Chapter 02 The Digestive System Mechanism for Nourishing the Body

MULTICHOICE

1. Within the lamina propria, lying just below the epithelium, is the mucosa-associated lymphoid tissue (MALT), which
(A) controls secretions from the mucosal glands
(B) contains white blood cells and protects against ingested microorganisms
(C) initiates peristalsis
(D) secretes mucus, hormones, and digestive juices into the lumen
Answer: (B)
2. Which structural component of the gastrointestinal tract lies within the muscularis externa and controls the contractions that cause motility?
(A) muscularis mucosae
(B) submucosal plexus
(C) myenteric plexus
(D) lumen
Answer: (C)
3. Which structure is <i>not</i> considered an accessory organ?
(A) pancreas
(B) liver
(C) gallbladder
(D) spleen
Answer: (D)
4. Bile is most important for the digestion and absorption of
(A) carbohydrates
(B) proteins
(C) fats

(D) vitamins
Answer: (C)
5. A decrease in the function of the parotid glands is most likely to result in
(A) a lack of triglyceride digestion
(B) bolus that is difficult to form
(C) saliva that is too thin, that is, a high water to mucus ratio
(D) diarrhea due to malabsorption
Answer: (B)
6. What is the name of the digestive enzyme in saliva that digests starch?
(A) lipase
(B) synthetase
(C) amylase
(D) lactase
Answer: (C)
7. Which substance is <i>not</i> a component of saliva?
(A) mucus
(B) enzymes
(C) water
(D) proteases
Answer: (D)
8. Endocrine cells of the pancreas are found in which structure?
(A) the pancreatic duct
(B) the islets of Langerhans
(C) the sphincter of Oddi
(D) the beta cells

Answer: (B)

9. Delayed gastric emptying is known as
(A) cholecystitis
(B) cholelithiasis
(C) gastritis
(D) gastroparesis
Answer: (D)
10. What product produced by neck cells in the oxyntic gland of the stomach protects the epithelium from mechanical and chemical damage?
(A) amylase
(B) pepsin
(C) gastrin
(D) mucus
Answer: (D)
11. Which cells, found both in the oxyntic glands and pyloric glands of the stomach, secrete hydrochloric acid and intrinsic factor?
(A) neck cells
(B) parietal cells
(C) chief cells
(D) enteroendocrine cells
Answer: (B)
12. Which cells, found in oxyntic glands in the body of the stomach, secrete pepsinogens?
(A) neck cells
(B) parietal cells
(C) chief cells
(D) enteroendocrine cells
Answer: (C)

13. Which specialized cell of the gastric epithelium secretes a hormone?

(A) neck
(B) parietal
(C) chief
(D) G-cell
Answer: (D)
14. The chief cells secrete
(A) gastrin
(B) mucus
(C) zymogens
(D) hydrochloric acid
Answer: (C)
15. The parietal cells secrete
(A) hydrochloric acid and intrinsic factor
(B) intrinsic factor and gastrin
(C) gastrin and zymogens
(D) zymogens and hydrochloric acid
Answer: (A)
16. Gastrin stimulates which cells?
(A) oxyntic cells
(B) parietal and chief cells
(C) pancreatic exocrine cells
(D) alpha cells
Answer: (B)
17. When the pH of the stomach is increased to avoid GERD, over time, the stomach may not be acidic enough. What is the most likely outcome?

(A) lack of carbohydrate digestion ${\bf r}$

(B) decreased protein digestion
(C) destruction of bacteria in the stomach
(D) gastric ulcer
Answer: (B)
18. Which glycoproteins bind water and are gel-forming?
(A) mucins
(B) proteoglycans
(C) prostaglandins
(D) zymogens
Answer: (A)
19. The product(s) of pepsin's action is/are
(A) disaccharides
(B) amylose
(C) short-chain fatty acids
(D) hydrolyzed proteins
Answer: (D)
20. Pepcid, a drug that is classified as an H ₂ receptor blocker, acts by
(A) inhibiting the secretion of hydrogen ions by the parietal cells
(B) inhibiting the release of acetylcholine by the vagus nerve
(C) inhibiting the binding of gastrin to the parietal cells
(D) inhibiting the binding of histamine to the parietal cells
Answer: (D)
21. Which medication inhibits hydrogen release into the gastric juice, which reduces GI mucosal irritation?
(A) Pepcid
(B) Nexium

(C) Tums
(D) Tagamet
Answer: (B)
22. Which process allows gastric expansion with food intake with minimal impact on intragastric pressure?
(A) peristalsis
(B) receptive relaxation
(C) segmentation
(D) pendular movement
Answer: (B)
23. Pyloric glands are located predominantly
(A) at the juncture of the esophagus and the stomach
(B) in the fundus and the body of the stomach
(C) in the antrum of the stomach
(D) in the cardiac portion of the stomach
Answer: (C)
24. Which phrase best describes the function of the crypt of Lieberkühn?
(A) mucus secretion
(B) glucose oxidation
(C) cellular differentiation
(D) amylase secretion
Answer: (C)
25. The pancreas is a digestive system accessory organ with two types of active tissue-the ductless endocrine cells that secrete insulin and glucagon and the
(A) liver-like cells that produce bile
(B) ductless absorptive tissue that controls bicarbonate
(C) acinar exocrine cells that produce digestive enzymes

