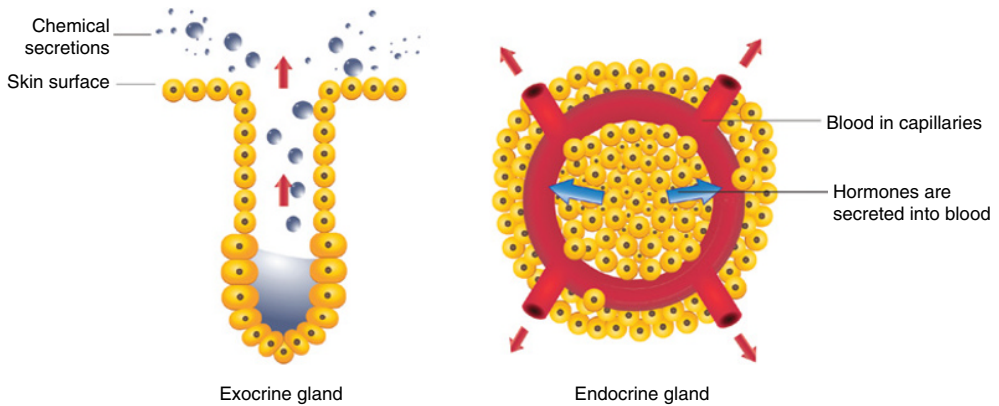


Figure 2.4 Endocrine and exocrine glands. Source: Courtesy of shutterstock/GRei.

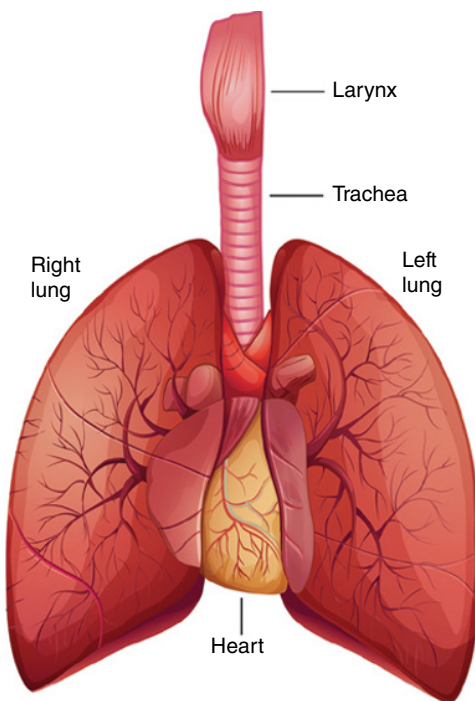


Figure 2.5 Respiratory system. Source: Courtesy of shutterstock/BlueRingMedia.

- Peritoneum** Membrane surrounding the organs of the abdomen.
- Pharynx** Throat
- Physiology** Study of the body's function.
- Trachea** Windpipe (Figure 2.5).
- Umbilicus** The navel (Figure 2.6).
- Ureter** Tube that carries urine from the kidneys to the urinary bladder.
- Urethra** Tube that carries urine from the urinary bladder to the outside of the body.
- Viscera** Internal organs.

Pathology of Structures

- Lavage** Irrigation or washing out of an organ or cavity.
- Malignant** Tending to become progressively worse.
- Membrane** Thin layer of tissue that covers a surface, lines a cavity, or divides a space or an organ.

- Evisceration** Displacement of internal organs outside the cavity that should contain them (Figure 2.7C).
- Hernia** Abnormal protrusion of an organ or tissue through the structure that should contain it (Figure 2.7A).
- Prolapse** Abnormal protrusion of an organ or tissue through a natural opening (Figure 2.7B).

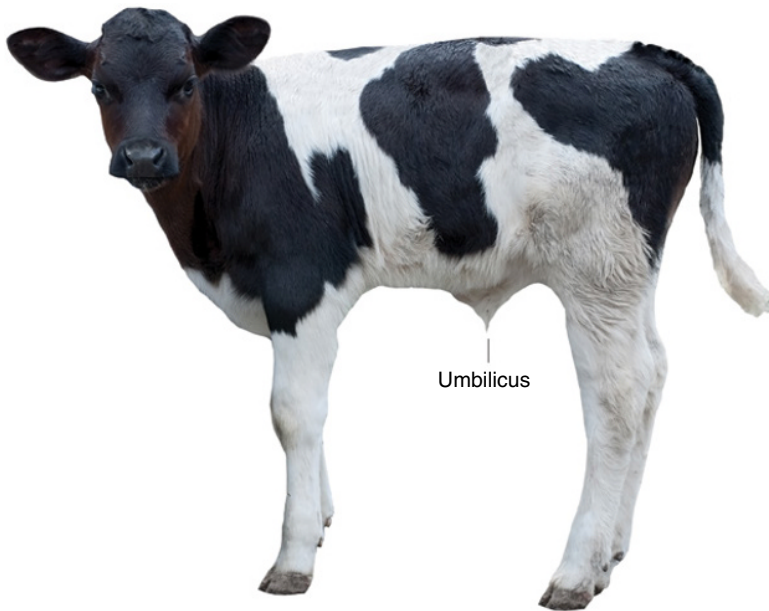


Figure 2.6 Umbilicus on a calf. Source: Courtesy of shutterstock/Damian Palus.

Introduction to the Skeletal Anatomy

Figure 2.8 shows a diagram of the dog skeleton. Knowing the location of these bones is essential in understanding how to use directional terminology. This chapter merely introduces the location of these bones. Chapter 3 will go into more detail on skeletal anatomy.

Directional Terms

We use directional terms when describing the location of various structures in the body and when comparing the relationship of one structure to another in the body (Table 2.3). These terms, for the most part, are widely used in veterinary medicine. To better understand their application, try picturing yourself on all fours. You'd be surprised how much this helps.

TECH TIP 2.2 Anterior and Posterior in Veterinary Medicine

These two terms can get confusing when trying to use them to describe structures on quadrupeds (animals on four legs). In human medicine, anterior describes the front of our body or the side with our face and belly. Posterior describes the back of our body or the side with the back of our head and our behind.

Since most animals are on four limbs, anterior and posterior no longer apply. The front of their body can be described as cranial or the head-side, the back of their body can be described as caudal or the tail-side.

Depending on how you view it, the front of their body may be their belly side in which case ventral would be used, the back of their body would dorsal.

Anterior and posterior can still be used on these animals though. For example, on the horse, when describing structures on the front and back side of the hoof.

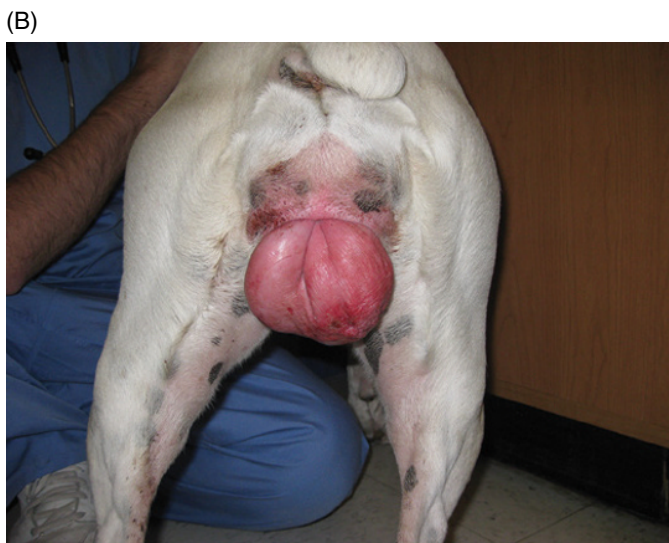


Figure 2.7 (A) Umbilical hernia in a Cocker Spaniel puppy. Source: Courtesy of shutterstock/WilleeCole. (B) Vaginal prolapse in an American Pit Bull Terrier. Source: Courtesy of A.K. Traylor, DVM; Microscopy Learning Systems. (C) Evisceration on dog about to go to surgery for repair. Source: Courtesy of Christine Gilbreath, CVT.

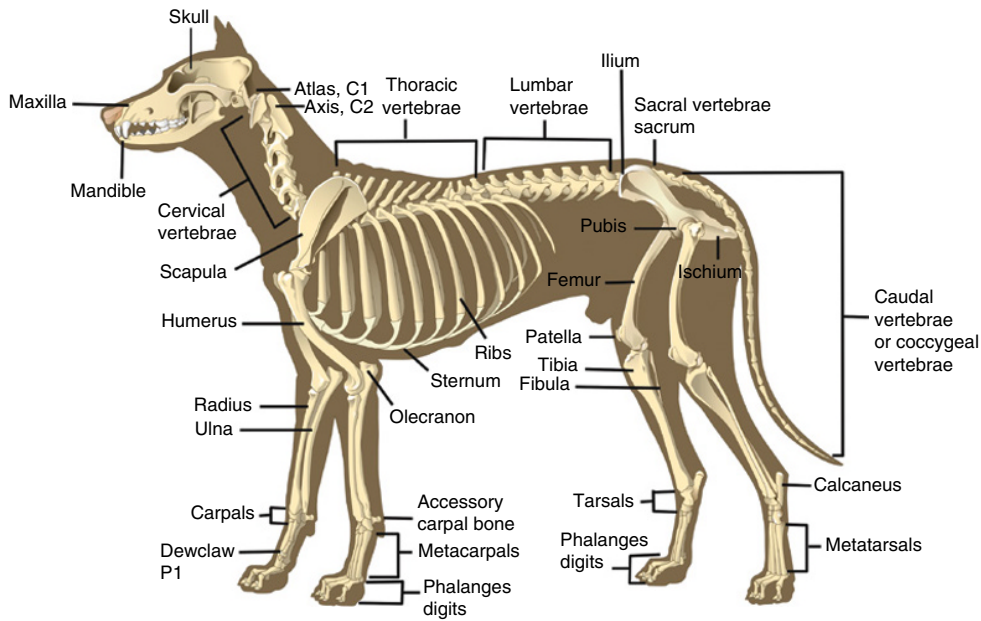


Figure 2.8 Dog skeleton. Source: Courtesy of shutterstock/AlexOnline.

Table 2.3 Directional terms.

Directional Term	Definition	Example
Dorsal	Pertaining to the back; closer to the back; away from the ground	The spine is dorsal to the sternum The spine is dorsal to the heart
Ventral	Pertaining to the belly; closer to the belly; towards the ground	The heart is ventral to the spine The sternum is ventral to the heart
Cranial	Pertaining to the head; closer to the head	The neck is cranial to the tail The heart is cranial to the stomach
Caudal	Pertaining to the tail; closer to the tail	The hindlimb is caudal to the forelimb The lumbar vertebrae are caudal to the cervical vertebrae
Medial	Pertaining to the middle; closer to the median plane; closer to the midline	The dewclaw is medial to the other digits The heart is medial to the ribs
Lateral	Pertaining to the side; further from the median plane; further from the midline	The ribs are lateral to the heart Your pinky toe is lateral to your big toe
Proximal	Pertaining to the beginning; nearer the point of attachment	The femur is proximal to the tibia The ulna is proximal to the carpals
Distal	Pertaining to far from the beginning; farther from the point of attachment	The patella is distal to the femur The phalanges are distal to the humerus

(Continued)

Table 2.3 (Continued)

Directional Term	Definition	Example
Superficial	Nearer the surface of the body.	A papercut is superficial The biceps are superficial to the humerus
Deep	Farther from the surface of the body.	A stab wound is deep The humerus is deep to the biceps muscle
Plantar	Pertaining to the caudal surface of the rear paw (pes) and tarsus.	A dog has a laceration on the plantar aspect of its left paw
Palmar	Pertaining to the caudal surface of the front paw (manus) and carpus.	A dog has a laceration on the palmar surface of its left paw
Rostral	Pertaining to the nose; closer to the nose.	The hard palate is rostral to the soft palate
Anterior	Pertaining to the front side of the body.	The toe of the hoof is anterior to the heel
Posterior	Pertaining to the back side of the body.	The heel of the hoof is posterior to the toe

Recumbency

Recumbent is defined as lying down. Certain procedures require an animal to be positioned in a particular recumbency. The following are examples of recumbency:

- Dorsal recumbency** Animal is lying on its back. This is also known as **supine** recumbency (Figure 2.9A).
- Ventral recumbency** Animal is lying on its belly. This is also known as **sternal** recumbency or **prone** recumbency.
- Lateral recumbency** Animal is lying on its side. An animal lying on its right side is said to be in right lateral recumbency (Figure 2.9B).

Planes of the Body

Planes are imaginary flat surfaces that divide the body into different sections (Table 2.4 and Figure 2.10).

The Spinal Column

As you've probably noticed in the dog skeleton diagram, there are different kinds of bones in the back called vertebrae. In between these backbones are cartilage pads called intervertebral disks (Figure 2.11).

- Intervertebral disk** Cartilage pad between vertebrae used for cushion and support.
- Spinal cord** Nervous tissue within the spinal cavity.
- Spinal column** Bones surrounding the spinal cavity.
- Vertebra** Backbone.
- Vertebrae** Backbones.

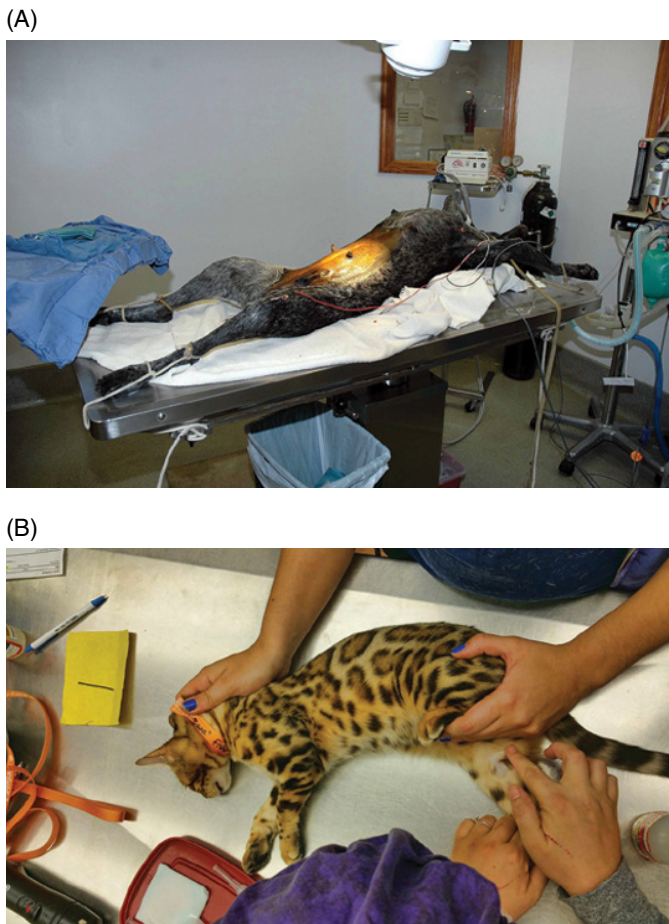


Figure 2.9 (A) Animal prepped for surgery in dorsal recumbency. Source: Courtesy of shutterstock/Julie Keen. (B) Cat restrained in lateral recumbency for a femoral venipuncture. Source: Courtesy of Ethan Heritage, CVT.

Table 2.4 Planes of the body.

Plane	Definition
Dorsal plane	Divides the body into a belly side (ventral) and a back side (dorsal)
Median plane	Divides the body into equal right and left halves. This is also known as a midsagittal plane
Sagittal plane	Divides the body into unequal right and left halves
Transverse plane	Divides the body into cranial and caudal halves

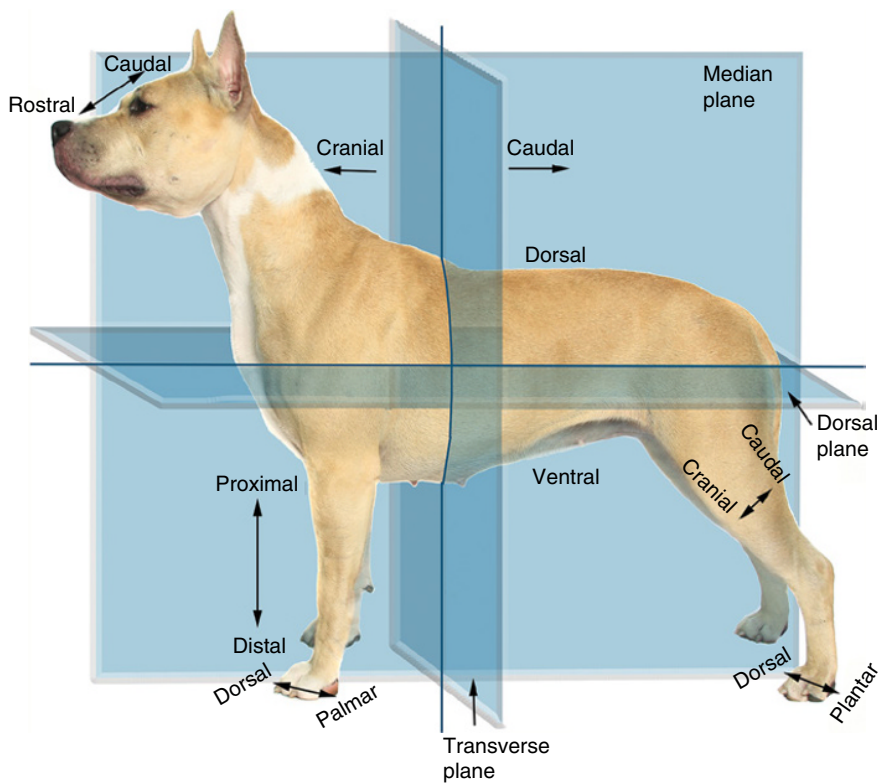


Figure 2.10 Medical planes and directional terms on a Pit Bull. Source: Courtesy of shutterstock/serg741.

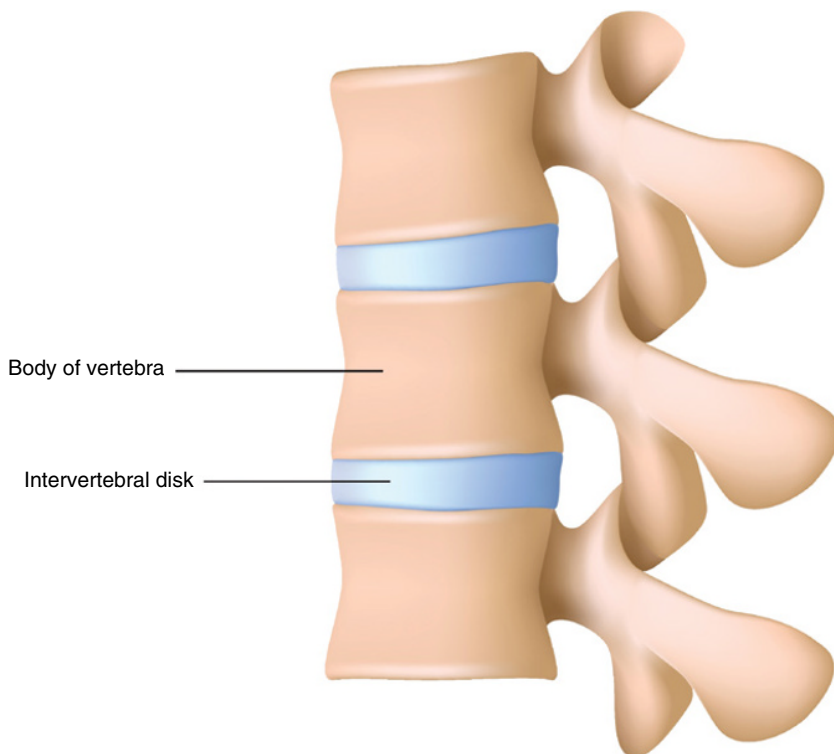


Figure 2.11 Intervertebral disk. Source: Courtesy of shutterstock/Alila Sao Mai.

Table 2.5 Vertebrae.

Vertebrae	Location
Cervical (C)	Neck area
Thoracic (T)	Chest area
Lumbar (L)	Lower back area (waist)
Sacral (S)	Sacrum
Caudal; coccygeal (Ca, Cy)	Tail area

Table 2.5 is a list of the different vertebrae and where they fall along the spinal column.

TECH TIP 2.3

The different kinds of vertebrae differ in numbers in each species. Instead of merely writing out the numbers of each type in a table, we write them into **vertebral formulas**, as follows:

- Dog and Cat:** $C_7T_{13}L_7S_{3\text{fused}}Ca(Cy)_{3-24}$
- Horse:** $C_7T_{18}L_6S_{5\text{fused}}Ca(Cy)_{15-21}$. Some Arabians have five lumbar
- Cattle:** $C_7T_{13}L_6S_5Ca(Cy)_{18-20}$
- Pigs:** $C_7T_{14-15}L_{6-7}S_4Ca(Cy)_{20-23}$
- Sheep and Goats:** $C_7T_{13}L_{6-7}S_4Ca(Cy)_{16-18}$
- Chickens:** $C_{14}T_7LS_{14\text{fused}}Ca(Cy)_6$

From the Outside In

Anatomical terms change when describing structures and landmarks on the outside of the body (Figure 2.12).

- Check** Fleshy portion on either side of the face, forming the sides of the mouth and continuing rostrally to the lips.
- Chest** Part of the body between the neck and abdomen; also called the **thorax**.
- Chin** Anterior prominence of the mandible.
- Elbow** Joint where the humerus, radius, and ulna meet; medically known as the **humeroradioulnar joint**.
- Flank** Lateral aspect of the body between the ilium and ribs.
- Forehead** Region between the eyes and ears.
- Hock** Common name for the tarsus joint.
- Muzzle** Skin, muscles, and fascia of the upper and lower lip and including the nasal bones.
- Pinna** Flap of the ear; also known as the **auricle**.
- Rump** Region around the pelvis, hindquarters, and buttocks; also known as the **croup** or **gluteal region**.
- Shoulder** Joint where the scapula and humerus meet; medically known as the **scapulohumeral joint**.
- Stifle** Joint where the femur and tibia meet; medically known as the **femorotibial joint**.
- Tail** Caudal appendage of the vertebral column made up of caudal vertebrae.

Building the Terms

Now it's time to assemble the word parts listed in Tables 2.6, 2.7 and 2.8. If you memorize the meaning of the combining forms, prefixes, and suffixes, then this will get easier each time. Remember your five basic rules to medical terminology when building and defining these terms. You'll notice some word parts are repeated from the previous chapter.

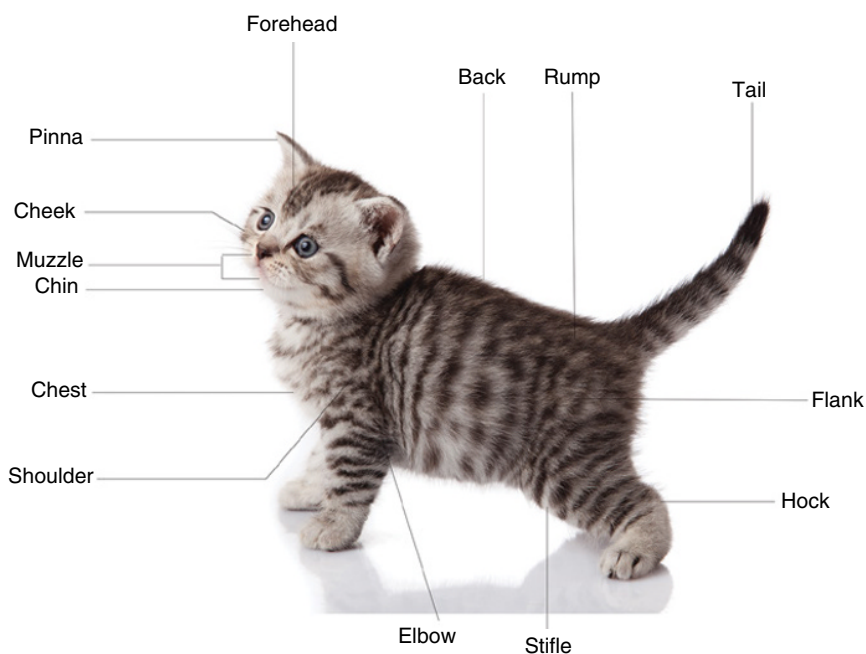


Figure 2.12 External landmarks on a kitten. Source: Courtesy of shutterstock/Ewa Studi.

Table 2.6 Combining forms.

Combining Form	Definition	Combining Form	Definition
Abdomin/o	Abdomen	Medi/o	Middle
Aden/o	Gland	My/o	Muscle
Adip/o	Fat	Neur/o	Nerve
Anis/o	Unequal (in size)	Nucle/o	Nucleus
Anter/o	Front	Path/o	Disease
Bol/o	To cast (throw)	Pelv/o	Pelvis (hip)
Caud/o	Tail	Peritone/o	Peritoneum
Cervic/o	Neck	Pharyng/o	Pharynx; throat
Chondr/o	Cartilage	Poster/o	Back; behind
Chrom/o	Color	Prot/o	First
Coccyg/o	Tailbone	Proxim/o	Nearest
Crani/o	Skull	Rhin/o	Nose
Crin/o	To secrete	Sacr/o	Sacrum
Cyt/o	Cell	Sarc/o	Connective tissue

(Continued)

Table 2.6 (Continued)

Combining Form	Definition	Combining Form	Definition
Dist/o	Far; distant	Spin/o	Spine; backbone
Dors/o	Back of body	Stern/o	Sternum
Duct/o	To lead or carry	Thel/o	Nipple
Hist/o	Tissue	Thorac/o	Chest
Inguin/o	Groin	Trache/o	Trachea; windpipe
Kary/o	Nucleus	Umbilic/o	Umbilicus; navel
Laryng/o	Larynx; voice box	Vertebr/o	Vertebrae; backbones
Later/o	Side	Viscer/o	Viscera; internal organs
Lumb/o	Lower back		

Table 2.7 Prefixes.

Prefix	Definition	Prefix	Definition
a-, an-	no; not; without	hypo-	deficient; below; under; less than normal
ana-	up	inter-	between
cata-	down	meta-	change
endo-	in; within	neo-	new
epi-	above; upon; on	uni-	one

Table 2.8 Suffixes.

Suffix	Definition	Suffix	Definition
-ac, -al, -ar, -eal, -iac, -ic, -ical, -ior, -ose	pertaining to	-oma	tumor; mass; fluid collection
-algia	pain	-osis	abnormal condition
-centesis	surgical puncture to remove fluid or gas	-plasia	development; formation; growth
-ectomy	removal; excision; resection	-plasm	formation
-ism	process; condition	-plasty	surgical repair
-ist	specialist	-somes	bodies
-itis	inflammation	-tomy	incision; process of cutting into
-logy	study of		

	Parts	Medical Term	Definition
Abdomin/o	+ -al	= Abdominal	: _____
Abdomin/o	+ -centesis	= Abdominocentesis	: _____
ana-	+ Bol/o + -ic	= Anabolic	: _____
cata-	+ Bol/o + -ic	= Catabolic	: _____
meta-	+ Bol/o + -ic	= Metabolic	: _____
Adip/o	+ -ose	= Adipose	: _____
Caud/o	+ -al	= Caudal	: _____
Cervic/o	+ -al	= Cervical	: _____
Chondr/o	+ -al	= Chondral	: _____
Chondr/o	+ -algia	= Chondralgia	: _____
Chondr/o	+ -ectomy	= Chondrectomy	: _____
Chondr/o	+ -oma	= Chondroma	: _____
Chondr/o	+ Sarc/o + -oma	= Chondrosarcoma	: _____

TECH TIP 2.4 Don't Forget Rule 5!

The terms anabolic, metabolic, and catabolic do not break down exactly. Because of this, we use rule 5 of medical terminology. To simplify, we can define them as follows:

- Anabolic – Pertaining to anabolism
- Catabolic – Pertaining to catabolism
- Metabolic – Pertaining to metabolism

I placed these terms in the blanks so you can see where the terms were derived from. Ana- for building up and cata- for breaking down.

TECH TIP 2.5 Rules for Using Sarcoma

When a combining form is attached to the term “sarcoma,” then it is inserted into the definition for sarcoma. As an example, the term osteosarcoma has the combining form “oste/o” attached to the term “sarcoma.” Therefore, the definition is a malignant tumor of bone arising from connective tissue.

Remember your definition for sarcoma from Chapter 1 and use the following guide.

A malignant tumor of _____ arising from connective tissue.

hypo-	+ Chondr/o	+ -iac	= Hypochondriac	: _____
Coccyg/o	+ -eal		= Coccygeal	: _____
Crani/o	+ -al		= Cranial	: _____
Crani/o	+ -tomy		= Craniotomy	: _____
Crani/o	+ Sacr/o	+ -al	= Craniosacral	: _____

TECH TIP 2.6 Did You Know?

We have all heard of or used the term hypochondriac when describing a person who thinks they are sick frequently. The origin of the term's usage stems from ancient Greece. In ancient times, the most common complaints of sickness would be related to the viscera in the hypochondriac region: the stomach, liver, and spleen. In most cases, these people were truly sick. They usually had eaten something they shouldn't have and were treated with medications to induce vomiting. However, with the limited knowledge of medicine in those times, many complaints went untreated and were believed to be lies created by the patients. Because these common complaints of the hypochondriac region were believed to be imaginary, these people became known as hypochondriacs: people suffering from hypochondriasis.

Crani/o	+ -plasty		= Cranioplasty	: _____
Cyt/o	+ -logy		= Cytology	: _____
Cyt/o	+ -logy	+ -ist	= Cytologist	: _____
Cyt/o	+ -logy	+ -ical	= Cytological	: _____
Hist/o	+ -logy		= Histology	: _____
Hist/o	+ -logy	+ -ist	= Histologist	: _____
Hist/o	+ -logy	+ -ical	= Histological	: _____
Hist/o	+ Path/o	+ -logy	= Histopathology	: _____
Hist/o	+ Path/o	+ -logy + -ist	= Histopathologist	: _____
Inguin/o	+ -al		= Inguinal	: _____
Anis/o	+ Kary/o	+ -osis	= Anisokaryosis	: _____
Laryng/o	+ -eal		= Laryngeal	: _____
Laryng/o	+ -itis		= Laryngitis	: _____
Lumb/o	+ -ar		= Lumbar	: _____
Lumb/o	+ Sacr/o	+ -al	= Lumbosacral	: _____
neo-	+ -plasia		= Neoplasia	: _____
neo-	+ -plasm		= Neoplasm	: _____
Nucle/o	+ -ar		= Nuclear	: _____
Nucle/o	+ -ic		= Nucleic	: _____
Path/o	+ -logy		= Pathology	: _____
Path/o	+ -logy	+ -ist	= Pathologist	: _____
Pelv/o	+ -ic		= Pelvic	: _____
Peritone/o	+ -al		= Peritoneal	: _____
Peritone/o	+ -itis		= Peritonitis	: _____
Pharyng/o	+ -eal		= Pharyngeal	: _____
Pharyng/o	+ -itis		= Pharyngitis	: _____
Rhin/o	+ -itis		= Rhinitis	: _____
Sacr/o	+ -al		= Sacral	: _____
Sacr/o	+ -algia		= Sacralgia	: _____
Sacr/o	+ Caud/o	+ -al	= Sacrocaudal	: _____
Sacr/o	+ Coccyg/o	+ -eal	= Sacrococcygeal	: _____
Sacr/o	+ Pelv/o	+ -ic	= Sacropelvic	: _____
Spin/o	+ -al		= Spinal	: _____
Trache/o	+ -al		= Tracheal	: _____
Trache/o	+ -tomy		= Tracheotomy	: _____
endo-	+ Trache/o	+ -al	= Endotracheal	: _____
Thorac/o	+ -centesis		= Thoracocentesis	: _____
<i>Also known as thoracentesis.</i>				
Thorac/o	+ -ic		= Thoracic	: _____
Thorac/o	+ -tomy		= Thoracotomy	: _____
Vertebr/o	+ -al		= Vertebral	: _____
inter	+ Vertebr/o	+ -al	= Intervertebral	: _____
Viscer/o	+ -al		= Visceral	: _____
Viscer/o	+ -algia		= Visceralgia	: _____
uni-	+ Later/o	+ -al	= Unilateral	: _____

Abbreviations

Table 2.9 Abbreviations.

Abbreviation	Definition
\bar{c}	With
\bar{s}	Without
ADR	Ain't doin right
CBA	Cat bite abscess (Figure 2.13A)
DHLPP-C	Distemper, hepatitis, leptospirosis, parvovirus, parainfluenza, coronavirus – canine vaccine set
ET tube	Endotracheal tube (Figure 2.14)
FeLV	Feline leukemia virus
FIP	Feline infectious peritonitis
FIV	Feline immunodeficiency virus
FVRCP	Feline viral rhinotracheitis, calicivirus, panleukopenia – feline vaccine set
HBC	Hit by car (Figure 2.13B)
IVD	Intervertebral disk (disc)
MM	Mucous membranes
neg or \ominus	Negative
pos or \oplus	Positive
pt.	Patient
PT	Physical therapy
RV	Rabies vaccine
stat	Immediately
V/D	Vomiting/diarrhea

TECH TIP 2.7 Mucus vs. Mucous

These terms are pronounced the same, but have slightly different meanings. “Mucus” refers to the actual slimy substance produced in areas such as your nose and eyes. “Mucous” is defined as pertaining to mucus. Its use is to describe the source of the mucus.

(A)



(B)



Figure 2.13 (A) Draining a cat bite abscess on a cat's cheek. (B) Dog that has been hit by a car. Note the road rash and grease on the hair. Source: Courtesy of Greg Martinez, DVM; www.youtube.com/drgregdvm.

Case Study: Define the medical terms and abbreviations in bold print.

You'll notice some terms from the previous chapter

You hear a page over the intercom stating that you are needed in the emergency room, **stat**. The **pt.** is Bungee, a four-year-old male **DLH** with an **abdominal evisceration**. Apparently, Bungee had been fighting with the neighbor's cat and fell from the top of the fence onto the gardening tools below. A quick check of his file shows that he is current on his **FVRCP, FeLV, and RV**. Upon **P/E**, a mass is found on the **lateral** aspect of his right stifle. The mass was warm to the touch. The veterinarian confirms that Bungee also has a **CBA**. His **MM** are pale and he's breathing rapidly. Pre-surgical bloodwork is run, which shows **anemia**.

Bungee is taken into surgery to repair the evisceration. An **endotracheal** tube is placed and Bungee is positioned in **dorsal recumbency** for the procedure. After replacing the abdominal **viscera**, the veterinarian performs an abdominal **lavage** to try to prevent **peritonitis**. Bungee was moved to the recovery room after surgery.

After waking up from the surgery, Bungee begins coughing. The owner should be told that Bungee will have short-term laryngitis because of the ET tube.

(A)



(B)



(C)



Figure 2.14 (A) Endotracheal tube and laryngoscope. Source: Courtesy of shutterstock/Chris Pole. (B) Placing an ET tube in a cat using a laryngoscope. Source: Courtesy of Greg Martinez, DVM; www.youtube.com/drgregdvm. (C) Cat waking up after surgery with an endotracheal tube still in place. Source: Courtesy of shutterstock/Julie Keen.

Exercises

2-A: Match the combining forms with their meaning.

- | | | |
|-----------|-----------|--------------|
| 1. _____ | Throat | A. Abdomin/o |
| 2. _____ | Disease | B. Adip/o |
| 3. _____ | Nose | C. Chondr/o |
| 4. _____ | Abdomen | D. Crani/o |
| 5. _____ | Groin | E. Cyt/o |
| 6. _____ | Voice box | F. Hist/o |
| 7. _____ | Cartilage | G. Inguin/o |
| 8. _____ | Fat | H. Laryng/o |
| 9. _____ | Skull | I. Path/o |
| 10. _____ | Tissue | J. Pelv/o |
| 11. _____ | Cell | K. Pharyng/o |
| 12. _____ | Hip | L. Rhin/o |

2-B: Write the correct medical term in the blank.

1. _____: Study of disease
2. _____: New formation
3. _____: Incision into the skull
4. _____: Pertaining to the internal organs
5. _____: Tumor of cartilage
6. _____: Pertaining to the groin
7. _____: Specialist in the study of cells
8. _____: Pertaining to the throat
9. _____: Inflammation of the voice box
10. _____: Pertaining to between the backbones
11. _____: Incision into the windpipe
12. _____: Incision into the chest
13. _____: Surgical repair of the skull
14. _____: Pertaining to the hip
15. _____: Pertaining to the sacrum and tail
16. _____: Pertaining to the lower back
17. _____: Pain in cartilage
18. _____: Irrigation of organ or cavity
19. _____: Not malignant; non-invasive
20. _____: Study of the body's function

2-C: Circle the correct spelling for each word.

