

**Chapter 14: Digestive System**

1. What are the major functions of the digestive system?

**Digestion**

- a. **Breakdown of ingested food**
- b. **Absorption of nutrients into the blood**

**Metabolism**

- c. **Production of cellular energy (ATP)**
- d. **Constructive and degradative cellular activities**

2. What is another name for the alimentary canal? Gastrointestinal (GI) Tract
3. List and describe the locations of the major parts of the alimentary canal.

**Mouth—the oral cavity.**

**Pharynx—extends from the back of the nasal cavity to the top of the esophagus.**

**Esophagus—extends from the pharynx to the stomach.**

**Stomach—just below the diaphragm on the left side of the body.**

**Small intestine—extends from the stomach to the large intestine.**

**Large intestine—extends from the small intestine to the anus.**

4. List and describe the location of the accessory organs of the digestive system.

**Salivary glands—located in the oral cavity.**

**Liver—lies just below the diaphragm on the right side of the body.**

**Gallbladder—lies on posterior side of the liver.**

**Pancreas—located behind the stomach, attached to the duodenum.**

5. Name the four layers of the wall of the alimentary canal from innermost to outermost.

**Mucosa or mucous membrane, Submucosa, Muscularis externa or Muscular layer, Serosa or serous layer**

6. Define peristalsis.

**Peristalsis is defined as the rhythmic propelling movements that occur in the alimentary canal.**

7. List and describe the locations of the major salivary glands.

**The parotid glands are the largest salivary glands and are located in front of, and somewhat below, each ear between the skin of the cheek and the masseter muscle. The submandibular glands are located in the floor of the mouth on the inside surface of the lower jaw. The sublingual glands are the smallest of the salivary glands and are on the floor of the mouth under the tongue.**

8. Discuss the digestive functions of saliva.

**The serous cells found in the salivary glands produce a watery fluid that contain amylase. Amylase is a digestive enzyme that splits starch and glycogen molecules into disaccharides. This is the first step of carbohydrate digestion.**

9. Name and locate the three major regions of the pharynx.

**Nasopharynx—located above the soft palate.**

**Oropharynx—located behind the soft palate and projects downward to the upper border of the epiglottis.**

**Laryngopharynx—located from the upper border of the epiglottis downward to the lower border of the cricoid cartilage of the larynx.**

10. Explain the functions of the esophagus.

**The esophagus functions as a tube that transports substances from the pharynx to the stomach.**

11. Describe the structure of the stomach. Name the different parts.

**The stomach is a J-shaped, pouchlike organ. Thick folds called rugae mark its inner lining. Its mucous membrane lining contains the gastric pits that are the openings for the gastric glands that secrete digestive enzymes.**

12. List and describe the locations of the parts of the small intestine.

**Duodenum—the first twenty-five centimeters of the small intestine, it lies behind the parietal peritoneum. It is the most fixed portion of the small intestine.**

**Jejunum—the proximal two-fifths of the remainder of the small intestine.**

**Ileum—the remainder of the small intestine.**

13. What is chyme? Where is chyme created?

**Soupy mixture of food mixed with acids and digestive enzymes, it will move into small intestine where digestion and absorption will be completed. It is created in the stomach and moves into the sm. intestine.**

14. Describe the functions of the intestinal villi.

**The villi serve to increase the surface area of the intestinal wall.**

**Monosaccharides, amino acids, fatty acids, and glycerol are absorbed by the villi.**

**Fat molecules with longer chains of carbon atoms enter the lacteals of the villi.**

**Other digestive products enter the villi and are carried away by the blood.**

15. List and describe the locations of the parts of the large intestine.

**It has little or no digestive function.**

**It secretes mucous.**

**Absorption is generally limited to water and electrolytes.**

**Formation and storage of feces**

**From ileum, chyme enters the cecum, encounters the appendix, travels up the ascending colon on right side of body, moves towards left side of body through transverse colon, moves down through**

**descending colon, then it enters sigmoid color, the rectum, and finally the anus where there is the opening for solid waste to be excreted.**

16. Describe the composition of bile.

**Bile is composed of bile salts, bile pigments (bilirubin and biliverdin), cholesterol, and electrolytes.**

17. Describe the structure and list the major functions of the liver.

**The liver is enclosed in a fibrous capsule and divided into lobes by connective tissue. Each lobe is further subdivided into hepatic lobules. These are the functional units of the liver. Each lobule consists of hepatic cells that radiate outward from a central vein.**

**Carbohydrate metabolism**

**Lipid metabolism**

**Protein metabolism**

**Glycogen and vitamin storage**

**Blood filtering**

**Detoxification**

**Secretion of bile**

18. What is the name for the tissue that connects the tongue to the floor of the mouth? frenulum

19. Chewing is also called mastication

20. The lymphoid tissue collections in the small intestine are called Peyer's Patches.

Type of nutrient	Primary place where it is digested	How?
Carbohydrates	<b><u>Starts in the mouth and finishes primarily in small intestine</u></b>	<b><u>Breakdown into simple sugars via enzyme action (hydrolysis)</u></b>
Proteins	<b><u>Starts in the stomach and finishes primarily in the small intestine.</u></b>	<b><u>Breakdown by pepsin in stomach and pancreatic and brush border enzymes in small intestine.</u></b>
Lipids	<b><u>Only occurs in the small intestine</u></b>	<b><u>Emulsified by bile salts in bile, and broke down by pancreatic lipases.</u></b>

21. In what part of the digestive system do almost ALL of the nutrients produced through digestion get absorbed into the bloodstream? **Small Intestine**

22. **An ulcer** is an open wound or sore in the digestive system that is acted on by acid gastric juice, usually in the stomach or duodenum.

23. A lymphatic vessel in the villus that absorbs fats from the chyme is called a **lacteal**.

24. An adult normally has **32** permanent teeth.

25. Baby teeth are called **deciduous** teeth, and there are **20** (#) of them total.

26. In the colon chyme changes to solid, fecal matter as water and salts are reabsorbed.
27. Inflammation of intestine is called enteritis. (use your med terms reference sheet!)
28. Inflammation of stomach is called gastritis. (use your med terms reference sheet!)
29. The bony structure at the top anterior portion of mouth is called the hard palate.
30. The cardioesophageal sphincter is the valve at the bottom of the esophagus.
31. The liver is the largest gland in the body; producing 1 pint of bile a day.
32. The esophagus, or foodpipe, is 10 inches long, and connects the pharynx to stomach.
33. The accumulation of bile causes jaundice, a yellowish skin discoloration.
34. The burning sensation caused when stomach acid flows up into the esophagus is called acid reflux or heartburn.
35. What are the six essential tasks of the GI tract? Briefly describe each.

- a. Ingestion – voluntary intake of food into the mouth
- b. Propulsion – propelling food from one organ to the next (peristalsis and segmentation)
- c. Food Breakdown – mechanical digestion
- d. Food Breakdown – chemical digestion using acids, enzymes, and digestive juices.
- e. Absorption – transport of digested nutrients from small intestine to the bloodstream, also water transport into bloodstream from large intestine.
- f. Defecation – Excretion of indigestible, solid waste through the anal opening.

36. What is segmentation?

Movement of food back and forth across the internal walls of an organ, serving to mix it with digestive juices. It also moves food along a little as well.

37. Distinguish between mechanical digestion and chemical digestion.

Mechanical - Mixing of food in the mouth by the tongue, Churning of food in the stomach, Segmentation in the small intestine, further prepares food for digestion.

Chemical - Enzymes break down food molecules into their building blocks

Each major food group uses different enzymes

- Carbohydrates are broken to simple sugars
- Proteins are broken to amino acids
- Fats are broken to fatty acids and alcohols

38. What two hormones are produced and released upon food entering the small intestine?

## Cholecystokinin and secretin

39. Explain the process of deglutition. What is the common name of deglutition?

- a. The soft palate raises, preventing food from entering the nasal cavity.
- b. The hyoid bone and the larynx are elevated; the epiglottis closes off the top of the trachea so that food is less likely to enter.
- c. The tongue is pressed against the soft palate, sealing off the oral cavity from the pharynx.
- d. The longitudinal muscles in the pharyngeal wall contract, pulling the pharynx upward toward the food.
- e. The lower portion of the inferior constrictor muscles relaxes, opening the esophagus.
- f. The superior constrictor muscles contract, stimulating a peristaltic wave to begin in the pharyngeal muscles. This wave forces the food into the esophagus.

40. What are mass movements?

Long, slow-moving but powerful contractile waves that move over large areas of the colon three to four times daily and move the contents towards the rectum for storage.

41. Name the types of cells that compose the gastric glands, name the secretion(s) that each cell produce(s) that together compose gastric juice, and give the function of each component of gastric juice.

Pepsin—is a protein-splitting enzyme, which is the beginning of digestion for nearly all types of dietary protein. The chief cells secrete pepsinogen (the precursor of pepsin) that then combines with hydrochloric acid to form pepsin. The parietal cells secrete hydrochloric acid (HCl) to break down food and keep pH low. The mucous neck cells secrete mucous to protect stomach lining from acid digestion. Intrinsic factor—aids in the absorption of vitamin B<sub>12</sub>.