OBJECTIVES

After studying this chapter, you should be able to:

1. List and describe the five basic activities of the digestive process.
2. List the four layers or tunics of the walls of the digestive tract.
3. Name the major and accessory organs of the digestive tract and their component anatomic parts.
4. Explain the major digestive enzymes and how they function.
5. Explain the functions of the liver.
6. Explain how absorption of nutrients occurs in the small intestine and how the feces form in the large intestine.
7. Name and describe the functions of the organs of the digestive tract.

ACTIVITIES

A. Completion

Fill in the blank spaces with the correct term.

1. Breaking down food into simpler substances that the cells can use is the process of ___.
2. Mastication is the process of ___.
3. __ plus lipase plus water produces glycerol.
4. The digestion of food begins in the mouth through the action of the enzyme ___.
5. The lining of the entire alimentary canal has ___ layers or ___.

NAME: ______________________________ DATE: ___________________
6. The tunica muscularis is responsible for propelling food along by ___.
7. The mesentery is an extension of the ___ ___.
8. The anterior part of the roof of the mouth is the ___ ___.
9. The lingual frenulum is a(n) ___ dividing the tongue.
10. The tongue is supported by the ___ bone.
11. Saliva is mostly water, but an important chemical activator in it is ___.
12. If the mumps virus infects the pancreas, it can cause ___.
13. The ___ extend slightly into each tooth socket.
14. Infants’ teeth are called ___ teeth.
15. Teeth can have as many as ___ root projections.
16. Tooth decay is also called ____ ___.
17. There are three parts to the pharynx; they are the ___ ___, and the ____.
18. The tube connecting the laryngopharynx and the stomach is the ___, which passes through the ___ and ___.
19. The stomach begins with the ___ and ends at the ___.
20. The small intestine begins with the ___ and ends with the ___.
21. An ulcer can be caused by either excess ___ or ___.
22. Alpha and beta cells of the pancreas secrete ___ and ___.
23. Another cell of the pancreas secretes enzymes; this is the ___.
24. There are ___ major functions of the liver.
25. The functions of the gallbladder are ___ and ___.
26. The walls of the small intestine are protected from digestion by ___.
27. The folds of the small intestine are called ___ and the projections are called ___.
28. The bowel begins with the ___ and ends at the ___ canal.
29. The end of the alimentary canal is the ___.
30. The final act of the digestive system is ___.
31. Hepatitis can be caused by virus ___ or virus ___.
32. Gallstones are caused by ___.
33. A chronic, inflammatory bowel disease with unknown origin is ___ ___.
34. Diverticulosis is a disorder characterized by ___ in the muscular layer of the colon.
35. Inflammation and enlargement of rectal veins is ___ or ___.
36. The taste of ___ was identified by Japanese researchers. It detects the flavor of MSG.
37. Stomach cancer produces gastric tumors called ___.
38. ___ cancer is an uncommon but deadly cancer. It occurs more often in men than in women.
B. Matching
Match the term on the right with the definition on the left.

39. degenerative liver disease  a. lingual frenulum
40. inflammatory bowel disease  b. sigmoid colon
41. rectal vein enlargement  c. bicusps
42. digested food to the cardiovascular system  d. amylase
43. gastrointestinal tract  e. filiform papillae
44. visceral peritoneum  f. cecum
45. posterior roof of the mouth  g. pepsinogen
46. septum divides the tongue  h. fundus
47. important in licking  i. jejenum
48. salivary enzyme  j. pancreatic duct
49. premolar  k. soft palate
50. three cusps  l. Crohn’s disease
51. enamel covered  m. absorption
52. tube behind the trachea  n. esophagus
53. rounded portion above the cardia  o. hemorrhoids
54. principal gastric enzyme  p. cirrhosis
55. duct of Wirsung  q. tricuspid
56. second portion of the large intestine  r. tunica serosa
57. first part of the large intestine  s. crown
58. colon joins the rectum  t. alimentary canal

