

CHAPTER

14

The Digestive System

► GASTROENTEROLOGY

After studying this chapter, you will be able to:

- 14.1 Name the parts of the digestive system and discuss the function of each part
- 14.2 Define combining forms used in building words that relate to the digestive system
- 14.3 Identify the meaning of related abbreviations
- 14.4 Name the common diagnoses, clinical procedures, and laboratory tests used in treating disorders of the digestive system
- 14.5 List and define the major pathological conditions of the digestive system
- 14.6 Explain the meaning of surgical terms related to the digestive system
- 14.7 Recognize common pharmacological agents used in treating disorders of the digestive system

Structure and Function

The three basic functions of the digestive system are as follows:

1. **Digestion** is the process of breaking down foods into nutrients that can be absorbed by cells. *Mechanical digestion* takes place in the mouth by chewing and in the stomach by churning actions. *Chemical digestion* takes place in the mouth by the addition of the saliva and continues in the stomach with the addition of digestive juices to chemically break down the food into simpler elements.
2. **Absorption** is the passing of digested nutrients into the bloodstream. This primarily occurs in the small intestines.
3. **Elimination** is the conversion of any residual material from a liquid to a solid and removal of that material from the alimentary canal via defecation.

The digestive system consists of the **alimentary canal** (digestive tract or gastrointestinal tract) and several accessory organs. Food enters the alimentary canal through the **mouth**, passes through the **pharynx** and **esophagus** into the **stomach**, then into the **small intestine** and **large intestine** or **bowels**, and then into the **anal canal**. Figure 14-1a shows the digestive system, and Figure 14-1b diagrams the digestive process.

The alimentary canal is a tube that extends from the mouth to the **anus**. The wall of the alimentary canal has four layers that aid in the digestion of the food that passes through it.



Colorado State University has a Web site (<http://arbl.cvmbs.colostate.edu/hbooks/pathphys/digestion>) that describes a voyage through the digestive tract.

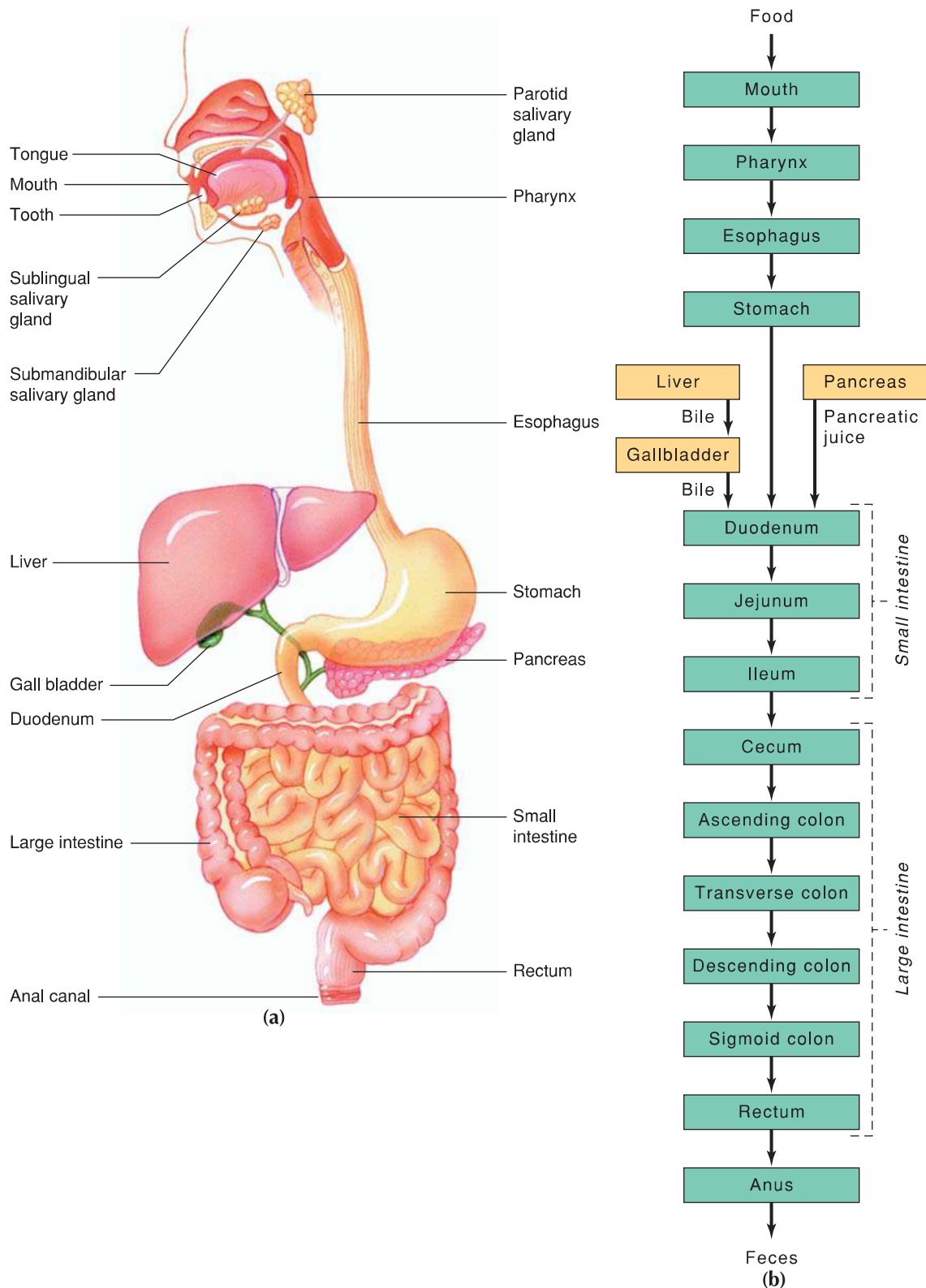


FIGURE 14-1 (a) The process of digestion begins in the mouth. (b) A diagram of the pathway of food through the body.

- The outer covering is a serous (watery) layer of tissue that protects the canal and lubricates the outer surface so that organs within the abdominal cavity can slide freely near the canal.
- The next layer is the muscular layer, which contracts and expands in wavelike motions called **peristalsis**, to move food along the canal.
- The third layer is made of loose connective tissue that holds various vessels, glands, and nerves that both nourish and carry away waste from surrounding tissue.
- The innermost layer is a mucous membrane that secretes mucus and digestive enzymes while protecting the tissues within the canal.

Digestive **enzymes** convert complex proteins into **amino acids**, compounds that can be absorbed by the body. Complex sugars are reduced to **glucose** and other simpler sugars, and fat molecules are reduced to **fatty acids** and other substances through the action of the digestive enzymes.

Mouth

The **lips** sense the food that is about to enter the mouth. They sense the temperature and texture of the food and can thus protect the mouth from receiving food that is too hot or too rough on the surface. Once food is taken into the oral cavity (mouth), it is chewed with the help of the muscles of the **cheeks** (the walls of the oral cavity), and the **tongue** (which moves food during **mastication**, chewing). The last mechanical process that takes place in the mouth is **deglutition** (swallowing). The tongue has **papillae**, small raised areas that contain the taste buds (cells that provide the sensation of taste). The tongue is connected to the floor of the mouth by a mucous membrane called a **frenulum**. At the back of the tongue, **lingual tonsils** form two rounded mounds of lymphatic tissue that play an important role in the immune system (see Chapter 13).

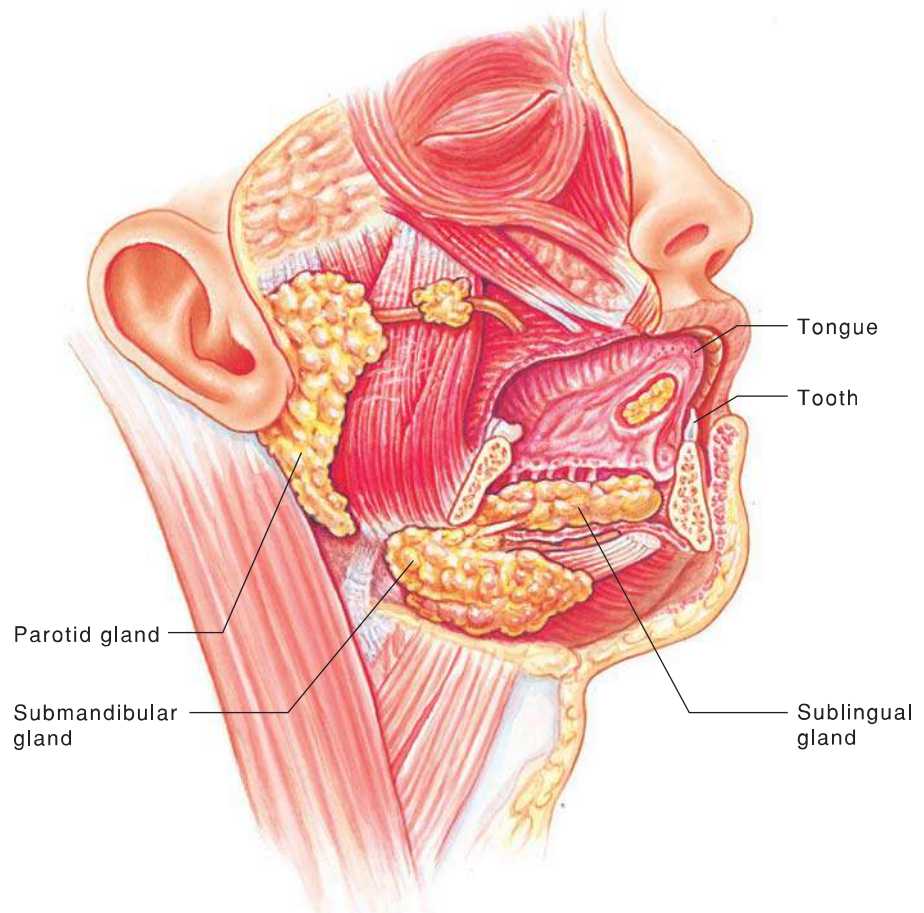
The roof of the mouth is formed by the **hard palate**, the hard anterior part of the palate with irregular ridges of mucous membranes called **rugae**, and the **soft palate**, the soft posterior part of the palate. At the back of the soft palate is a downward cone-shaped projection called the **uvula**. During swallowing, the soft palate and the uvula direct food downward into the esophagus, thus preventing any food from entering the sinus area. On either side of the back of the mouth are rounded masses of lymphatic tissue called the **palatine tonsils**. The mouth also contains the **gums**, the fleshy sockets that hold the teeth. Chapter 21 discusses the teeth.

Digestion of food begins in the mouth with mastication. In addition, the three sets of **salivary glands** surrounding the oral cavity secrete **saliva**, a fluid containing enzymes (such as **amylase**, an enzyme that begins the digestion of carbohydrates) that aid in breaking down food. Each gland has ducts through which the saliva travels to the mouth. The three pairs of salivary glands are the *parotid glands*, located inferior to the cheekbone; the *submandibular glands*, located below the mandible; and the *sublingual glands*, located in the base of the mouth below the tongue (Figure 14-2).

Pharynx

From the mouth, food goes through the pharynx (**throat**). Both food and air share this passageway. The pharynx is a muscular tube (about 5 inches long in adults) that moves food into the esophagus. Air moves through the

FIGURE 14-2 The salivary glands release fluids that start the digestive process.



trachea (windpipe). When we eat and swallow food, a flap of tissue (the **epiglottis**) covers the trachea until the food is moved into the esophagus. The epiglottis prevents food from entering the larynx (the voice box). Food that happens to get into the larynx when we are eating causes choking.

Esophagus

The esophagus is a muscular tube (9 to 10 inches long in the average adult) that contracts rhythmically (peristalsis) to push food toward the stomach. At the bottom of the esophagus, just above the stomach, is a group of thickened muscles in the esophageal wall called the *lower esophageal sphincter* or

MORE ABOUT . . .

Choking

People have died of choking, even when efforts were made to save them. If an object such as a chicken bone became lodged in the windpipe, it was difficult to remove it while still allowing the person to breathe. A doctor, Harry J. Heimlich, discovered that a simple series of movements can prevent choking to death in most cases. The movements involve placing arms around the abdomen just below the diaphragm, grasping fists, and thrusting upward to dislodge the item. Testimony from around the world affirms that this maneuver is put to good use every day.

TABLE 14-1 Major Components of Gastric Juice

Component	Function
pepsin	digests almost all types of protein
hydrochloric acid	provides acidic environment for action of pepsin
mucus	provides alkaline protective layer on the inside of the stomach wall

cardiac sphincter. The cardiac sphincter is a group of muscles that regulates the opening and closing of the stomach entrance. As the swallowed food is advanced toward the stomach by the peristaltic wave, the cardiac sphincter will open briefly. Once the food is in the stomach, it will close. This prevents **reflux** (backflow) and **emesis** or **regurgitation** (vomiting). Every time more food comes through the esophagus to the stomach, the muscles relax and allow the food to pass.

Stomach

The stomach is a pouchlike organ in the left hypochondriac region of the abdominal cavity. The stomach receives food from the esophagus and mixes it with gastric juice. The enzyme **pepsin** in the gastric juice begins protein digestion. Table 14-1 shows the major components of gastric juice. Gastric juice is produced by the gastric glands, which are stimulated to produce this substance continuously but in varying amounts depending on the amount of food being absorbed.

The stomach has four regions (Figure 14-3).

- The *cardiac region*, the region closest to the heart, is where the cardiac sphincter allows food to enter the stomach and prevents regurgitation.

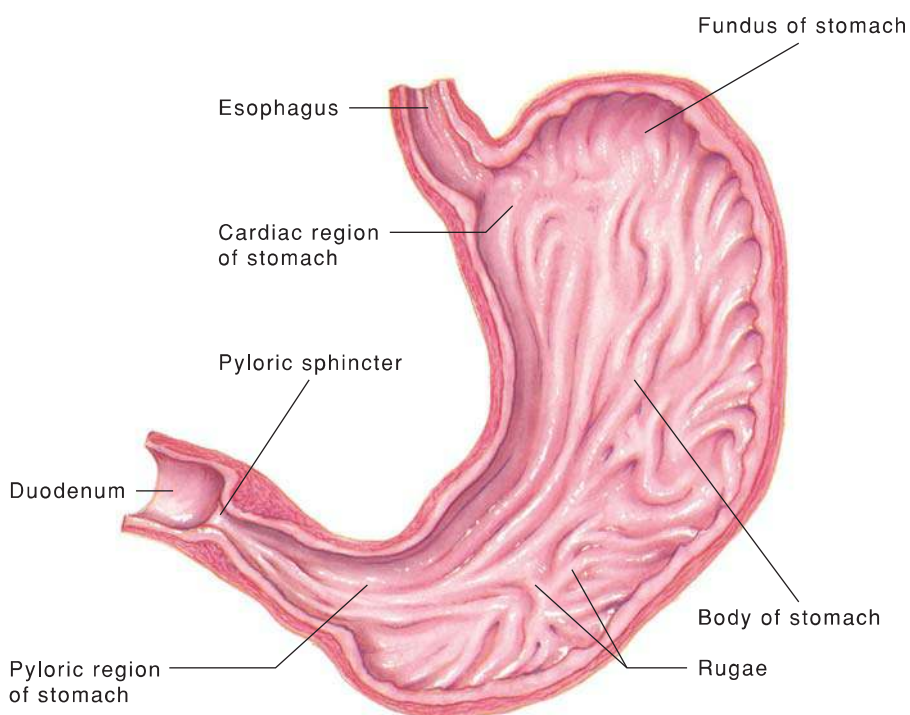


FIGURE 14-3 The stomach has four regions and rugae in its lining.

If the cardiac sphincter does not close completely, or if it fails to remain closed, stomach juices can splash into the esophagus where there is no protective lining. This causes extreme burning known as *heartburn*.

- The **fundus** is the upper, rounded portion of the stomach.
- The **body** is the middle portion.
- The **pylorus**, the narrowed bottom part of the stomach, has a powerful, circular muscle at its base, the *pyloric sphincter*. This sphincter controls the emptying of the stomach's contents into the small intestine.

Stomach juices are extremely acidic in order for them to digest food. The lining of the stomach (and of the intestines) serves to protect the cells of the lining from being affected by the digestive juices in the stomach. The lining is relatively thick with many folds of mucous tissue called *rugae*. As the stomach fills up, the wall distends and the folds disappear.

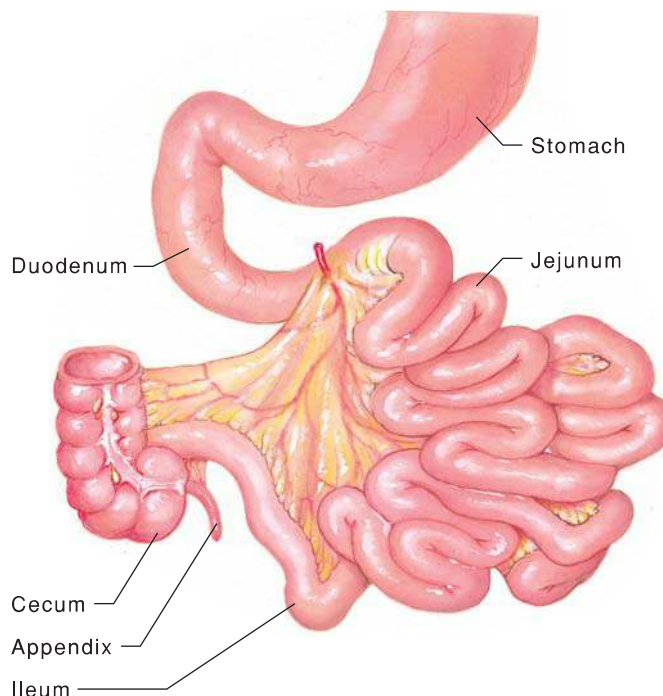
After eating, the muscular movements of the stomach and the mixing of food with gastric juice forms a semifluid mass called **chyme**. Chyme may consist of food that has been in the stomach for several hours, or it may contain food that is broken down in as little as one hour. The type of food and the amounts eaten determine how long it takes for the stomach to release the chyme. The muscles of the stomach release the chyme in small batches at regular intervals into the small intestine, where further digestion takes place.

Small Intestine

The small intestine receives chyme from the stomach, bile from the liver, and pancreatic juice from the pancreas (Figure 14-4). The small intestine has the following three parts:

1. The **duodenum** is only about 10 inches long. In it, chyme mixes with bile to aid in fat digestion; with pancreatic juice to aid in digestion of starch, proteins, and fat; and with intestinal juice to aid in digesting sugars (glucose). Glands in the walls of the small intestine excrete intestinal

FIGURE 14-4 The small intestine connects the stomach to the large intestine.



juice. The juices also help change starch (**glycogen**) into glucose. The entire small intestine is lubricated by secretions from mucous glands. The small intestine is lined with **villi** (singular, **villus**), tiny, one-cell-thick finger-like projections with capillaries through which digested nutrients are absorbed into the bloodstream and lymphatic system.

2. The **jejunum** is an eight-foot long section of the small intestine in which the digestive process continues.
3. The **ileum** connects the small intestine to the large intestine. Located at the bottom of the ileum is the *ileocecal sphincter muscle* that relaxes to allow undigested and unabsorbed food material into the large intestine in fairly regular waves. Other muscular contractions segment the ileum and prevent waste material in the large intestine from backing up into the small intestine.

Together, the three sections of the small intestine are about 20 feet long from the stomach to the large intestine. The small intestine lies within the abdominopelvic cavity, where it is held in place by the **mesentery**, a membranous tissue that attaches both the small and large intestines to the muscle wall at the dorsal part of the abdomen. Absorption (passage of material through the walls to the bloodstream) begins in the small intestines. Chyme takes from one to six hours to travel through the small intestine before it enters the large intestine. The length of time for digestion varies depending on the food being digested and the health of the digestive system.

Large Intestine

The large intestine (Figure 14-5), which is about five feet long, has the following four parts:

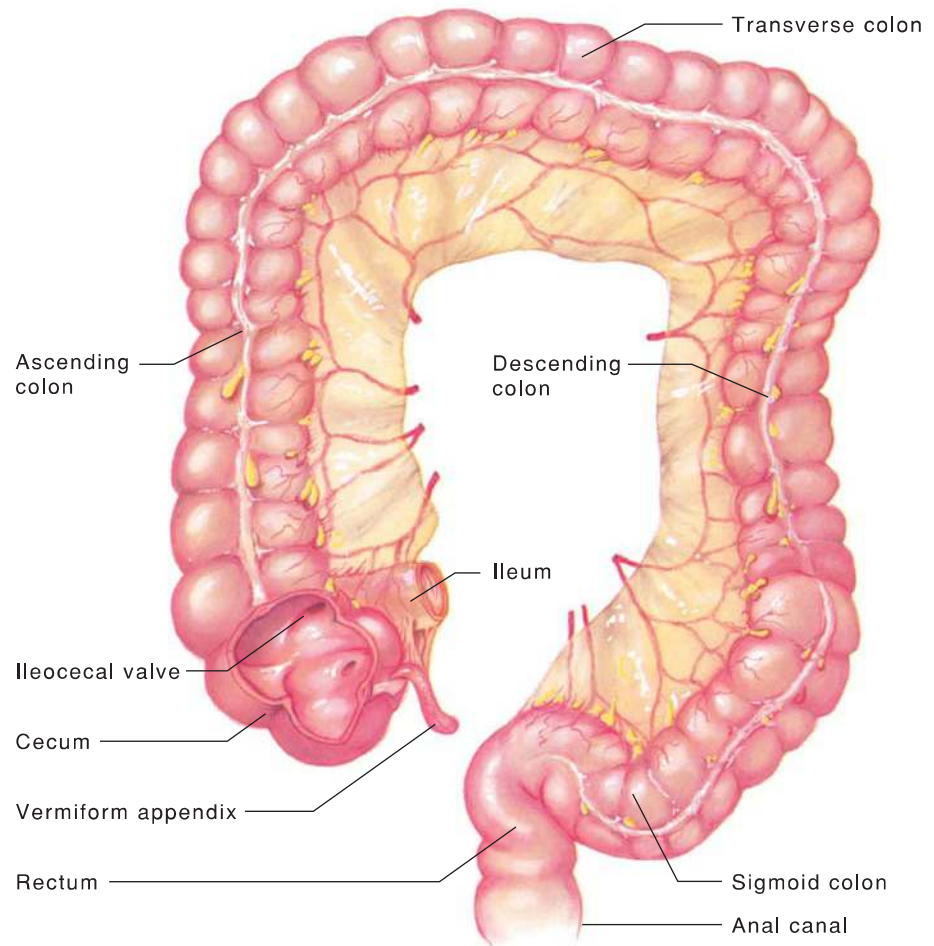
1. The **cecum** is a pouch attached to the bottom of the ileum of the small intestine. The cecum has three openings: one from the ileum into the cecum; one from the cecum into the colon; and another from the cecum into a wormlike pouch on the side, the **appendix** (also called the *vermiform appendix*). The appendix is filled with lymphatic tissue, but is considered an **appendage**, an accessory part of the body that has no central function, because it no longer has a role in the digestive process. The appendix can, however, become inflamed and may require surgical removal. Within the cecum, the process of turning waste material into semisolid waste (*feces*) begins, as water and certain necessary substances are absorbed back into the bloodstream. As the water is removed, a semisolid mass is formed and moved into the colon.

MORE ABOUT . . .

Intestinal Health

Intestinal health is often directly related to the amount of fiber in a person's diet. In 2005, the federal nutritional guidelines specifically recommended an increase in fibrous foods as a boost to general health and especially to digestive health. The most fibrous foods include vegetables, fruits, and whole grains. Nutritional labels on food give the amount of dietary fiber per serving. It is generally recommended that a person ingest 25 grams of fiber per day.

FIGURE 14-5 The large intestine leads from the small intestine to the anal canal.



2. The next section is the **colon**. The colon is further divided into three parts—the *ascending colon*, the *transverse colon*, and the *descending colon*. The ascending colon extends upward from the cecum to a place under the liver where it makes a right-angle bend known as the *hepatic flexure*. After the bend, the transverse colon continues across the abdomen from right to left where it makes a right-angle bend (the *splenic flexure*) toward the spleen. After the bend, the descending colon extends down to the rim of the pelvis where it connects to the sigmoid colon.
3. The **sigmoid colon** is an s-shaped body that goes across the pelvis to the middle of the sacrum, where it connects to the rectum.
4. The **rectum** attaches to the *anal canal*. **Feces (stool)** then pass from the anal canal into the anus. The anus and anal canal open during the release of feces from the body (**defecation**).

The entire large intestine forms a rectangle around the tightly packed small intestine. Undigestible waste products from digestion usually remain in the large intestine from 12 to 24 hours.

Liver

The **liver** is an important digestive organ located in the right, upper quadrant of the abdominal cavity. Although it is not within the digestive tract, it performs many digestive functions. The liver is a relatively large organ weighing about 3 pounds in the average adult. It is divided into two lobes, the right lobe and the left lobe (Figure 14-6).

The *hepatic portal system* is the group of blood vessels that transports blood and other substances to and from the liver. This system is particularly important in regard to the newly absorbed nutrients and other, possibly more harmful, substances that may have been ingested. The portal vein within this system directs all blood from the small intestines, with the newly absorbed substances from the villi, directly to the liver where there will be some filtration of harmful substances and some conversion of nutrients and medication into a form usable by the body.

Aside from changing food nutrients into usable substances, the liver also secretes **bile** (a yellowish-brown to greenish fluid), which is stored in the gallbladder for use in breaking down fats and other digestive functions. It stores glucose and certain vitamins for release when the body needs them. The liver also secretes **bilirubin**, a bile pigment that is combined with bile and excreted into the duodenum.

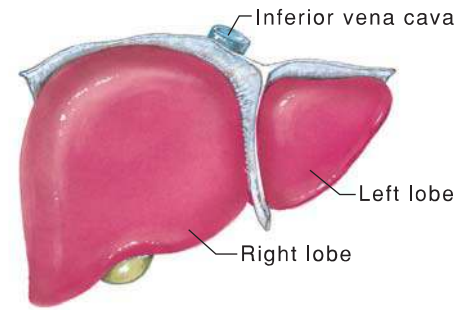


FIGURE 14-6 The liver secretes bile, a fluid that is important in digestion of fats.

Gallbladder

The bile released from the liver to the *hepatic duct* is then released into the *cystic duct*, which brings the substance into the **gallbladder**. The gallbladder performs two functions. It stores bile until it is needed for digestion and it concentrates bile by removing some of the water. Bile is thicker and richer in the gallbladder than it is in the liver, which is why gallstones form in the gallbladder. Then the bile is forced out of the cystic duct into the *common bile duct*.

At the entrance to the duodenum, bile mixes with pancreatic juices and enters the duodenum from the common bile duct. There the bile aids in **emulsification**, the breaking down of fats.

Pancreas

The chyme that empties into the small intestine mixes with secretions from the pancreas and liver. The **pancreas** is five to six inches long and lies across the posterior side of the stomach. The pancreas is a digestive organ in that it secretes digestive fluids into the small intestine through its system of ducts. The digestive fluid is called *pancreatic juice*, which includes various enzymes such as *amylase* and *lipase*. The pancreas is also an endocrine gland that regulates blood sugar through the release of insulin (a hormone) and, as such, is discussed in Chapter 15.

VOCABULARY REVIEW

In the previous section, you learned terms relating to the digestive system. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. The etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Meaning
absorption [ăb-SŎRP-shŭn] Latin <i>absorptio</i> , a swallowing	Passing of nutrients into the bloodstream.
alimentary [ăl-ĭ-MĒN-tĕr-ē] canal	Muscular tube from the mouth to the anus; digestive tract; gastrointestinal tract.

Term	Meaning
amino [ă-MĒ-nō] acid	Chemical compound that results from digestion of complex proteins.
amylase [ĂM-ĭl-ās]	Enzyme that is part of pancreatic juice and saliva and that begins the digestion of carbohydrates.
anal [Ā-nāl] canal	Part of the digestive tract extending from the rectum to the anus.
anus [Ā-nūs]	Place at which feces exit the body.
appendage [ă-PĚN-dĭj]	Any body part (inside or outside) either subordinate to a larger part or having no specific central function.
appendix [ă-PĚN-dĭks] Latin, appendage	Wormlike appendage to the cecum.
bile [bĭl] Latin <i>bilis</i>	Yellowish-brown to greenish fluid secreted by the liver and stored in the gallbladder; aids in fat digestion.
bilirubin [bĭl-ĭ-RŪ-bĭn] bili-, bile + Latin <i>ruber</i> , red	Pigment contained in bile.
body	Middle section of the stomach.
bowel [bōw-l] Latin <i>botulus</i> , sausage	Intestine.
cecum [SĒ-kŭm] Latin, blind	Pouch at the top of the large intestine connected to the bottom of the ileum.
cheeks	Walls of the oral cavity.
chyme [kĭm] Greek <i>chymos</i> , juice	Semisolid mass of partially digested food and gastric juices that passes from the stomach to the small intestine.
colon [KŌ-lŏn] Greek <i>kolon</i>	Major portion of the large intestine.
defecation [dĕ-fĕ-KĀ-shŭn] Latin <i>defaeco</i> , to remove the dregs	Release of feces from the anus.
deglutition [dĕ-glŭ-TĬSH-ŭn] Latin <i>deglutio</i> , to swallow	Swallowing.
digestion [dĭ-JĚS-chŭn] Latin <i>digestio</i>	Conversion of food into nutrients for the body and into waste products for release from the body.
duodenum [dŭ-ō-DĒ-nŭm] Latin <i>duodeni</i> , twelve (about equal in size to the width of twelve fingers)	Top part of the small intestine where chyme mixes with bile, pancreatic juices, and intestinal juice to continue the digestive process.
elimination [ĕ-lĭm-ĭ-NĀ-shŭn]	The conversion of waste material from a liquid to a semisolid and removal of that material via defecation.
emesis [ĕ-MĒ-sĭs]	See regurgitation.
emulsification [ĕ-MŬL-sĭ-ĭ-KĀ-shŭn]	Breaking down of fats.
enzyme [ĔN-zĭm]	Protein that causes chemical changes in substances in the digestive tract.

Term	Meaning
epiglottis [ĕ-pĭ-GLŎ-tĭs]	Movable flap of tissue that covers the trachea.
esophagus [ĕ-SŎF-ă-gŭs]	Part of alimentary canal from the pharynx to the stomach.
fatty acid	Acid derived from fat during the digestive process.
feces [FĒ-sēz] Latin <i>faeces</i> , dregs	Semisolid waste that moves through the large intestine to the anus, where it is released from the body.
frenulum [FRĒN-yū-lŭm] Latin, small bridle	Mucous membrane that attaches the tongue to the floor of the mouth.
fundus [FŮN-dŭs] Latin, bottom	Upper portion of the stomach.
gallbladder [GĂWL-blăd-ĕr]	Organ on lower surface of liver; stores bile.
glucose [GLŪ-kōs]	Sugar found in fruits and plants and stored in various parts of the body.
glycogen [GLĪ-kō-jĕn]	Starch that can be converted into glucose.
gums [gŭmz]	Fleshy sockets that hold the teeth.
hard palate [PĂL-ăt]	Hard anterior portion of the palate at the roof of the mouth.
ileum [ĪL-ē-ŭm]	Bottom part of the small intestine that connects to the large intestine.
jejunum [jĕ-JŪ-nŭm] Latin <i>jejunos</i> , empty	Middle section of the small intestine.
large intestine	Passageway in intestinal tract for waste received from small intestine to be excreted through the anus; also, place where water reabsorption takes place.
lingual tonsils [LĪNG-gwăl TŎN-sĭls]	Two mounds of lymph tissue at the back of the tongue.
lipase [LĪP-ăs]	Enzyme contained in pancreatic juice.
lips Old English <i>lippa</i>	Two muscular folds formed around the outside boundary of the mouth.
liver [LĪV-ĕr] Old English <i>lifer</i>	Organ important in digestive and metabolic functions; secretes bile.
mastication [măs-tĭ-KĂ-shŭn] Latin <i>mastico</i> , to chew	Chewing.
mesentery [MĚS-ĕn-tĕr-ē, MĚZ-ĕn-tĕr-ē] Greek <i>mesenterion</i>	Membranous tissue that attaches small and large intestines to the muscular wall at the dorsal part of the abdomen.
mouth Old English <i>muth</i>	Cavity in the face in which food and water is ingested.
palatine [PĂL-ă-tĭn] tonsils	Mounds of lymphatic tissue on either side of the pharynx.
pancreas [PĂN-krĕ-ăs] Greek <i>pankreas</i> , sweetbreads	Digestive organ that secretes digestive fluids; endocrine gland that regulates blood sugar.
papilla (<i>pl.</i> , <i>papillae</i>) [pă-PĪL-ă (-ē)] Latin, nipple	Tiny projection on the superior surface of the tongue that contains taste buds.

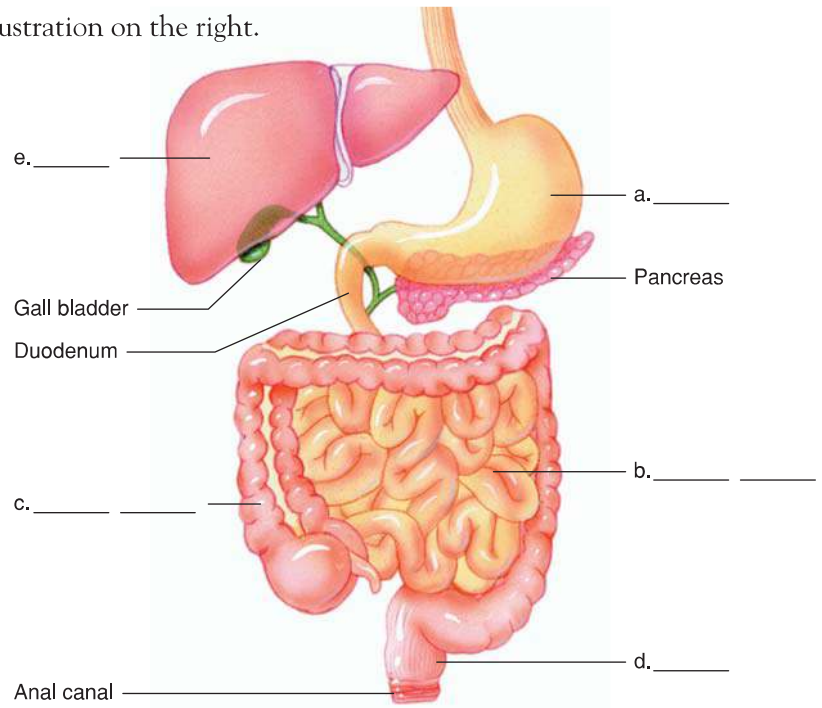
Term	Meaning
pepsin [PĚP-sĭn] Greek <i>pepsis</i> , digestion	Digestive enzyme in gastric juice.
peristalsis [pĕr-ĭ-STĀL-sĭs] peri-, around + Greek <i>stalsis</i> , constriction	Coordinated, rhythmic contractions of smooth muscle that force food through the digestive tract.
pharynx [FĀR-ĭngks] Greek, throat	Tube through which food passes to the esophagus.
pylorus [pĭ-LŌR-ŭs] Latin, gatekeeper	Narrowed bottom part of the stomach.
rectum [RĚK-tŭm] Latin, straight	Bottom portion of large intestine; connected to anal canal.
reflux [RĒ-flŭks] re-, back + Latin <i>fluxus</i> , a flow	See regurgitation.
regurgitation [rĕ-GŪR-jĭ-TĀ-shŭn] re- + Latin <i>gurgito</i> , to flood	Backward flow from the normal direction.
rugae [RŪ-gĕ] Latin, wrinkles	Folds in stomach lining; irregular ridges of mucous membrane on the hard palate.
saliva [să-LĪ-vă] Latin	Fluid secreted by salivary glands; contains amylase.
salivary [SĀL-ĭ-vār-ē] glands	Glands in the mouth that secrete fluids that aid in breaking down food.
sigmoid [SĬG-mŏyd] colon	S-shaped part of large intestine connecting at the bottom to the rectum.
small intestine	Twenty-foot long tube that continues the process of digestion started in the stomach; place where most absorption takes place.
soft palate [PĀL-ăt]	Soft posterior part of the palate in the mouth.
stomach [STŌM-ăk] Latin <i>stomachus</i>	Large sac between the esophagus and small intestine; place where food is broken down.
stool [stŭl] Old English <i>stol</i> , seat	Feces.
throat Old English <i>throtu</i> , throat	Pharynx.
tongue [tŭng] Old English <i>tunge</i>	Fleshy part of the mouth that moves food during mastication (and speech).
uvula [YŪ-vyū-lă] Latin, small grape	Cone-shaped projection hanging down from soft palate.
villus (<i>pl.</i> , <i>villi</i>) [VĪL-ŭs (-ĭ)] Latin, shaggy animal hair	Tiny, fingerlike projection on the lining of the small intestine with capillaries through which digested nutrients are absorbed into the bloodstream and lymphatic system.

STRUCTURE AND FUNCTION EXERCISES

Complete the Diagram

1. Label the digestive system parts in the illustration on the right.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____



Check Your Knowledge

For each of the following words, write C in the space provided if the word is spelled correctly. If it is not, spell the word correctly.

- | | |
|----------------------|---------------------|
| 2. papilae _____ | 7. villi _____ |
| 3. frenelum _____ | 8. amylase _____ |
| 4. deglutition _____ | 9. lypase _____ |
| 5. chime _____ | 10. bilirubin _____ |
| 6. glycogen _____ | |

Fill in the Blanks

11. Food is moved along the alimentary canal by a process called _____.
12. The four areas of the stomach are _____, _____, _____, _____, and _____.
13. The three parts of the small intestine are the _____, _____, and _____.
14. The four parts of the large intestine are the _____, _____, _____, _____, and _____.
15. The longest intestine is the _____ intestine.
16. A group of blood vessels that transports blood and other substances to and from the liver is called the _____, _____, _____.
17. Two enzymes in pancreatic juice are _____ and _____.
18. Bile aids in the breaking down of fats, a process called _____.

CASE STUDY

Getting a Referral

Asmin Sahib reported burning chest pains to her general practitioner. Ms. Sahib feared that the pains indicated that she was having a heart attack. After a thorough examination, including an ECG, the physician found Ms. Sahib to have no cardiovascular pathology. The general practitioner referred Asmin to Dr. Mary Walker, a gastroenterologist (specialist in the digestive system).

Critical Thinking

19. Why might Asmin feel she is having a heart attack?
20. What parts of the body will the gastroenterologist treat?

Combining Forms and Abbreviations

The lists below include combining forms and abbreviations that relate specifically to the digestive system. Pronunciations are provided for the examples.

COMBINING FORM	MEANING	EXAMPLE
an(o)	anus	<i>anoplasty</i> [ā-nō-PLĀS-tē], surgical repair of the anus
append(o), appendic(o)	appendix	<i>appendicitis</i> [ă-pĕn-dĭ-SĪ-tĭs], inflammation of the appendix
bil(o), bili	bile	<i>biliverdin</i> [bĭl-ĭ-VĒR-dĭn], green bile pigment
bucc(o)	cheek	<i>buccogingival</i> [būk-ō-JĪN-jĭ-văl], pertaining to the cheeks and gums
cec(o)	cecum	<i>cecopexy</i> [SĒ-kō-pĕk-sē], surgical repair or fixing of the cecum to correct excessive mobility
celi(o)	abdomen	<i>celioma</i> [SĒ-lē-ō-mă], tumor in the abdomen
chol(e), cholo	bile	<i>choleic</i> [kō-LĒ-ĭk], pertaining to bile
cholangi(o)	bile vessel	<i>cholangiogram</i> [kō-LĀN-jē-ō-grām], x-ray image of the bile vessels
cholecyst(o)	gallbladder	<i>cholecystectomy</i> [kō-lē-sĭs-TĒK-tō-mē], removal of the gallbladder
choledoch(o)	common bile duct	<i>choledochotomy</i> [kō-lĕd-ō-KŌT-ō-mē], incision into the common bile duct
col(o), colon(o)	colon	<i>colectomy</i> [kō-LĒK-tō-mē], removal of all or part of the colon
duoden(o)	duodenum	<i>duodenitis</i> [dū-ōd-ĕ-NĪ-tĭs], inflammation of the duodenum

COMBINING FORM	MEANING	EXAMPLE
enter(o)	intestines	<i>enteropathy</i> [čn-těr-ŮP-ă-thē], any intestinal disease
esophag(o)	esophagus	<i>esophagoscopy</i> [ě-sŏf-ă-GŎS-kŏ-pē], examination of the interior of the esophagus
gastr(o)	stomach	<i>gastralgia</i> [găs-TRĀL-jē-ă], stomachache
gloss(o)	tongue	<i>glossopharyngeal</i> [GLŎS-ŏ-fă-RĬN-jē-ăl], of the tongue and pharynx
gluc(o)	glucose	<i>glucogenesis</i> [glū-kŏ-JĚN-ě-sīs], formation of glucose
glyc(o)	sugar	<i>glycosuria</i> [glī-kŏ-SŪ-rē-ă], abnormal excretion of carbohydrates in urine
glycogen(o)	glycogen	<i>glycogenolysis</i> [GLĬ-kŏ-jě-NŎL-ĭ-sīs], breakdown of glycogen to glucose
hepat(o)	liver	<i>hepatitis</i> [hěp-ă-TĪ-tīs], liver disease or inflammation
ile(o)	ileum	<i>ileitis</i> [ĭl-ē-Ī-tīs], inflammation of the ileum
jejun(o)	jejunum	<i>jejunostomy</i> [jě-jū-NŎS-tŏ-mē], surgical opening to the outside of the body for the jejunum
labi(o)	lip	<i>labioplasty</i> [LĀ-bē-ŏ-plăs-tē], surgical repair of lips
lingu(o)	tongue	<i>linguodental</i> [lĭng-gwŏ-DĚN-tăl], pertaining to tongue and teeth
or(o)	mouth	<i>orofacial</i> [ŏr-ŏ-FĀ-shăl], pertaining to mouth and face
pancreat(o)	pancreas	<i>pancreatitis</i> [păn-krē-ă-TĪ-tīs], inflammation of the pancreas
periton(eo)	peritoneum	<i>peritonitis</i> [PĚR-ĭ-tŏ-NĪ-tīs], inflammation of the peritoneum
pharyng(o)	pharynx	<i>pharyngotonsillitis</i> [fă-RĬN-jŏ-tŏn-sĭ-LĪ-tīs], inflammation of tonsils and pharynx
proct(o)	anus, rectum	<i>proctologist</i> [prŏk-TŎL-ŏ-jĭst], specialist in study and treatment of diseases of the anus and rectum
pylor(o)	pylorus	<i>pylorospasm</i> [pĭ-LŎR-ŏ-spăzm], involuntary contraction of the pylorus
rect(o)	rectum	<i>rectoabdominal</i> [RĚK-tŏ-ăb-DŎM-ĭ-năl], of the rectum and abdomen
sial(o)	saliva, salivary gland	<i>sialism</i> [SĪ-ă-lĭzm], excessive secretion of saliva
sialaden(o)	salivary gland	<i>sialoadenitis</i> [SĪ-ă-lŏ-ă-dĕ-NĪ-tīs], inflammation of the salivary glands
sigmoid(o)	sigmoid colon	<i>sigmoidoscopy</i> [SĪG-mŏy-DŎS-kŏ-pē], visual examination of the sigmoid colon

COMBINING FORM	MEANING	EXAMPLE
steat(o)	fats	<i>steatorrhea</i> [stē-ă-tō-RĒ-ă], greater than normal amounts of fat in the feces
stomat(o)	mouth	<i>stomatitis</i> [STŌ-mă-TĪ-tis], inflammation of the lining of the mouth

ABBREVIATION	MEANING	ABBREVIATION	MEANING
ALT, AT	alanine transaminase	IBD	inflammatory bowel disease
AST	aspartic acid transaminase	IBS	irritable bowel syndrome
BE	barium enema	NG	nasogastric
BM	bowel movement	NPO	nothing by mouth (Latin, <i>nul per os</i>)
EGD	esophagogastroduodenoscopy	SGOT	serum glutamic oxaloacetic transaminase
ERCP	endoscopic retrograde cholangiopancreatography	SGPT	serum glutamic pyruvic transaminase
GERD	gastroesophageal reflux disease	TPN	total parenteral nutrition
GI	gastrointestinal	UGI(S)	upper gastrointestinal (series)

CASE STUDY

Seeing a Specialist

Dr. Walker reviewed Asmin Sahib's family history. It showed that two members of her immediate family had died from cancer of the digestive tract. Her father had stomach cancer, and her sister had liver cancer. Since Asmin has always known the risks associated with digestive cancers, she has maintained a healthy diet and has had regular checkups to detect any signs of the kinds of cancer that have afflicted her family.

Critical Thinking

21. Why is family history important in evaluating a patient?
22. Before cancer was detected in her family members, they suffered from chronic stomach and liver inflammations. What are the medical names for these two conditions?

COMBINING FORMS AND ABBREVIATIONS EXERCISES

Build Your Medical Vocabulary

Use the following combining forms or roots along with suffixes you learned in Chapter 2 to give the missing term. gastr(o) esophag(o) proct(o) chol(o) cholecyst(o) choledoch(o) hepat(o) pancreat(o) colon(o) duoden(o) rect(o)

23. Excision (removal) of the stomach: _____
24. Inflammation of the esophagus: _____
25. Prolapse of the rectum: _____

26. Pertaining to the duodenum: _____
27. Excision of a part of the common bile duct: _____
28. Inflammation of the pancreas: _____
29. Pain in the rectum: _____
30. Visual examination of the colon: _____
31. Enlargement of the liver: _____
32. Suture of the stomach: _____
33. Specialist in the study of diseases and treatment of the rectum and anus: _____
34. Inflammation of the gallbladder: _____
35. Liver tumor: _____

Find the Combining Forms

For the following terms, write the gastrointestinal combining form(s) in the space provided and define each term.

- | | |
|---------------------------|--------------------------------------|
| 36. pyloroduodenal _____ | 48. hepatomegaly _____ |
| 37. perianal _____ | 49. gastroenterology _____ |
| 38. enterocolostomy _____ | 50. esophagogastroduodenoscopy _____ |
| 39. ileocecal _____ | 51. proctitis _____ |
| 40. sublingual _____ | 52. oropharynx _____ |
| 40. appendectomy _____ | 53. celiac _____ |
| 41. cecostomy _____ | 54. pancreatolysis _____ |
| 42. enteromycosis _____ | 55. biliuria _____ |
| 43. gastrocolostomy _____ | 56. enteroecstasis _____ |
| 44. buccogingival _____ | 57. ileopexy _____ |
| 45. cholecystitis _____ | 58. hepatotoxic _____ |
| 46. labiodental _____ | 59. peritonitis _____ |
| 47. appendicolith _____ | 60. pharyngitis _____ |

CASE STUDY

Treating the Symptoms

Dr. Walker finds Asmin to be a healthy 49-year-old except for the burning sensations in her chest. Dr. Walker has decided to have Asmin try a bland diet (avoidance of spicy food, alcohol, and caffeine) and sleeping with the head of the bed raised. She prescribes a mild antacid. Dr. Walker suggests a return visit in three weeks to see if the steps to avoid esophageal reflux are showing improvement.

After three weeks, Asmin has shown marked improvement. Dr. Walker tells her she can add some spicy foods back into her diet slowly, but to continue

to avoid alcohol and caffeine. Asmin will need a checkup with Dr. Walker in six months.

Critical Thinking

61. What diagnostic test will Dr. Walker use to check Asmin's reflux condition in six months?
62. What other tests might Dr. Walker prescribe for someone with a family history of intestinal cancer?



FIGURE 14-7 A scanned image of the intestinal tract.

Diagnostic, Procedural, and Laboratory Terms

The digestive or gastrointestinal system is examined in many different ways to diagnose a number of problems. Gastroenterologists (specialists in the digestive system) perform procedures to examine the internal health of various organs. They order blood tests to look for signs of infection or disease and also use some of the extensive number of imaging procedures available for this body system.

A stool specimen may be tested to identify disease-causing organisms such as parasites. This test is called a *stool culture*. A *stool culture and sensitivity test* (C & S) is used to try out different medications on *microorganisms* to check for effectiveness. A *chemical test of a stool specimen* (*hemocult* test or *stool guaiac*) indicates whether there is bleeding in the digestive tract. Guaiac is a substance added to the stool sample that reacts with any occult (not visible) blood.

Various types of endoscopes are used to examine the digestive system, either through the mouth, the anus, or an opening into the abdominal cavity. An **esophagoscopy** is the use of an *esophagoscope* to illuminate the esophagus as it is passed through the mouth and into the esophagus. When ulcers are seen in the digestive system through the endoscope, a diagnosis of *H. pylori* (*Helicobacter pylori*), bacteria that cause ulcers, is given. This is usually treated with an antibiotic and dietary modification. A *gastroscope* is used to examine the stomach in **gastroscopy**. A **colonoscopy** is the use of an endoscope to examine the colon. A *proctoscope* is used to examine the rectum and anus in a **proctoscopy**. A *sigmoidoscope* is used to examine the sigmoid colon in **sigmoidoscopy**. *Endoscopic retrograde cholangiopancreatography* (ERCP) is a procedure used to examine the biliary ducts with x-ray, a contrast medium, and the use of an endoscope. **Peritoneoscopy** or *laparoscopy* is the examination of the abdominal cavity with an instrument called a *peritoneoscope* or a *laparoscope*.

X-rays and other imaging techniques are used extensively to search for abnormalities. An MRI shows the major organs of the digestive system. A CAT scan provides a visual image of the abdominal cavity and the digestive tract. To examine more specific areas, patients are usually given a contrast medium or other substance that stands out against the background of the x-ray produced. A *barium swallow* is the ingestion of a barium solution before an x-ray of the esophagus, which is generally used to locate foreign objects that have been swallowed (Figure 14-7). A *barium enema* is the administration of a barium solution through an enema before taking a series of x-rays of the colon called a *lower GI series*. An *upper GI series* (UGIS) provides x-rays of the esophagus, stomach, and duodenum, usually after the patient swallows a barium solution or other contrast medium. A *cholangiogram* is an image of the bile vessels taken in **cholangiography**, an x-ray of the bile ducts. A *cholecystogram* is an image of the gallbladder taken in **cholecystography**, an x-ray of the gallbladder taken after the patient swallows iodine. A liver scan, done after injection of radioactive material, can reveal abnormalities. Ultrasound is used to provide images of the entire abdominal area, as in *abdominal ultrasonography*.

Several serum tests indicate how the liver is functioning. A *serum glutamic oxaloacetic transaminase* (SGOT) or an *aspartate transaminase* (AST) measures the enzyme levels in serum that has leaked from damaged liver cells. Another serum test for liver function is the *serum glutamic pyruvic transaminase* (SGPT). This test is also known as an *alanine transaminase* (ALT, AT). A *serum bilirubin* measures bilirubin in the blood as an indicator of jaundice.

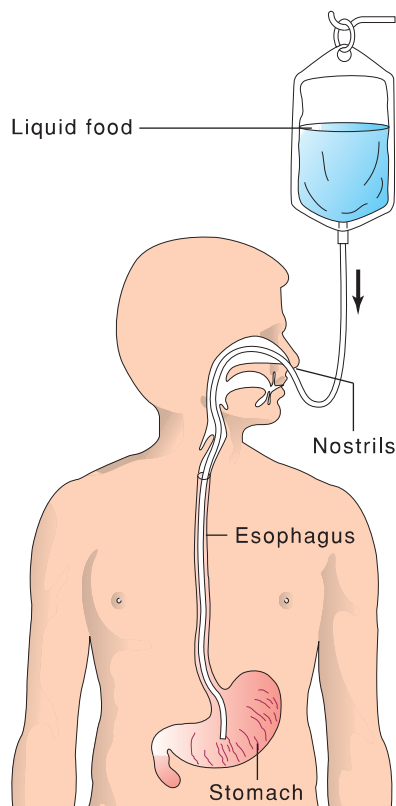


FIGURE 14-8 Liquid nourishment can be provided through a nasogastric (NG) tube. This type of tube may also be used to relieve fluid buildup in the stomach or to take stomach content samples.

An *alkaline phosphatase* reveals levels of the enzyme alkaline phosphatase in serum as an indicator of liver disease, especially liver cancer.

A *nasogastric (NG) tube* is passed through the nose to the stomach to relieve fluid buildup or to take stomach content samples for analysis (Figure 14-8). This process is called *nasogastric intubation*.

VOCABULARY REVIEW

In the previous section, you learned terms relating to diagnosis, clinical procedures, and laboratory tests. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. The etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Meaning
cholangiography [kō-lăn-jē-ŎG-ră-fē] cholangio-, bile vessel + -graphy, a recording	X-ray of the bile ducts.
cholecystography [kō-lē-sīs-TÖG-ră-fē] chole-, bile + cysto-, bladder + -graphy	X-ray of the gallbladder.
colonoscopy [kō-lŏn-ŎS-kō-pē] colono-, colon + -scopy, a viewing	Examination of the colon using an endoscope.
esophagoscopy [ě-sŏf-ă-GÖS-kō-pē] esophago-, esophagus + -scopy	Examination of the esophagus with an esophagoscope.
gastroscopy [găs-TRÖS-kō-pē] gastro-, stomach + -scopy	Examination of the stomach using an endoscope.

Term	Meaning
peritoneoscopy [PĔR-ĭ-tō-nē-ŌS-kō-pē] peritoneo-, peritoneum + -scopy	Examination of the abdominal cavity using a peritoneoscope.
proctoscopy [prōk-TŌS-kō-pē] procto-, rectum + -scopy	Examination of the rectum and anus using a proctoscope.
sigmoidoscopy [SĪG-mŏy-DŌS-kō-pē] sigmoido-, sigmoid colon + -scopy	Examination of the sigmoid colon using a sigmoidoscope.

DIAGNOSTIC, PROCEDURAL, AND LABORATORY TERMS EXERCISES

Find a Match

Match the diagnostic test in the left-hand column with the definition or possible diagnosis resulting from the test in the right-hand column.

- | | |
|--|--|
| 63. ____ serum bilirubin | a. x-ray of esophagus, stomach, and duodenum |
| 64. ____ alkaline phosphatase | b. barium |
| 65. ____ upper GI series | c. cholangiogram |
| 66. ____ image of bile vessels | d. nasogastric tube |
| 67. ____ testing of waste for disease-causing organisms | e. SGOT |
| 68. ____ tube to retrieve stomach contents for examination | f. stool guaiac |
| 69. ____ element in a solution used in x-rays | g. jaundice |
| 70. ____ test for liver function | h. liver cancer |
| 71. ____ x-rays of the intestines and anal canal | i. stool culture |
| 72. ____ hemoccult test | j. lower GI series |

CASE STUDY

Testing and Diagnosing

Dr. Walker has morning hours at a local hospital several days a week. Today, Jim Santarelli is scheduled for a colonoscopy. His medical record is shown below:

Critical Thinking

73. What might Dr. Walker be looking for in this procedure?
74. If the examination shows a clear colon, what lifestyle changes might Dr. Walker recommend?

PROCEDURE: colonoscopy

SURGEON: Dr. Walker

INDICATION: This man has a two-year history of increasing, intermittent, sudden bouts of diarrhea without mucus or blood. Antispasmodic treatment with Bentyl has failed. He had a negative barium enema 3 1/2 months ago. Stools have been hemoccult negative. There are no systemic symptoms. The frequency of the diarrhea is once every other day to twice a week.

With the patient turned onto his left side, he was monitored using continuous SAO2 pulse monitoring and intermittent blood pressure monitoring. An IV was started in the left forearm. Mr. Santarelli was given 50 mg of Demerol and 10 mg of Valium by slow intravenous injection. After adequate sedation was achieved, the colonoscopy was performed.

Pathological Terms

The digestive system is both the site and the source of many diseases and disorders. What we take into our mouths determines the type of nutrition our body receives. Eating disorders can be the catalyst for disease processes to start.

Eating Disorders

Anorexia is a loss of appetite. In its most severe form, **anorexia nervosa**, it is a morbid refusal to eat because the person wishes to be dangerously thin. **Bulimia** is a disease wherein bingeing on food and then purposely purging or vomiting is also a quest for abnormal weight loss. Both anorexia nervosa and bulimia can produce many health problems and symptoms, such as hair loss, amenorrhea, and heart damage. Figure 14-9 shows the overlap of starving, bingeing, and purging that can be present in both anorexia nervosa and bulimia. **Obesity** is often the result of overeating, although recent gene studies indicate a possible hereditary defect in many obese people. Obesity can be one of the factors in many health problems, such as heart disease and diabetes. Many eating disorders can be treated with psychological counseling; some, such as anorexia nervosa, may result in death if the patient is not treated at an eating disorder unit or clinic.

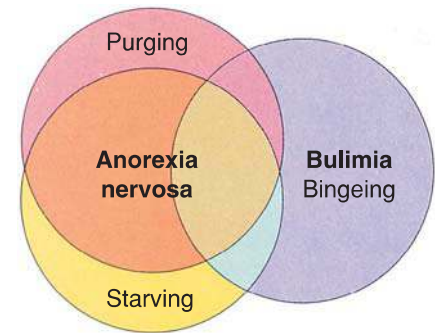


FIGURE 14-9 Starving, bingeing, and purging are symptoms that can overlap in both anorexia nervosa and bulimia.

Disorders of the Mouth, Pharynx, and Esophagus

Areas in the mouth can become inflamed from an infection, allergy, injury, or internal disorder. **Cheilitis** occurs on the lips; **glossitis** occurs on the tongue; **sialoadenitis** occurs in the salivary glands; and **parotitis** or **parotiditis** occurs in the parotid glands. Various other dental disorders may similarly cause inflammation (see Chapter 20). **Halitosis** is unusually foul mouth odor, which may be caused by poor dental hygiene, gum disease, certain foods, or by an internal disorder such as a sinus infection. **Ankyloglossia** is a condition in which the tongue is partially or completely attached to the floor of the mouth, thereby preventing normal movement. Normal swallowing is an important part of maintaining good nutrition. People with swallowing disorders usually have to have their diet supplemented via a tube. **Aphagia** is an inability to swallow; **dysphagia** is difficulty in swallowing.

Diseases of the pharynx are discussed in Chapter 7 as part of the respiratory system. Food travels into the mouth, through the pharynx, and into the esophagus. *Esophageal varices* are twisted veins in the esophagus that are prone to hemorrhage and ulcers. **Esophagitis** is any inflammation of the esophagus. *Gastroesophageal reflux disease* (GERD) or *esophageal reflux* involves malfunctioning of the sphincter muscle at the bottom of the esophagus. It opens at the wrong time to allow backflow of stomach contents into the esophagus, causing irritation of the esophageal lining. **Achalasia** is the failure of the same esophageal sphincter to relax during swallowing and allow food to pass easily from the esophagus into the stomach to continue the digestive process. This disorder interferes with the intake of normal amounts of nutrients.

Stomach Disorders

The stomach is also the site of many disorders. Some people are sensitive to various foods (such as very spicy dishes) or have allergies to others (as milk

The National Association of Anorexia Nervosa and Related Disorders (www.anad.org) offers support for eating disorders at their Web site.

products). **Achlorhydria** is the lack of hydrochloric acid in the stomach, a chemical necessary for digestion. **Dyspepsia** is difficulty in digesting food, particularly in the stomach. **Gastritis** is any stomach inflammation. **Gastroenteritis** is an inflammation of both the stomach and small intestine. **Flatulence** is an accumulation of gas in the stomach or intestines. **Eructation** (belching) may release some of this gas. **Nausea** is a sick feeling in the stomach caused by illness or the ingestion of spoiled food. Nausea may also be felt in certain situations such as early pregnancy or when repetitive motion causes discomfort as in car sickness, sea sickness, and so on. **Hematemesis** is the vomiting of blood from the stomach, usually a sign of a severe disorder. *Stomach ulcers* or gastric ulcers are a type of **peptic ulcer**, a sore on the mucous membrane of any part of the gastrointestinal system. A **hiatal hernia** is a protrusion of the stomach through an opening in the diaphragm called the hiatal opening. The pyloric sphincter can become abnormally narrow and cause the condition known as *pyloric stenosis*.

Disorders of the Liver, Pancreas, and Gallbladder

Secretions of the liver, pancreas, and gallbladder mix with the stomach contents that move into the duodenum. The liver can be the site of **jaundice** or **icterus**, when excessive bilirubin in the blood (**hyperbilirubinemia**) causes a yellow discoloration of the skin. Newborn jaundice may be a result of liver disease or many other factors. It is sometimes treated with exposure to artificial lights or sunlight. **Hepatomegaly** is an enlarged liver. **Hepatopathy** is a general term for liver disease, and **hepatitis** is a term for several types of contagious diseases, some of which are sexually transmitted (see Chapter 10). **Cirrhosis** is a chronic liver disease usually caused by poor nutrition and excessive alcohol consumption. **Pancreatitis** is an inflammation of the pancreas. (Other pancreatic diseases are discussed in Chapter 15.)

The gallbladder can be the site of calculi (**gallstones** or **cholelithiasis**) that block the bile from leaving the gallbladder. The presence of gallstones in the common bile duct is called *choledocholithiasis*. **Cholangitis** is any inflammation of the bile ducts. **Cholecystitis** is any inflammation of the gallbladder, either acute or chronic. The duodenum can be the site of **duodenal ulcers**. Duodenal ulcers are a type of peptic ulcer and are thought to be bacterial (*H. pylori*) in origin. This discovery has led to the widespread use of antibiotics to treat many types of ulcers. On the side of the duodenum lies the appendix, which can become inflamed if gastric substances leak into it from the duodenum. This condition is called **appendicitis**, which usually requires surgery to prevent the appendix from bursting.

Intestinal Disorders

The small and large intestines can have ulcers, obstructions, irritations, inflammations, abnormalities, and cancer. An **ileus** is an intestinal blockage, which may be caused by lack of sufficient moisture to move waste material through the system or by an internal disorder. **Enteritis** and **colitis** are general terms for inflammations in the small intestine. **Ulcerative colitis** is a chronic type of *irritable bowel disease* (IBD) or *inflammatory bowel disease* with recurring ulcers and inflammations. Other symptoms may include cramping, abdominal pain, and diarrhea. IBDs are often associated with stress. **Crohn's**

The American Liver Foundation (www.liverfoundation.org) supports research into the causes and cure of liver disease.

disease is another type of IBD with symptoms similar to ulcerative colitis but lacking ulcers and sometimes having **fistulas**, abnormal passages or openings in tissue walls. **Colic** is a condition (usually in infants) of gastrointestinal distress due to allergies, an underdeveloped digestive tract, or other conditions that prevent easy digestion of food. In infants, colic usually resolves itself within a few months as the infant matures. **Diverticulosis** is a condition in which **diverticula**, small pouches in the intestinal wall, trap food or bacteria. **Diverticulitis** is an inflammation of the diverticula. **Ileitis** is an inflammation of the ileum. **Dysentery** is a general term for irritation of the intestinal tract with loose stools and other symptoms, such as abdominal pain and weakness. It is often caused by bacteria such as those found in many underdeveloped countries. **Polyposis** is a general term for a condition in which polyps develop in the intestinal tract. Polyps can become cancerous so they are often checked or removed to detect any abnormalities at an early stage. *Colonic polyposis* is polyps in the colon, which have a high likelihood of changing to *colorectal cancer*.

A **volvulus**, an intestinal blockage caused by twisting of the intestine on itself, requires emergency surgery (Figure 14-10). An **intussusception** is the telescoping of the intestine. One section prolapses (collapses) into a neighboring part (Figure 14-11). The abdominal and peritoneal regions surrounding the intestinal tract can become filled with fluid (**ascites**) or inflamed (**peritonitis**).

The Rectum and Anus

The rectum, anus, and stool may play a role in some disorders. **Proctitis** is an inflammation of the rectum and anus. **Constipation** is a condition with infrequent or difficult release of bowel movements, sometimes the result of insufficient moisture to soften and move stools. **Diarrhea** is loose, watery stools that may be the result of insufficient roughage or of an internal disorder. **Flatus** is the release of gas through the anus.

The analysis of stool for blood, bacteria, and other elements can provide a clue to various ailments. **Melena** is a condition in which blood that is not fresh appears in the stool as a black, tarry mass. **Hematochezia** is bright red blood in the stool. **Steatorrhea** is fat in the stool.

A small opening in the anal canal is called an **anal fistula**. Waste material can enter the abdominal cavity through a fistula. The anus may be the site of **hemorrhoids**, swollen, twisted veins that can cause great discomfort.

Hernias

A **hernia** is any loop or twist of an intestine or other organ not positioned correctly in the abdomen. There are many types of hernias. Some common ones are as follows:

- A **hiatal hernia** is the protrusion of the stomach through the esophageal hiatus of the diaphragm.
- An **inguinal hernia** is a protrusion of the intestine through a weakness in the abdominal wall (Figure 14-12).
- A **strangulated hernia** is one in which blood flow is restricted or absent.
- A **femoral hernia** is a protrusion of a loop of intestine into the femoral canal.

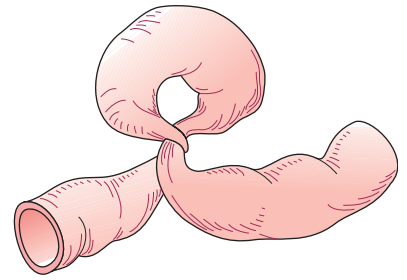


FIGURE 14-10 A volvulus is a twisting of the intestine that causes a blockage and requires surgery.

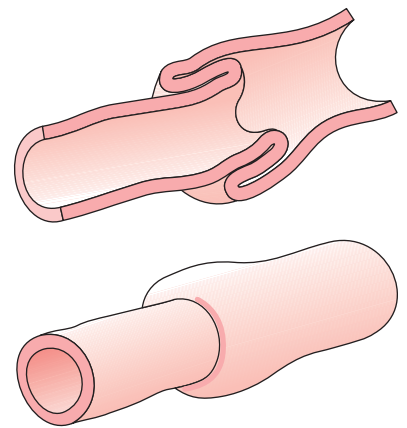


FIGURE 14-11 An intussusception occurs most often in children and requires surgical correction.

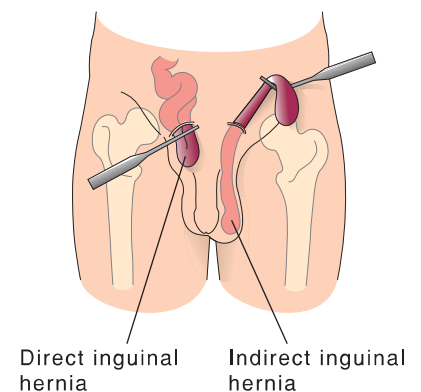


FIGURE 14-12 An inguinal hernia usually requires surgery.

- An *umbilical hernia* is a protrusion of part of the intestine into the umbilicus.
- An *incarcerated hernia* is one in which movement of bowel is restricted or obstructed.

VOCABULARY REVIEW

In the previous section, you learned terms relating to pathology. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. The etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Definition
achalasia [ăk-ă-LĀ-zhē-ă] a-, without + Greek <i>chhalasis</i> , a relaxing	Inability of a muscle, particularly the cardiac sphincter, to relax.
achlorhydria [ă-klōr-HĪ-drē-ă]	Lack of hydrochloric acid in the stomach.
anal fistula [Ā-nāl FĪS-tyū-lă]	Small opening in the anal canal through which waste matter can leak into the abdominal cavity.
ankyloglossia [ĂNG-kĭ-lō-GLŌS-ē-ă] Greek <i>ankylos</i> , bent + <i>glossus</i> , tongue	Condition of the tongue being partially or completely attached to the bottom of the mouth.
anorexia nervosa [ăn-ō-REK-sē-ă nēr-VŌ-să] an-, without + Greek <i>orexis</i> , appetite	Eating disorder with extreme weight loss.
aphagia [ă-FĀ-jē-ă] a-, without + -phagia, eating	Inability to swallow.
appendicitis [ă-pĕn-dĭ-SĪ-tĭs] appendic-, appendix + -itis, inflammation	Inflammation of the appendix.
ascites [ă-SĪ-tēs] Latin, bags	Fluid buildup in the abdominal and peritoneal cavities.
bulimia [bū-LĒM-ē-ă] Greek <i>boux</i> , ox + <i>limos</i> , hunger	Eating disorder with bingeing and purging.
cheilitis [kĭ-LĪ-tĭs] Greek <i>cheilos</i> , lip + -itis	Inflammation of the lips.
cholangitis [kō-lăn-JĪ-tĭs] cholangi-, bile vessel + -itis	Inflammation of the bile ducts.
cholecystitis [KŌ-lē-sĭs-TĪ-tĭs] chole-, bile + cyst-, bladder + -itis	Inflammation of the gallbladder.
cholelithiasis [KŌ-lē-lĭ-THĪ-ă-sĭs] chole- + Greek <i>lithos</i> , stone + -iasis, condition	Gallstones in the gallbladder.
cirrhosis [sĭr-RŌ-sĭs] Greek <i>kirrhos</i> , yellow + -osis, condition	Liver disease, often caused by alcoholism.
colic [KŌL-ĭk] Greek <i>kolikos</i> , of the colon	Gastrointestinal distress, especially of infants.

Term	Definition
colitis [kō-LĪ-tīs] col-, colon + -itis	Inflammation of the colon.
constipation [kōn-stī-PĀ-shŭn] Latin <i>constipo</i> , to press together	Difficult or infrequent defecation.
Crohn's [krōnz] disease After Burrill Crohn (1884–1983), U. S. gastroenterologist	Type of irritable bowel disease with no ulcers.
diarrhea [dī-ă-RĒ-ă] Greek <i>diarrhoia</i> , a flowing through	Loose, watery stool.
diverticula [dī-vēr-TĪK-yū-lă] Latin <i>diverticulum</i> , a side road	Small pouches in the intestinal walls.
diverticulitis [DĪ-vēr-tĭk-yū-LĪ-tīs] diverticul(a) + -itis	Inflammation of the diverticula.
diverticulosis [DĪ-vēr-tĭk-yū-LŌ-sīs] diverticul(a) + -osis	Condition in which diverticula trap food or bacteria.
duodenal [DŪ-ō-DE-năl] ulcer	Ulcer in the duodenum.
dysentery [DĪS-ĕn-tēr-ē] Greek <i>dysenteria</i> , bad bowels	Irritation of the intestinal tract with loose stools.
dyspepsia [dīs-PĒP-sē-ă] dys-, bad + -pepsia, digestion	Indigestion.
dysphagia [dīs-FĀ-jē-ă] dys- + -phagia, eating	Difficulty in swallowing.
enteritis [ĕn-tēr-Ī-tīs] enter-, intestine + -itis	Inflammation of the small intestine.
eructation [ē-rŭk-TĀ-shŭn] Latin <i>eructo</i> , to belch	Belching.
esophagitis [ĕ-sōf-ă-JĪ-tīs] esophag-, esophagus + -itis	Inflammation of the esophagus.
fistula [FĪS-tyū-lă] Latin, a pipe	Abnormal opening in tissue.
flatulence [FLĀT-yū-lĕns]	Gas in the stomach or intestines.
flatus [FLĀ-tŭs] Latin, a blowing	Gas in the lower intestinal tract that can be released through the anus.
gallstones	Calculi in the gallbladder.
gastritis [găs-TRĪ-tīs] gastr-, stomach + -itis	Inflammation of the stomach.
gastroenteritis [GĀS-trō-ĕn-tēr-Ī-tīs] gastro- + enter- + -itis	Inflammation of the stomach and small intestine.
glossitis [glō-SĪ-tīs] gloss-, tongue + -itis	Inflammation of the tongue.

Term	Definition
halitosis [hăl-ĭ-TŌ-sĭs] Latin <i>halitus</i> , breath + -osis	Foul mouth odor.
hematemesis [hē-mă-TĔM-ē-sĭs] hemat-, blood + emesis	Blood in vomit.
hematochezia [HĔ-mă-tō-KĔ-zhē-ă] hemato-, blood + Greek <i>chezo</i> , to defecate	Red blood in stool.
hemorrhoids [HĔM-ō-rōydz]	Swollen, twisted veins in the anus.
hepatitis [hĕp-ă-TĪ-tĭs] hepat-, liver + -itis	Inflammation or disease of the liver.
hepatomegaly [HĔP-ă-tō-MĔG-ă-lē] hepato-, liver + -megaly, enlargement	Enlarged liver.
hepatopathy [hĕp-ă-TŌP-ă-thē] hepato- + -pathy, disease	Liver disease.
hiatal hernia [hĭ-Ā-tăl HĔR-nē-ă]	Protrusion of the stomach through an opening in the diaphragm.
hyperbilirubinemia [HĪ-pĕr-BĪL-ĭ-rū-bĭ-NĔ-mē-ă] hyper-, excessive + bilirubin + -emia, blood	Excessive bilirubin in the blood.
icterus [ĪK-tĕr-ŭs] Greek <i>ikteros</i>	Jaundice.
ileitis [ĪL-ē-Ī-tĭs] ile-, ileum + -itis	Inflammation of the ileum.
ileus [ĪL-ē-ŭs] Latin, a twisting	Intestinal blockage.
intussusception [ĪN-tŭs-sŭ-SĔP-shŭn] Latin <i>intus</i> , within + <i>suscipio</i> , to take up	Prolapse or collapse of an intestinal part into a neighboring part. One section collapses into another like a telescope.
jaundice [JĀWN-dĭs]	Excessive bilirubin in the blood causing yellowing of the skin.
melena [mĕ-LĔ-nă] Greek <i>melaina</i> , black	Old blood in the stool.
nausea [NĂW-zhē-ă] Latin, seasickness	Sick feeling in the stomach.
obesity [ō-BĔS-ĭ-tē] Latin <i>obesus</i> , fat	Abnormal accumulation of fat in the body.
pancreatitis [PĀN-krē-ă-TĪ-tĭs] pancreat-, pancreas + -itis	Inflammation of the pancreas.
parotitis, parotiditis [păr-ō-TĪ-tĭs, pă-rôt-ĭ-DĪ-tĭs] parot(id gland) + -itis	Inflammation of the parotid gland.
peptic ulcer	Sore on the mucous membrane of the digestive system; stomach ulcer or gastric ulcer.

Term	Definition
peritonitis [PĔR-ĭ-tō-NĪ-tĭs] periton-, peritoneum + -itis	Inflammation of the peritoneum.
polyposis [PŎL-ĭ-PŎ-sĭs] polyp + -osis	Condition with polyps, as in the intestines.
proctitis [prŏk-TĪ-tĭs] proct-, rectum + -itis	Inflammation of the rectum and anus.
sialoadenitis [SĪ-ă-lō-ăd-ĕ-NĪ-tĭs] sialoaden-, salivary gland + -itis	Inflammation of the salivary glands.
steatorrhea [STĒ-ă-tō-RĒ-ă] steato-, fat + -rrhea, a flowing	Fat in the blood.
ulcerative colitis [kŏ-LĪ-tĭs]	Inflammation of the colon with ulcers.
volvulus [VŎL-vyū-lŭs] Latin <i>volvo</i> , to roll	Intestinal blockage caused by the intestine twisting on itself.

PATHOLOGICAL TERMS EXERCISES

Find a Match

Match the terms in the left-hand column with the correct definition in the right-hand column.

- | | |
|--------------------------|---|
| 75. ____ bulimia | a. intestinal blockage caused by the intestine twisting on itself |
| 76. ____ colitis | b. red blood in the stool |
| 77. ____ diverticula | c. prolapse of an intestinal part into a neighboring part |
| 78. ____ eructation | d. eating disorder with bingeing and purging |
| 79. ____ hematochezia | e. inflammation of the colon |
| 80. ____ intussusception | f. inflammation of the peritoneum |
| 81. ____ jaundice | g. fat in the stool |
| 82. ____ peritonitis | h. small pouches in the intestinal wall |
| 83. ____ steatorrhea | i. icterus |
| 84. ____ volvulus | j. belching |

Check Your Knowledge

Circle the correct term that completes the sentence.

85. Jane's parents have brought her to see an internist. Jane is 5'10'' and weighs 105 pounds. Jane thinks she is fat. The doctor suspects Jane's problem is _____. (obesity, anorexia, aphagia)
86. John was seen in the emergency room. He complained of abdominal pain with cramping and diarrhea. He was concerned that he might have _____. (constipation, irritable bowel disease, hemorrhoids)
87. Jean has been complaining of severe pain in the RUQ following the ingestion of food, especially foods like nuts and ice cream. She believes she might have _____. (pancreatitis, appendicitis, cholecystitis)
88. Dora is feeling sluggish and unwell. She complains to her doctor that she has been unable to have a bowel movement for the past 5 days. She is diagnosed with _____. (diarrhea, hematochezia, constipation)

89. Many people cannot lie flat after eating because of a burning sensation in the chest and throat. The pain makes the person feel that he or she is having a heart attack. This condition, seen frequently in the emergency room, is called _____. (inguinal hernia, dysentery, gastroesophageal reflux)

Spell It Correctly

For each of the following words, write C if the spelling is correct. If it is not, write the correct spelling.

- | | |
|------------------------------|-------------------------|
| 90. dypepsia _____ | 96. polyposis _____ |
| 91. hyperbilirubinemia _____ | 97. cirrosis _____ |
| 92. diverticuli _____ | 98. hietal hernia _____ |
| 93. hematochazia _____ | 99. achlorhydria _____ |
| 94. inginal hernia _____ | 100. flatulence _____ |
| 95. iliitis _____ | |

CASE STUDY

Performing Surgery

Dr. Walker has another patient scheduled for a colonoscopy. Laura Martinez had an earlier colonoscopy, which was negative. Since then, she has experienced some rectal bleeding. This time her colonoscopy shows several suspicious-looking polyps near the rectum. Dr. Walker biopsies several of them. The result is positive for cancer, but the area of malignancy that needs to be removed is limited.

Critical Thinking

101. What operation will likely be performed?
102. Why might the operation include a colostomy?

Surgical Terms

Treating the digestive tract often includes biopsies, surgeries, and observation using endoscopes. The following is a list of some of the surgical procedures performed on the digestive system.

- **Abdominocentesis** or **paracentesis** is a surgical puncture to remove fluid or relieve pressure in the abdominal cavity, as in ascites.
- **Cholelithotomy** is an incision for the removal of stones. **Choledocholithotomy** is an incision for removal of stones in the common bile duct. **Cholelithotripsy** is the crushing of gallstones using sound waves or other techniques.
- Surgical repair of the digestive tract includes **cheiloplasty** (lip repair); **glossorrhaphy** (tongue suturing); **esophagoplasty** (esophagus repair); and **proctoplasty** (repair of the rectum and anus).
- Some parts of the digestive tract may require partial or complete removal because of malignancies or chronic inflammation. A **glossectomy** is removal of the tongue. A **polypectomy** is the removal of polyps, particularly in areas such as the colon, which are susceptible to cancer. An **appendectomy** is the removal of a diseased appendix.

that is in danger of rupturing. A **cholecystectomy** is the removal of the gallbladder, particularly one that is constantly inflamed and susceptible to painful bouts of gallstones. A **diverticulectomy** is removal of diverticula. A **gastrectomy** is removal of some or all of the stomach. It may be followed by a gastric resection, to repair the remaining part of the stomach. A **gastric resection** or **gastric bypass** removes a portion of the stomach to limit overeating as a treatment for obesity. A simpler procedure called *gastric lap band surgery* is also used as a treatment for obesity. A **colectomy** is the removal of some or all of the colon. This may be a temporary operation that is followed by a surgical reconnection of parts of the colon or it may require the use of a colostomy bag. A **pancreatectomy** is removal of the pancreas usually only in cases with malignancy. A **hemorrhoidectomy** is the removal of hemorrhoids, which are sometimes treated by laser cauterization. A **hepatic lobectomy** is removal of one or more lobes of the liver. It is usually preceded by a **liver biopsy** to determine the type and extent of disease. People can live with only part of a liver. However, if a person with a completely diseased liver does not receive an organ transplant, he or she will usually die. An anal fistula is removed in an **anal fistulectomy**. **Billroth's I** and **Billroth's II** are two types of operations. The first is the excision of the pylorus, and the second is the resectioning of the pylorus with the stomach.

- An **anastomosis**, a surgical union of two hollow tubes, is sometimes used to bypass parts of the intestines as in the case of removal of a section of the intestines. There are many types of anastomoses used in various body systems. There are a number of ways that anastomoses can correct digestive disorders. An *ileorectal anastomosis* is the connection of the ileum and the rectum after a total colectomy. An *end-to-side anastomosis* is a connection of the end of one vessel to the side of a larger one.

Look at the following website for information concerning gastric bypass and gastric lap band surgery.
<http://www.webmd.com/video/lap-band-after-gastric-bypass>

MORE ABOUT . . .

Gastric Lap Band Surgery

This surgical procedure is one of the newer method for weight loss surgery that places a silicone band device around the stomach. Unlike gastric bypass surgery, which removes part of the stomach, this procedure surgically implants a band at the upper part of the stomach, forming a small pouch that can hold only a small amount of food. The surgery only involves cutting into the abdomen for the placement of the band. No cutting is done on the stomach itself. Patients must be willing to make major changes in their eating habits and lifestyles just as they would with other weight loss practices. To be eligible, other nonsurgical weight loss methods have not been successful and a person must have a Body Mass Index (BMI) of at least 40 and with one or more comorbidities.

Research suggests that although weight loss is usually not as extreme, gastric lap band surgery can be as beneficial in sending diabetes into remission as gastric bypass surgery. Linking research on the disease processes that are exacerbated by obesity is an important association when making advances in our ability to reduce the effects of the over weight condition of our population's health.

For more information, go to <http://www.fda.org> and <http://nlm.nih.gov/medlineplus>.

- Openings may have to be made in the gastrointestinal tract. Sometimes they are temporary to allow evacuation of waste material. In some cases, they are permanent as when intestinal parts cannot be reconnected. An **ileostomy** is the creation of an opening in the abdomen, which is attached to the ileum to allow fecal matter to discharge into a bag outside the body. A **colostomy** is an opening in the colon to the abdominal wall to create a place for waste to exit the body other than through the anus. A colostomy is sometimes required in the case of diseases such as cancer and ulcerative colitis.

VOCABULARY REVIEW

In the previous section, you learned terms relating to surgery. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. The etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Definition
abdominocentesis [ăb-DŌM-ĭ-nō-sĕn-TĒ-sĭs] Latin <i>abdominis</i> , abdomen + <i>-centesis</i> , puncture	Incision into the abdomen to remove fluid or relieve pressure.
anal fistulectomy [Ā-nāl fĭs-tyū-LĔK-tō-mē]	Removal of an anal fistula.
anastomosis [ă-NĀS-tō-MŌ-sĭs] Greek <i>anastomoo</i> , to furnish with a mouth	Surgical union of two hollow structures.
appendectomy [ăp-pĕn-DEK-tō-mē] append-, appendix + <i>-ectomy</i> , removal	Removal of the appendix.
Billroth's [BĪLL-rŏths] I After C. A. Billroth (1829–1894), Austrian surgeon	Excision of the pylorus.
Billroth's II	Resection of the pylorus with the stomach.
cheiloplasty [KĪ-lŏ-plās-tē] Greek <i>cheilos</i> , lip + <i>-plasty</i> , repair	Repair of the lips.
cholecystectomy [KŌ-lē-sĭs-TĔK-tō-mē] cholecyst-, gallbladder + <i>-ectomy</i>	Removal of the gallbladder.
choledocholithotomy [kŏ-LĔD-ŏ-kŏ-lĭ-THŌT-ŏ-mē] choledoch-, common bile duct + Greek <i>lithos</i> , stone + <i>-tomy</i> , a cutting	Removal of stones from the common bile duct.
cholelithotomy [KŌ-lē-lĭ-THŌT-ŏ-mē] chole-, bile + Greek <i>lithos</i> , stone + <i>-tomy</i>	Removal of gallstones.
cholelithotripsy [kŏ-lē-LĪTH-ŏ-trĭp-sē] chole- + Greek <i>lithos</i> , stone + <i>tripsis</i> , a rubbing	Breaking up or crushing of stones in the body, especially gallstones.
colectomy [kŏ-LĔK-tō-mē] col-, colon + <i>-ectomy</i>	Removal of the colon.

Term	Definition
colostomy [kō-LÖS-tō-mē] colo-, colon + -stomy, mouth, opening	Creation of an opening from the colon into the abdominal wall.
diverticulectomy [dī-vēr-tīk-ū-LĚK-tō-mē]	Removal of diverticula.
esophagoplasty [ĕ-SÖF-ă-gō-plās-tē] esophago-, esophagus + -plasty	Repair of the esophagus.
gastrectomy [gās-TRĚK-tō-mē] gastr-, stomach + -ectomy	Removal of part or all of the stomach.
gastric resection or gastric bypass	Removal of part of the stomach and repair of the remaining part.
glossectomy [glō-SĚK-tō-mē] gloss-, tongue + -ectomy	Removal of the tongue.
glossorrhaphy [glō-SÖR-ă-fē] glosso-, tongue + -rrhaphy, suturing	Suture of the tongue.
hemorrhoidectomy [HĚM-ō-rōy-DĚK-tō-mē] hemorrhoid(s) + -ectomy	Removal of hemorrhoids.
hepatic lobectomy [hĕ-PĀT-īk lō-BĚK-tō-mē]	Removal of one or more lobes of the liver.
ileostomy [ĪL-ē-ÖS-tō-mē] ileo-, ileum + -stomy	Creation of an opening into the ileum.
liver biopsy	Removal of a small amount of liver tissue to examine for disease.
pancreatectomy [PĀN-krē-ă-TĚK-tō-mē] pancreat-, pancreas + -tomy	Removal of the pancreas.
paracentesis [PĀR-ă-sĕn-TĚ-sīs] Greek <i>parakentesis</i> , a tapping for edema	Incision into the abdominal cavity to remove fluid or relieve pressure.
polypectomy [pōl-ī-PĚK-tō-mē] polyp + -ectomy	Removal of polyps.
proctoplasty [PRÖK-tō-plās-tē] procto-, rectum + -plasty	Repair of the rectum and anus.