(D) erythropoietic cells that produce red blood cells
Answer: (C)
26. Pancreatic juice that enters the duodenum through the sphincter of Oddi contains all of the following EXCEPT
(A) digestive enzymes
(B) intrinsic factor
(C) anions such as bicarbonate and chloride
(D) cations such as sodium, potassium, and calcium
Answer: (B)
27. In which part of the brain is the swallowing center located?
(A) the hypothalamus
(B) the medulla oblongata
(C) the thalamus
(D) the pons
Answer: (B)
28. In which organ are enzymes produced that are responsible for digestion of 50 percent of carbohydrate and protein and 90 percent of fat?
(A) liver
(B) esophagus
(C) pancreas
(D) gallbladder
Answer: (C)
29. Which hormone's major action is to alkalize intestinal contents by stimulating secretion of bicarbonate from the pancreas and by inhibiting gastric acid secretion and gastric emptying?
(A) gastrin
(B) secretin
(C) cholecystokinin

(D) GRP
Answer: (B)
30. Dumping syndrome may be caused by
(A) bacterial infections
(B) viral infections
(C) partial removal of the stomach to treat obesity
(D) gall stones
Answer: (C)
31. The hormone primarily responsible for contraction of the gallbladder and release of bile into the duodenum is
(A) gastrin
(B) secretin
(C) cholecystokinin
(D) GRP
Answer: (C)
32. Bile salts are synthesized from cholesterol in the
(A) canaliculi
(B) common bile duct
(C) hepatocytes
(D) gallbladder
Answer: (C)
33. The surface coat of microvilli is known as
(A) the glycocalyx
(B) the crypts of Lieberkühn
(C) motilin
(D) proteases

34. The total bile acid pool in the human body is 2.5 to 5 g. What percentage of bile is reabsorbed in the distal ileum?	
(A) 10 percent	
(B) 30 percent	
(C) 65 percent	
(D) 90 percent	
Answer: (D)	
35. A large gall stone blocking the cystic duct might result in(A) a reduction in the production of bile by the liver	
(B) an increase in bile production by the liver	
(C) enhancement of fat digestion	
(D) interference with fat digestion	
Answer: (D)	
36. Which substance is enterohepatically circulated?	
(A) pancreatic enzymes	
(B) bile	
(C) glucose	
(D) CCK	
Answer: (B)	
37. In general, in which portion of the gastrointestinal tract does most absorption occur?	
(A) esophagus	
(B) stomach	
(C) small intestine	
(D) colon	

Answer: (A)

Answer: (C)

38. A common cause of peptic ulcer disease (PUD) is the bacterium
(A) Escherichia coli
(B) Helicobacter pylori
(C) Staphylococcus aureus
(D) Enterobacter aerogenes
Answer: (B)
39. Which structure helps to prevent the migration of bacteria from the large intestine back into the small intestine?
(A) the cecum
(B) the appendix
(C) the ileocecal valve
(D) the ileum
Answer: (C)
40. Which hormone(s) is/are responsible for decreasing sodium absorption in the colon?
(A) glucocorticoids
(B) mineralocorticoids
(C) vasopressin
(D) glucagon
Answer: (C)
41. Which division of the nervous system decreases digestive tract motility and secretions?
(A) parasympathetic
(B) somatic
(C) adrenergic
(D) sympathetic
Answer: (D)

 $\textbf{42.} \ \ \textbf{Which hormone diminishes gastric acid secretion?}$

(A) somatostatin
(B) gastrin
(C) cholecystokinin
(D) pancreatic polypeptide
Answer: (A)
43. Which hormone stimulates gall bladder contraction?
(A) motilin
(B) gastrin
(C) cholecystokinin
(D) secretin
Answer: (C)
44. A deficiency in secretion of cholecystokinin might lead to which problem?
(A) a reduction in gastric acid production
(B) difficulty digesting fats
(C) difficulty digesting proteins
(D) a buildup of intestinal gas
Answer: (B)
45. When diagnosing lactose intolerance, is measured in the breath following oral consumption of 50 g lactose.
(A) methane
(B) hydrogen
(C) carbon dioxide
(D) sulfur
Answer: (B)
46. Lactose intolerance is <i>least</i> common in
(A) European Americans

(B) African Americans
(C) American Indians
(D) Asian Americans
Answer: (A)
47. Taking antihistamines might lead to a(n)
(A) increase in stomach acid production
(B) increase in bile release
(C) decrease in stomach acid secretion
(D) reduction in pancreatic enzyme production
Answer: (C)
48. Which hormone decreases appetite?
(A) peptide YY
(B) motilin
(C) secretin
(D) pancreatic polypeptide
Answer: (A)
49. Among the regulatory peptide molecules, some are recognized as true hormones. Which substance is a paracrine rather than a hormone?
(A) somatostatin
(B) secretin
(C) cholecystokinin
(D) gastrin
Answer: (A)
50. Secretin is released from the enteroendocrine S-cell in the
(A) proximal small intestine
(B) gastric mucosa

(C) esophagus
(D) colon
Answer: (A)
TRUEFALSE
51. Secretin stimulates HCl release.
(A) True
(B) False
Answer: (B)
52. CCK stimulates pancreatic zymogen release.
(A) True
(B) False
Answer: (A)
53. Leptin secretion stimulates the desire to eat.
(A) True
(B) False
Answer: (B)
54. CCK stimulates the release of bile.
(A) True
(B) False
Answer: (A)
55. GIP stimulates the release of a hormone from the pancreatic β -cells.
(A) True
(B) False
Answer: (A)

62. The predominant component of saliva is amylase.
(A) True
(B) False
Answer: (B)
63. The fundus of the stomach lies below the gastroesophageal sphincter.
(A) True
(B) False
Answer: (B)
64. Villi are s-designed to increase the absorptive surface area of the small
(A) True
(B) False
Answer: (A)
65. Pancreatitis occurs when zymogens become activated within the pancreas.
(A) True
(B) False
Answer: (A)
MATCH
66. <i>Digestive Substances:</i> Match the substance important for digestion with its site of production.
MATCH
67. Match the corresponding action to the hormone. Each choice is used only once.

SHORTANSWER

- **68.** Discuss the role of drug therapies such as Tagamet, Zantac, and Pepcid in the treatment of peptic ulcers.**Answer:** The answer should include the following items:
- $\mathbf{69.}$ Describe the beneficial effects of secretions released by colonic bacteria. Answer: The answer should include the following items:

70. What happens to reabsorbed bile acids after transported back to the liver?**Answer:** The answer should include the following items:

Answer: Reabsorbed bile acids are reconjugated to amino acids and secreted into bile along with the newly synthesized bile acids.

- **71.** Describe the mechanisms by which resin-type drugs and functional foods containing phytostanols lower high blood cholesterol levels. **Answer:** The answer should include the following items:
- **72.** Broad-spectrum antibiotics are capable of killing many different bacteria, including many of those that naturally live in the intestines. Develop a hypothesis regarding the effects of broad-spectrum antibiotics on the beneficial effects of gut flora. **Answer:** The answer should include the following items:
- **73.** What are probiotics and prebiotics? Give examples of each.**Answer:** The answer should include the following items:

Answer: Probiotics are live microorganisms (that is, active cultures of specific strains of bacteria) that when administered in adequate amounts confer health benefits to its hosts. Prebiotics (discussed in more detail in Chapter 4) are substances that are not digested by human digestive enzymes but confer health benefits to the host by acting as substrates for the growth and/or activity of one or more species of healthful bacteria in the colon.

Answer: The most common probiotic bacteria are lactic acid bacteria, usually strains of Lactobacillus and Bifidobacterium genera. To be considered a probiotic, the product must contain 100 million live active bacteria per gram. At present, probiotics are mostly consumed as yogurt with live cultures and as fermented or cultured milk and milk products (such as buttermilk and kefir). In the United States, yogurt is often fermented by Lactobacillus bulgaricus and Streptococcus thermophilus, and milk is usually fermented by L. acidophilus and L. casei. Other bacteria used to manufacture dairy products include Leuconostoc esntheroides, L. mesenteroides, and Lactococcus lactis. Other food sources of probiotics include miso, tempeh, and some soy beverages/products.

- **74.** Discuss three of the five mechanisms by which probiotics may be helpful in diarrheal illnesses.**Answer**: The answer should include three of the following items:
- **75.** How might an imbalance of the hormones ghrelin and leptin lead to obesity?**Answer**: The answer should include the following items:

Answer: Because ghrelin acts on the hypothalamus to stimulate appetite, and leptin suppresses food intake, an imbalance could affect an individual's ability to control his or her appetite leading to obesity.

- **76.** Bariatric surgery involves removal or bypass of a large portion of the stomach. Speculate on how the production of ghrelin following bariatric surgery might affect appetite and explain your reasoning. **Answer:** The answer should include the following items:
- 77. Discuss the functions and significance of the folds of Kerckring, the villi, and the microvilli. Answer: The answer should include the following items:

MULTICHOICE

78. RYGB surgery involves ____.

(A) creating a pouch after the proximal and distal portions of the stomach are separated
(B) placing a band on the stomach and creating a pouch
(C) removing 85 percent of the stomach surgically
(D) connecting the esophagus directly to the duodenum
Answer: (A)
79. The most common bariatric procedure performed in the United States is
(A) gastric banding
(B) sleeve gastrectomy
(C) RYGB
(D) biliopancreatic diversion
Answer: (C)
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80. Which nutritional deficiency occurs frequently following RYGB?
(A) vitamin D
(B) protein
(C) fat
(D) vitamin C
Answer: (B)
81. Deficiency of which vitamin is associated with neurological deficiencies?
(A) vitamin D
(B) vitamin C
(C) vitamin A
(D) thiamin
Answer: (D)
82. Deficiency of vitamin B_{12} occurs due to
(A) inflammation of the GI tract
(B) insufficient intrinsic factor

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- (C) a change in diet
- (D) excessive stomach acid

Answer: (B)