C. Key Terms
Use the text to look up the following terms. Write the definition or explanation.

59. Absorption:

60. Amylase:

61. Apical foramen:
62. Brunner's glands/duodenal glands:

63. Cardia:

64. Cementum:

65. Chyme:

66. Circumvallate papillae:

67. Crypt of Lieberkuhn:

68. Diarrhea:

69. Digestion:

70. Esophageal hiatus:

71. Falciform ligament:
72. Fundus:

73. Fungiform papillae:

74. Hard palate:

75. Haustrae:

76. Helicobacter pylori:

77. Ileocecal valve:

78. Kupffer's cells:

79. Mediastinum:

80. Microvilli/brushborder:

81. Mumps:
82. Muscularis mucosa:

83. Parietal cells:

84. Pepsin:

85. Pepsinogen:

86. Peristalsis:

87. Plicae:

88. Right colic (hepatic) flexure:

89. Rugae:

90. Uvula:

91. Zymogenic/chief cells:
D. Labeling Exercise

92. Label the parts of the digestive system as indicated in Figure 16-1.

Figure 16-1

A. ________________________  G. ________________________
B. ________________________  H. ________________________
C. ________________________  I. ________________________
D. ________________________  J. ________________________
E. ________________________  K. ________________________
F. ________________________  L. ________________________
93. Label the parts of the stomach and the small intestine as indicated in Figure 16-2.

A. ___________________________   H. ___________________________
B. ___________________________   I. ___________________________
C. ___________________________   J. ___________________________
D. ___________________________   K. ___________________________
E. ___________________________   L. ___________________________
F. ___________________________   M. ___________________________
G. ___________________________

Figure 16-2
E. Coloring Exercise

94. Using Figure 16-3, color the ascending colon red, the transverse colon green, the descending colon yellow, the sigmoid colon brown, the rectum orange, and the cecum blue.
F. Critical Thinking

Answer the following questions in complete sentences.

95. Why do cavities occur?

96. Explain the first stage of digestion.

97. Why does food stuck in the esophagus cause breathing difficulties?

98. Why does a hiatal hernia cause a burning sensation in the esophagus?

99. Explain the formation of an ulcer.
100. Incomplete development of the hard palate (cleft palate) causes nasality. Why?

101. How does the pancreas contribute to the digestive process?

102. Explain absorption in the small intestine.

103. As people age, why do they become more susceptible to digestive system disorders?

104. Of the career opportunities presented, choose one that is the most interesting to you. Explain why.
Complete the crossword puzzle using the following clues.

ACROSS
4. One of the largest organs of the digestive system
8. Anticoagulant
11. Tooth that tears food
12. Inflammation of the liver
13. Waste elimination
15. Breakdown of food
17. Stores bile
19. Teeth are made of it
23. Breaks down starch in the mouth
26. Chewing
27. Stomach folds
28. Taking in food
29. Pushing food along
30. Pouchlike herniation

DOWN
1. Teeth
2. Tooth that grinds food
3. Folds of the intestine
5. Extension of the visceral peritoneum
6. 99.5% H₂O
7. Teeth that cut food
9. Tunica serosa
10. Semifluid in the intestine
14. Connects with the duodenum
16. Gums
18. Swallowing
20. First part of large intestine
21. Disease of the salivary glands
22. Between the crown and root
24. Enlarged rectal veins
25. Hangs from the palate
CHAPTER QUIZ

1. An inflammation of the liver that can be caused by alcohol or a virus is called
   a. cirrhosis  d. diverticulosis
   b. Crohn's disease  e. none of the above
   c. hepatitis

   Answer:

2. When the liver becomes scarred and degenerates, it is called
   a. cirrhosis  d. diverticulosis
   b. Crohn's disease  e. none of the above
   c. hepatitis

   Answer:

3. A chronic, inflammatory bowel disease is called
   a. cirrhosis  d. diverticulosis
   b. Crohn's disease  e. none of the above
   c. hepatitis

   Answer:

4. When the bowel has pouchlike herniations, it is called
   a. cirrhosis  d. diverticulosis
   b. Crohn's disease  e. none of the above
   c. hepatitis

   Answer:

Bill Martin, a 19-year-old male student, is brought into the emergency room by his college roommates. Bill tells the health care provider that he started developing lower right abdominal pain while playing basketball. He states that his pain is becoming more severe. Based on his symptoms and the results of diagnostic studies, Bill is scheduled for emergency abdominal surgery.