- | | | |
|--------------|-----------|-----------|
| 1. Diaphragm | Diaphram | Diafram |
| 2. Larynx | Layrnx | Larnyx |
| 3. Diarrhea | Diahrrea | Diarrhea |
| 4. Abscess | Absess | Abscess |
| 5. Cartilage | Cartilaje | Cartlaje |
| 6. Malignant | Malignent | Malignant |

7. Thorasic	Thoracic	Thoracic
8. Vertibrea	Vertebra	Vertebrae
9. Cerival	Cervical	Cervicle
10. Vommiting	Vomiting	Vomitting

2-D: Define the following suffixes.

- | | |
|---------------------|-------------------|
| 1. _____: -plasty | 7. _____: -plasia |
| 2. _____: -ose | 8. _____: -ism |
| 3. _____: -logy | 9. _____: -osis |
| 4. _____: -algia | 10. _____: -ar |
| 5. _____: -centesis | 11. _____: -oma |
| 6. _____: -ist | 12. _____: -itis |

2-E: Match the following directional terms to complete the sentences. Some terms are used more than once.

- | | |
|------------|----------------|
| A. Cranial | F. Lateral |
| B. Caudal | G. Medial |
| C. Deep | H. Proximal |
| D. Distal | I. Superficial |
| E. Dorsal | J. Ventral |

1. The sternum is _____ to the thoracic vertebrae.
2. The tarsals are _____ to the carpals.
3. A cat scratch is _____; a stab wound is _____.
4. The humerus is _____ to the metacarpals.
5. The atlas is _____ to the ilium.
6. The ribs are _____ to the heart.
7. The dewclaw is _____ to the other digits.
8. A dog lying on its side is in _____ recumbency.
9. The intestines are _____ to the heart.
10. The phalanges are _____ to the stifle.
11. The tibia is _____ to the fibula.
12. The thoracic vertebrae are _____ to the sacral vertebrae.
13. The lumbar vertebrae are _____ to the umbilicus.
14. The accessory carpal bone is on the _____ aspect of the carpus.
15. The humerus is _____ to the muscles.
16. The mandible is _____ to the thoracic vertebrae.
17. A cat lying on its belly is in _____ recumbency.
18. The calcaneus is _____ to the accessory carpal bone.
19. The femur is _____ to the tarsals.
20. The bone is _____ to the skin.

2-F: Define the following abbreviations.

1. _____: CBA
2. _____: FIP

3. _____: V/D
4. _____: stat
5. _____: P.T.
6. _____: ⊖
7. _____: FIV
8. _____: DHLPP-C
9. _____: \bar{s}
10. _____: pos
11. _____: \bar{c}
12. _____: MM
13. _____: ADR

2-G: Define the following prefixes.

- | | |
|------------------|-------------------|
| 1. _____: hypo- | 5. _____: ana- |
| 2. _____: inter- | 6. _____: endo- |
| 3. _____: meta- | 7. _____: neo- |
| 4. _____: cata- | 8. _____: a-, an- |

2-H: Define the following medical terms.

- | | |
|----------------------------|----------------------------|
| 1. _____: Nucleus | 9. _____: Endocrine glands |
| 2. _____: Prolapse | 10. _____: Urethra |
| 3. _____: Evisceration | 11. _____: Diaphragm |
| 4. _____: Anabolism | 12. _____: Pharynx |
| 5. _____: Histopathology | 13. _____: Cell membrane |
| 6. _____: Chondrosarcoma | 14. _____: Catabolism |
| 7. _____: Abdominal cavity | 15. _____: IVD |
| 8. _____: Exocrine glands | |

Answers can be found starting on page 675.

Review Tables

Fill in the tables and refer to Tables 2.6–2.9 for answers.

Table 2.10

Combining Forms	Definition	Combining Forms	Definition
Abdomin/o		Medi/o	
Aden/o		My/o	
Adip/o		Neur/o	
Anis/o		Nucle/o	

Table 2.10 (Continued)

Combining Forms	Definition	Combining Forms	Definition
Anter/o		Path/o	
Bol/o		Pelv/o	
Caud/o		Peritone/o	
Cervic/o		Pharyng/o	
Chondr/o		Poster/o	
Chrom/o		Prot/o	
Coccyg/o		Proxim/o	
Crani/o		Rhin/o	
Crin/o		Sacr/o	
Cyt/o		Sarc/o	
Dist/o		Spin/o	
Dors/o		Stern/o	
Duct/o		Thel/o	
Hist/o		Thorac/o	
Inguin/o		Trache/o	
Kary/o		Umbilic/o	
Laryng/o		Vertebr/o	
Later/o		Viscer/o	
Lumb/o			

Table 2.11

Prefix	Definition	Prefix	Definition
a-, an-		hypo-	
ana-		inter-	
cata-		meta-	
endo-		neo-	
epi-		uni-	

Table 2.12

Suffix	Definition	Suffix	Definition
-ac, -al, -ar, -eal, -iac, -ic, -ical, -ior, -ose		-oma	
-algia		-osis	
-centesis		-plasia	
-ectomy		-plasm	
-ism		-plasty	
-ist		-somes	
-itis		-tomy	
-logy			

Table 2.13

Abbreviation	Definition
̄	
̄	
ADR	
CBA	
DHLPP-C	
ET Tube	
FeLV	
FIP	
FIV	
FVRCP	
HBC	
IVD	
MM	
neg or ⊖	
pos or ⊕	
pt.	
PT	
RV	
stat	
V/D	