SURGICAL TERMS EXERCISES

Fill in the Blanks

103. Removal of a liver lobe is a(n) _____.
104. Repair of a part of the stomach is a(n) _____.
105. Two openings that allow waste to exit the body other than through the anus are a(n) _____ and a(n) _____.
106. The crushing of gallstones is called _____.
107. Incision into the intestinal tract to remove fluid is _____ or _____.

CASE STUDY

Resolving a Complaint

Dora, a patient complaining of constipation, was given a laxative to regulate her bowel movements. Doctors found that Dora avoided foods high in roughage because of an acid condition in her stomach.

Critical Thinking

108. Why is it important that Dora eat foods with high roughage content?
109. What other medication might the doctor prescribe to make it easier for her to digest such foods?

Many antacids are a good source of calcium.

Pharmacological Terms

Aside from treatments for cancer, medications for the digestive tract counteract situations that occur in various parts of the tract. **Antacids** neutralize stomach acid. Many antacids are taken before meals to prevent the building up of excess stomach acids. Others are taken after symptoms appear. **Antiemetics** prevent vomiting. **Antispasmodics** relieve spasms in the gastrointestinal tract. A **laxative** stimulates movement of bowels. A **cathartic** induces vomiting. An **antidiarrheal** helps to control loose, watery stools. Table 14-2 lists some common medications used to treat the intestinal tract.

TABLE 14-2 Medications Used to Treat Digestive Disorders

Drug Class	Purpose	Generic	Trade Name
antacid and anti-gastric reflux agents	to neutralize stomach acid	cimetidine aluminum & magnesium hydroxide famotidine magaldrate ranitidine esomeprazole	Tagamet Maalox, Mylanta, Di-Gel Pepcid Riopan Zantac Nexium
antidiarrheal	to control loose stools	bismuth subsalicylate loperamide attapulgate	Pepto-Bismol Imodium Kaopectate, Diasorb
antiemetic	to prevent regurgitation	dimenhydrinate meclizine	Dramamine Bonine, Antivert
antispasmodic	to calm spasms in the intestinal tract	dicyclomine hyoscyamine	Antispas, Bentyl Anaspaz, Cystospaz
cathartic	to cause vomiting (after ingestion of poison)	ipecac syrup	none
laxative	to relieve constipation	psyllium bisacodyl senna docusate	Metamucil Dulcolax, Theralax Senokot Therevac

VOCABULARY REVIEW

In the previous section, you learned terms relating to pharmacology. Before going on to the exercises, review the terms below and refer to the previous section if you have any questions. Pronunciations are provided for certain terms. Sometimes information about where the word came from is included after the term. The etymologies (word histories) are for your information only. You do not need to memorize them.

Term	Definition
antacid [ănt-ĂS-ĭd] ant-, against + acid	Agent that neutralizes stomach acid.
antidiarrheal [ăn-tē-dī-ă-RĒ-ăl] anti-, against + diarrhea	Agent that controls loose, watery stools.
antiemetic [ĂN-tē-ě-MĚT-ĭk] anti- + emetic, related to vomiting	Agent that prevents vomiting.
antispasmodic [ăn-tē-spăz-MŎD-ĭk] anti- + spasmodic	Agent that controls intestinal tract spasms.
cathartic [kă-THĂR-tĭk] Greek <i>katharsis</i> , purification	Agent that induces vomiting; also a strong laxative for emptying the bowels.
laxative [LĂX-ă-tĭv] Latin <i>laxativus</i>	Agent that induces bowels to move in order to relieve constipation.

PHARMACOLOGICAL TERMS EXERCISES

Find a Match

Match the pharmacological agent in the left-hand column with its use in the right-hand column.

- | | |
|-------------------------|---|
| 110. ____ antacid | a. causes vomiting |
| 111. ____ antidiarrheal | b. calms spasms |
| 112. ____ antiemetic | c. prevents regurgitation |
| 113. ____ antispasmodic | d. relieves constipation |
| 114. ____ cathartic | e. controls loose, watery stools |
| 115. ____ laxative | f. relieves burning sensation in digestive disorder |

CHALLENGE SECTION

The record for Dr. Walker's patient, Holly Berger, shows a history of gastrointestinal problems. Dr. Walker performed a procedure that allowed a full examination and biopsies of certain sections of Holly's intestinal tract. The procedure was performed in the hospital, and the patient was able to leave after a few hours in the recovery room.

Critical Thinking

116. Why did Dr. Walker take biopsies of various intestinal tract areas?
117. From his examination of the stomach and duodenum, Dr. Walker able to rule out Crohn's disease. What indication was most likely in the record that made this possible?

TERMINOLOGY IN ACTION

The patient record for Manny Ramos lists two procedures and four diagnostic terms. Define all six terms and break them down into their word parts.

MEDICAL RECORD		PROGRESS NOTES
DATE 6/28/XX	Patient complains of intermittent stomach pains, some rectal bleeding, heartburn. Schedule tests on two successive days in three weeks.	
7/22/XX	8:00 Colonoscopy. Four polyps removed and biopsied. Otherwise normal. J. Phelps, M.D.	
7/23/XX	8:00 Esophagoscopy. Numerous lesions present. J. Phelps, M.D.	
7/23/XX	Colonoscopy shows precancerous polyps. Recommend 6-month follow-up. Gastric reflux present—treat with Nexium; Stomach ulcers, give 4-week course of treatment and list of dietary restrictions. Recheck stool in 6 weeks. Recommend dental visit for persistent halitosis.	

PATIENT'S IDENTIFICATION (For typed or written entries give: Name—last, first, middle; grade; rank; hospital or medical facility)		REGISTER NO.	WARD NO. 4B
Manny Ramos 000-33-5555		PROGRESS NOTES STANDARD FORM 509	

USING THE INTERNET

Go to the American Gastroenterological Association site (<http://www.gastro.org>), click the public section, then click the digestive health resource center, and then choose a gastroenterological disease site. Write a brief one-paragraph summary of some of the information you gather about the disease.

CHAPTER REVIEW

The material that follows is to help you review this chapter.

Root Out the Meaning

Separate the following terms into word parts and define each word part

- | | |
|-------------------------------|-----------------------------|
| 118. buccal | 143. cholecystoduodenostomy |
| 119. cecotomy | 144. cholecystopexy |
| 120. cecopexy | 145. cholecystogram |
| 121. cecal | 146. cholecystorrhaphy |
| 122. celiac | 147. cholecystosonography |
| 123. celiorrhaphy | 148. cholecystostomy |
| 124. celiotomy | 149. cholecystotomy |
| 125. celiscopy | 150. choledocholithiasis |
| 126. celiocentesis | 151. colitis |
| 127. cholelith | 152. colorectitis |
| 128. cholemesis | 153. colostomy |
| 129. cholelithotomy | 154. duodenectomy |
| 130. cholepoiesis | 155. enteritis |
| 131. cholestasis | 156. enterocolitis |
| 132. cholelithotripsy | 157. esophagocele |
| 133. cholangiocarcinoma | 158. gastrocolitis |
| 134. cholangiectasis | 159. gastroenteritis |
| 135. cholangiogram | 160. glossitis |
| 136. cholangiography | 161. hepatoscopy |
| 137. cholangioma | 162. ileostomy |
| 138. cholangiopancreatography | 163. jejunectomy |
| 139. cholangioscope | 164. labiogingival |
| 140. cholecystectomy | 165. pancreatopathy |
| 141. cholecyst | 166. pharyngectomy |
| 142. cholecystocolostomy | |

Complete the Sentence

Circle the term that best describes the *italicized* description of the correct answer

167. *Creation of an opening from the colon* (colonostomy, colectomy, colostomy) into the abdominal wall.
168. A(n) (fistula, anastomosis, icterus), *a surgical union of two hollow tubes*, is sometimes used to bypass parts of the intestines as in the case of removal of a section of the intestines.
169. A gastric bypass or (gastrotomy, gastric resection, gastric ascites) *removes a portion of the stomach* to limit overeating as a treatment for obesity.

170. Mrs. Abernathy has been experiencing an uncomfortable *burning in her upper chest area* after eating. The doctor suspects (UGIS, GERD, EGD).
171. The *coordinated, rhythmic contractions of smooth muscle* that force food through the digestive tract are known as: (peritoneal, peristaltic, peritalsis).

Build Your Medical Vocabulary

Build a word that means the same as each of the phrases below.

172. Abnormal condition of fungus in the mouth _____
173. Fatty inflammation of the liver _____
174. Excessive secreting of saliva _____
175. Pertaining to the rectum and abdomen _____
176. Surgical fixation of the liver _____
177. Herniation of the liver _____
178. Surgically created opening in the stomach _____
179. Surgical repair of the stomach and the intestines _____
180. Incision into the esophagus _____
181. Pertaining to the intestines _____
182. Observation of the duodenum: _____
183. Any intestinal disease _____
184. Discharge of abnormal amounts of sugar _____
185. The study of the intestines _____
186. Surgical fixation of the intestines _____
187. Pertaining to the ileum and cecum _____
188. A stone or calculus in the stomach _____
189. An x-ray examination of the liver _____
190. Surgical suturing of the common bile duct _____
191. Pathological condition or state of stones in the gallbladder _____
192. Fibrous condition of the bile ducts _____
193. Inflammation of the abdomen _____
194. Production of bile _____
195. Inflammation of the common bile duct _____
196. A heavy (unusual) discharge from the colon _____
197. Presence of a gallstone _____
198. Disease of the gallbladder _____
199. Dilation of the bile ducts _____

Matching

Match each of the following medical conditions with its description.

200. ____ intestinal blockage caused by the intestine twisting on itself a. anorexia nervosa

- | | |
|--|--------------------|
| 201. ____ condition of having polyps, as in the intestines | b. eructation |
| 202. ____ foul mouth odor | c. colic |
| 203. ____ gas in the stomach or intestines | d. polyposis |
| 204. ____ inability to swallow | e. halitosis |
| 205. ____ eating disorder with bingeing and purging | f. aphagia |
| 206. ____ old blood in the stool | g. bulimia |
| 207. ____ blood in vomit | h. icterus |
| 208. ____ eating disorder with extreme weight loss | i. volvulus |
| 209. ____ belching | j. melena |
| 210. ____ small pouches in the intestinal walls | k. diverticula |
| 211. ____ liver disease, often caused by alcoholism | l. dyspepsia |
| 212. ____ indigestion | m. fistula |
| 213. ____ irritation of the intestinal tract with loose stools | n. intussusception |
| 214. ____ gastrointestinal distress, especially in infants | o. hiatal hernia |
| 215. ____ fluid buildup in the abdominal and peritoneal cavities | p. cirrhosis |
| 216. ____ abnormal opening in tissue | q. dysentery |
| 217. ____ prolapse or collapse of an intestinal part into a neighboring part | r. hematemesis |
| 218. ____ jaundice | s. flatulence |
| 219. ____ protrusion of the stomach through an opening in the diaphragm | t. ascites |

True or False

Indicate in the blank whether the statement is true (T) or false (F).

220. Reflux is another name for regurgitation. T F
221. Crohn's disease is a type of IBD. T F
222. An inguinal hernia is the protrusion of the intestine through a weakness in the stomach wall. T F
223. The medical term for red blood in the stool is *hematochezia*. T F
224. *Cheil(o)* and *labi(o)* are both word parts for the lip(s). T F
225. A cathartic is a medication used to stop diarrhea. T F
226. The definition of dysphagia is inability to speak. T F
227. A strangulated hernia is one in which movement of bowel is restricted or obstructed. T F
228. Another name for the digestive tract is the alimentary canal. T F
229. The upper portion of the stomach is known as the frenulum. T F

Check Your Spelling

Write the correct spelling in the blank to the right of each word. If the word is already spelled correctly, place a C in the blank.

- | | |
|----------------------------|--------------------------|
| 230. rectoskope _____ | 233. cheilorrhaphy _____ |
| 231. esophagomalacia _____ | 234. enzyme _____ |
| 232. coalopexy _____ | 235. mastacation _____ |

236. paracentesis _____

237. antidiarrheal _____

238. emesis _____

239. rugay _____

DEFINITIONS

Define the following terms and combining forms. Review the chapter before starting. Make sure you know how to pronounce each term as you define it. The blue words in curly brackets refer to the Spanish glossary available online at www.mhhe.com/medterm3e.

WORD

- | | | |
|---|---|--|
| 240. abdominocentesis
[ăb-DŌM-ĭ-nō-sĕn-TĒ-sĭs] | 261. appendage [ă-PĔN-dĭj]
{apéndice} | 285. cholangitis [kō-lăn-JĪ-tĭs]
{colangitis} |
| 241. absorption [ăb-SŌRP-shŭn]
{absorción} | 262. appendectomy
[ăp-pĕn-DĚK-tō-mĕ]
{apendectomía} | 286. cholecyst(o) |
| 242. achalasia [ăk-ă-LĀ-zhĕ-ă]
{acalasia} | 263. appendicitis
[ă-pĕn-dĭ-SĪ-tĭs] {appendicitis} | 287. cholecystectomy
[KŌ-lĕ-sĭs-TĚK-tō-mĕ] |
| 243. achlorhydria [ă-klŏr-HĪ-drĕ-ă] | 264. appendix [ă-PĔN-dĭks]
{apéndice} | 288. cholecystitis [KŌ-lĕ-sĭs-TĪ-tĭs]
{colecistitis} |
| 244. alimentary [ăl-ĭ-MĔN-tĕr-ĕ]
canal | 265. ascites [ă-SĪ-tĕs] {ascitis} | 289. cholecystography [kō-lĕ-sĭs-TŌG-ră-fĕ]
{colecistografía} |
| 245. amino [ă-MĒ-nō] acid
{aminoácido} | 266. bil(o), bili | 290. choledoch(o) |
| 246. amylase [ĂM-ĭl-ās]
{amilasa} | 267. bile [bĭl] {bilis} | 291. choledocholithotomy
[kō-LĚD-ŏ-kŏ-lĭ-THŌT-ŏ-mĕ] |
| 247. anal [Ă-năl] canal | 268. bilirubin [bĭl-ĭ-RŪ-bĭn]
{bilirrubina} | 292. cholelithiasis
[KŌ-lĕ-lĭ-THĪ-ă-sĭs] |
| 248. anal fistula [FĪS-tyū-lă] | 269. Billroth's [BĪLL-rŏths] I | 293. cholelithotomy
[KŌ-lĕ-lĭ-THŌT-ŏ-mĕ] |
| 249. anal fistulectomy
[fĭs-tyū-LĚK-tō-mĕ] | 270. Billroth's II | 294. cholelithotripsy
[kō-lĕ-LĪTH-ŏ-trĭp-sĕ] |
| 250. anastomosis [ă-NĀS-tō-MŌ-sĭs]
{anastomosis} | 271. body {cuerpo} | 295. chyme [kĭm] {quimo} |
| 251. ankyloglossia
[ĂNG-kĭ-lŏ-GLŌS-ĕ-ă]
{anquiloglosia} | 272. bowel [bŏw-l] {intestine} | 296. cirrhosis [sĭr-RŌ-sĭs] {cirrosis} |
| 252. an(o) | 273. bucc(o) | 297. col(o), colon(o) |
| 253. anorexia nervosa
[ăn-ŏ-RĚK-sĕ-ă nĕr-VŌ-să] | 274. bulimia [bŭ-LĔM-ĕ-ă] | 298. colectomy [kō-LĚK-tō-mĕ]
{colectomía} |
| 254. antacid [ănt-ĂS-ĭd] | 275. cathartic [kă-THĂR-tĭk] | 299. colic [KŌL-ĭk] {cólico} |
| 255. antidiarrheal [ăn-tĕ-dĭ-ă-RĒ-ă] | 276. cec(o) | 300. colitis [kō-LĪ-tĭs] {colitis} |
| 256. antiemetic [ĂN-tĕ-ĕ-MĔT-ĭk] | 277. cecum [SĒ-kŭm] {ciego} | 301. colon [KŌ-lŏn] {colon} |
| 257. antispasmodic
[ăn-tĕ-spăz-MŌD-ĭk] | 278. celi(o) | 302. colonoscopy [kō-lŏn-ŌS-kŏ-pĕ]
{colonoscopia} |
| 258. anus [Ă-nŭs] {ano} | 279. cheeks {carrillos} | 303. colostomy [kō-LŌS-tō-mĕ]
{colostomía} |
| 259. aphagia [ă-FĀ-jĕ-ă] {afagia} | 280. cheilitis [kĭ-LĪ-tĭs]
{queilitis} | 304. constipation [kŏn-stĭ-PĀ-shŭn]
{constipación} |
| 260. append(o), appendic(o) | 281. cheiloplasty [KĪ-lŏ-plăs-tĕ] | 305. Crohn's [krŏnz] disease |
| | 282. chol(e), cholo | |
| | 283. cholangi(o) | |
| | 284. cholangiography
[kō-lăn-jĕ-ŌG-ră-fĕ] | |

WORD

306. defecation [dě-fě-KĀ-shŭn] {defecación}
307. deglutition [dē-glŭ-TĪSH-ŭn] {deglución}
308. diarrhea [dī-ā-RĒ-ă] {diarrea}
309. digestion [dī-JĚS-chŭn] {digestión}
310. diverticula [dī-věr-TĪK-yŭ-lă]
311. diverticulectomy [dī-věr-tĭk-ŭ-LĚK-tō-mē]
312. diverticulitis [DĪ-věr-tĭk-yŭ-LĪ-tĭs] {diverticulitis}
313. diverticulosis [DĪ-věr-tĭk-yŭ-LŌ-sĭs] {diverticulosis}
314. duoden(o)
315. duodenal [DŪ-ō-DĒ-năl] ulcer
316. duodenum [dū-ō-DĒ-nŭm] {duodeno}
317. dysentery [DĪS-ĕn-těr-ē] {disentería}
318. dyspepsia [dĭs-PĚP-sē-ă] {dyspepsia}
319. dysphagia [dĭs-FĀ-jē-ă] {disfagia}
320. elimination [ē-lĭm-ĭ-NĀ-shŭn]
321. emesis [ĕ-MĒ-sĭs] {emesis}
322. emulsification [ĕ-MŪL-sĭ-fĭ-KĀ-shŭn]
323. enter(o)
324. enteritis [ĕn-těr-Ī-tĭs] {enteritis}
325. enzyme [ĚN-zĭm] {enzima}
326. epiglottis [ĕp-ĭ-GLŌ-tĭs] {epiglŏtis}
327. eructation [ē-rŭk-TĀ-shŭn] {eructación}
328. esophag(o)
329. esophagitis [ĕ-sŏf-ă-JĪ-tĭs] {esofagitis}
330. esophagoplasty [ĕ-SŌF-ă-gŏ-plăs-tē] {esofagoplastia}
331. esophagoscopy [ĕ-sŏf-ă-GŌS-kŏ-pē] {esofagoscopia}
332. esophagus [ĕ-SŌF-ă-gŭs] {esófago}
333. fatty acid
334. feces [FĒ-sēz] {heces}
335. fistula [FĪS-tyŭ-lă] {fistula}
336. flatulence [FLĀT-yŭ-lĕns] {flatulencia}
337. flatus [FLĀ-tŭs] {flato}
338. frenulum [FRĚN-yŭ-lŭm] {frenillo}
339. fundus [FŪN-dŭs] {fondo}
340. gallbladder [GĀWL-blăd-ĕr] {vesícula biliar}
341. gallstone {cálculo biliar}
342. gastrectomy [găs-TRĚK-tō-mē] {gastrectomía}
343. gastric bypass
344. gastric resection
345. gastritis [găs-TRĪ-tĭs] {gastritis}
346. gastr(o)
347. gastroenteritis [GĀS-trŏ-ĕn-těr-Ī-tĭs] {gastroenteritis}
348. gastroscopy [găs-TRŌS-kŏ-pē] {gastroscoŭpia}
349. gloss(o)
350. glossectomy [glŏ-SĚK-tō-mē]
351. glossitis [glŏ-SĪ-tĭs] {glositis}
352. glossorrhaphy [glŏ-SŌR-ă-fē]
353. gluc(o)
354. glucose [GLŪ-kŏs] {glucosa}
355. glyc(o)
356. glycogen(o)
357. glycogen [GLĪ-kŏ-jĕn] {glucógeno}
358. gums [gŭmz] {encia}
359. halitosis [hăl-ĭ-TŌ-sĭs] {halitosis}
360. hard palate [PĀL-ăt]
361. hematemesiis [hĕ-mă-TĚM-ē-sĭs] {hematemesis}
362. hematochezia [HĒ-mă-tŏ-KĒ-zhē-ă]
363. hemorrhoidectomy [HĚM-ŏ-rŏy-DĚK-tō-mē] {hemorroidectomía}
364. hemorrhoids [HĚM-ŏ-rŏydz] {hemorroides}
365. hepat(o)
366. hepatic lobectomy [hĕ-PĀT-ĭk lŏ-BĚK-tō-mē]
367. hepatitis [hĕp-ă-TĪ-tĭs] {hepatitis}
368. hepatomegaly [HĚP-ă-tŏ-MĚG-ă-lē] {hepatomegalia}
369. hepatopathy [hĕp-ă-TŌP-ă-thē] {hepatopatía}
370. hiatal hernia [hĭ-Ā-tăl HĚR-nē-ă]
371. hyperbilirubinemia [HĪ-pĕr-BĪL-ĭ-rŭ-bĭ-NĒ-mē-ă]
372. icterus [ĪK-těr-ŭs] {icterus}
373. ile(o)
374. ileitis [ĪL-ē-Ī-tĭs] {ileitis}
375. ileostomy [ĪL-ē-ŌS-tō-mē] {ileostomía}
376. ileum [ĪL-ē-ŭm] {íleon}
377. ileus [ĪL-ē-ŭs] {íleo}
378. intussusception [ĪN-tŭs-sŭ-SĚP-shŭn]
379. jaundice [JĀWN-dĭs] {ictericia}
380. jejun(o)
381. jejunum [jĕ-JŪ-nŭm] {yeyuno}
382. labi(o)
383. large intestine
384. laxative [LĀX-ă-tĭv]
385. lingu(o)
386. lingual tonsils [LĪNG-gwăl TŌN-sĭls]
387. lipase [LĪP-ăs] {lipasa}
388. lips {labio}
389. liver [LĪV-ĕr] {hígado}

WORD

- | | | |
|--|--|---|
| 390. liver biopsy | 409. periton(eo) | 429. sial(o) |
| 391. mastication [mä-s-tĩ-KĀ-shŭn] {masticación} | 410. peritoneoscopy [PĚR-ĩ-tō-nē-ŌS-kō-pē] {peritoneoscopia} | 430. sialaden(o) |
| 392. melena [mě-LĚ-nā] {melena} | 411. peritonitis [PĚR-ĩ-tō-NĪ-tis] {peritonitis} | 431. sialoadenitis [SĪ-ă-lō-ăd-ě-NĪ-tis] |
| 393. mesentery [MĚS-ěn-tēr-ē, MĚZ-ěn-tēr-ē] {mesenterio} | 412. pharyng(o) | 432. sigmoid(o) |
| 394. mouth {boca} | 413. pharynx [FĀR-ĩngks] {faringe} | 433. sigmoid [SĪG-mōyd] colon |
| 395. nausea [NĀW-zhē-ă] {náusea} | 414. polypectomy [pōl-ĩ-PĚK-tō-mē] {polipectomía} | 434. sigmoidoscopy [SĪG-mōy-DŌS-kō-pē] |
| 396. obesity [ō-BĚS-ĩ-tē] {obesidad} | 415. polyposis [PŌL-ĩ-PŌ-sis] {poliposis} | 435. small intestine |
| 397. or(o) | 416. proct(o) | 436. soft palate [PĀL-ăt] |
| 398. palatine [PĀL-ă-tin] tonsils | 417. proctitis [prōk-TĪ-tis] {proctitis} | 437. steat(o) |
| 399. pancreas [PĀN-krē-ăs] {páncreas} | 418. proctoplasty [PRŌK-tō-plăs-tē] | 438. steatorrhea [STĚ-ă-tō-RĚ-ă] {esteatorrea} |
| 400. pancreat(o) | 419. proctoscopy [prōk-TŌS-kō-pē] | 439. stomat(o) |
| 401. pancreatectomy [PĀN-krē-ă-TĚK-tō-mē] {pancreatectomía} | 420. pylor(o) | 440. stomach [STŌM-ăk] {estómago} |
| 402. pancreatitis [PĀN-krē-ă-TĪ-tis] {pancreatitis} | 421. pylorus [pī-LŌR-ŭs] {píloro} | 441. stool [stŭl] {heces} |
| 403. papilla (pl., papillae) [pă-PĪL-ă (-ē)] {papilas} | 422. rect(o) | 442. throat [thrōwt] {garganta} |
| 404. paracentesis [PĀR-ă-sěn-TĚ-sis] | 423. rectum [RĚK-tŭm] {recto} | 443. tongue [tŭng] {lengua} |
| 405. parotitis, parotiditis [păr-ō-TĪ-tis, păr-rōt-ĩ-DĪ-tis] | 424. reflux [RĚ-flŭks] {reflujo} | 444. ulcerative colitis [ŬL-sēr-ă-tiv kō-LĪ-tis] |
| 406. pepsin [PĚP-sin] {pepsina} | 425. regurgitation [rē-GŬR-jĩ-TĀ-shŭn] {regurgitación} | 445. uvula [YŬ-vyŭ-lă] {uvula} |
| 407. peptic ulcer | 426. rugae [RŬ-gē] {rugae} | 446. villus (pl., villi) [VĪL-ŭs (-ĩ)] {vellosidad} |
| 408. peristalsis [pēr-ĩ-STĀL-sis] {peristaltismo} | 427. saliva [să-LĪ-vă] {saliva} | 447. volvulus [VŌL-vyŭ-lŭs] {vólvulo} |
| | 428. salivary [SĀL-ĩ-vār-ē] glands | |

Abbreviations

Write the full meaning for each abbreviation.

ABBREVIATION

- | | | |
|--------------|-----------|-------------|
| 448. ALT, AT | 454. GERD | 460. SGOT |
| 449. AST | 455. GI | 461. SGPT |
| 450. BE | 456. IBD | 462. TPN |
| 451. BM | 457. IBS | 463. UGI(S) |
| 452. EGD | 458. NG | |
| 453. ERCP | 459. NPO | |

Name _____ Date _____

Chapter 14: Word- Building (20 questions—1 pts. each)

Using the following combining forms, complete the word that best fits the definition of each word relating to the digestive system listed below. Combining forms may be used more than once.

an(o)	chol(o)	gluc(o)	rect(o)
append(o)	colon(o)	glyc(o)	sial(o)
bil(i)	duoden(o)	hepat(o)	sigmoid(o)
bucc(o)	enter(o)	labi(o)	steat(o)
cec(o)	gastr(o)	lingu(o)	stomat(o)

1. Bile-producing: _____ genic
2. Away from the liver: _____ fugal
3. Tending to mobilize sugars: _____ kinetic
4. Affecting the intestine: _____ tropic
5. Surgical anchoring of the cecum: _____ pexy
6. Chronic lip spasms: _____ chorea
7. Gallstone: _____ lith
8. Hernia in the rectum: _____ cele
9. Narrowing of the intestine: _____ stenosis
10. Lining of the anal canal: _____ derm
11. Inflammation of the stomach and colon: _____ colitis
12. Disease of the mouth: _____ pathy
13. Tumor of the bile duct: _____ angioma
14. Surgical opening of the sigmoid colon: _____ ostomy
15. Removal of the appendix: _____ ectomy
16. Poisonous to the liver: _____ toxic
17. Secretion of fat in the stool: _____ rrhea
18. Dilation of the stomach: _____ ectasis
19. Visual examination of the colon: _____ scopy
20. Mouth pain: _____ algia