QUESTIONS

1. Why is Bill experiencing severe lower right abdominal pain?

2. Where is the structure located that is causing Bill's symptoms?

3. Why is this structure prone to the development of obstruction and other problems?

4. Why must Bill undergo emergency abdominal surgery?
5. The movement of food through the alimentary canal by smooth muscles is called
   a. ingestion  
   b. digestion  
   c. mastication  
   d. peristalsis  
   e. none of the above  

**Answer:**

6. Taking food into the body is called
   a. ingestion  
   b. digestion  
   c. mastication  
   d. peristalsis  
   e. none of the above  

**Answer:**

7. The act of swallowing is called
   a. deglutition  
   b. mastication  
   c. ingestion  
   d. peristalsis  
   e. none of the above  

**Answer:**

8. Which of the following is NOT an accessory structure of the gastrointestinal tract?
   a. teeth  
   b. tongue  
   c. liver  
   d. salivary glands  
   e. none of the above  

**Answer:**

9. Which of the following is NOT one of the four tunics of the alimentary canal?
   a. tunica mucosa  
   b. lamina propria  
   c. muscularis  
   d. serosa  
   e. none of the above  

**Answer:**

10. Which of the papillae are important in licking?
    a. fungiform  
    b. circumvallate  
    c. filiform  
    d. frenulum  
    e. none of the above  

**Answer:**

11. The salivary glands that secrete the least amount of saliva are the
    a. parotids  
    b. submandibular  
    c. buccal  
    d. sublingual  
    e. none of the above  

**Answer:**

12. Which of the following substances is NOT found in saliva?
    a. amylase  
    b. urea  
    c. lipase  
    d. phosphates  
    e. none of the above  

**Answer:**
13. The number of permanent teeth is
   a. 20  
   b. 13  
   c. 24  
   d. 32  
   e. none of the above

Answer:

14. Cavities are known as
   a. dentes  
   b. gingivae  
   c. pulp  
   d. caries  
   e. none of the above

Answer:

15. Which of the following are NOT teeth?
   a. molar  
   b. canine  
   c. incisor  
   d. cuspid  
   e. none of the above

Answer:

16. All of the following are parts of the pharynx EXCEPT
   a. tracheo  
   b. naso  
   c. oro  
   d. laryngo  
   e. none of the above

Answer:

17. The major symptom of a hiatal hernia is
   a. tickling  
   b. raspiness  
   c. burning  
   d. pressure  
   e. none of the above

Answer:

18. All of the following are parts of the stomach EXCEPT
   a. cardia  
   b. fundus  
   c. pylorus  
   d. antrum  
   e. none of the above

Answer:

19. All of the following are secretion cells of the stomach EXCEPT
   a. zymogenic  
   b. alpha  
   c. parietal  
   d. mucous  
   e. none of the above

Answer:

20. The folds of the stomach are called
   a. pepsin  
   b. HCl  
   c. rugae  
   d. pepsinogen  
   e. none of the above

Answer:
21. Approximately 80% of nutrient absorption takes place in the
   a. stomach
   b. small intestine
   c. large intestine
   d. liver
   e. none of the above
   Answer:

22. Digestion of protein begins in the
   a. stomach
   b. pancreas
   c. liver
   d. large intestine
   e. none of the above
   Answer:

23. Which of the following is NOT a function of the liver?
   a. produces heparin
   b. phagocytoses blood cells
   c. stores excess carbohydrates
   d. produces bile salts
   e. absorbs water
   Answer:

24. All of the following are parts of the small intestine EXCEPT
   a. duodenum
   b. cecum
   c. jejunum
   d. ileum
   e. plicae
   Answer:

25. The absorption structures of the small intestine are
   a. villi
   b. plicae
   c. chyme
   d. rugae
   e. none of the above
   Answer:

26. The valves of the alimentary canal are of which type?
   a. flap
   b. cusp
   c. bicusp
   d. sphincter
   e. none of the above
   Answer:

27. Which large intestinal movement mixes the chyme and helps in the absorption of water?
   a. peristalsis
   b. mass peristalsis
   c. vibration
   d. haustral churning
   e. none of the above
   Answer:

28. Which of the following is NOT a part of the colon?
   a. rectum
   b. ascending
   c. sigmoid
   d. transverse
   e. descending
   Answer:
29. Which of the following is NOT a function of the large intestine?
   a. water absorption
e. digestive enzyme secretion
   b. feces formation
d. mucus production
   c. vitamin production
   Answer:

30. Which of the following is the end of the alimentary canal?
   a. sigmoid
c. anus
d. descending colon
   b. rectum
e. none of the above
   Answer:

31. Which of the following is a pear-shaped sac located in a depression of the liver surface?
   a. gallbladder
c. parotid gland
d. villi
e. jejunum
   b. colon
   Answer:

32. Which of the following is an indication of stomach ulcers or cancer?
   a. GERD
c. jaundice
d. chronic gastritis
   b. tapeworm infection
e. chronic pancreatitis
   Answer:

33. GERD causes a burning sensation in the esophagus because gastric juice is high in
   a. sugars
c. ammonia
d. sulfuric acid
   b. water
e. hydrochloric acid
   Answer: