Chapter 16 a--The Digestive System

1. Mixing movements

   A. promote digestion by mixing food with digestive juices
   B. facilitate absorption by exposing luminal contents to absorptive surfaces
   C. take place only in the stomach
   D. promote digestion by mixing food with digestive juices and facilitate absorption by exposing luminal contents to absorptive surfaces
   E. all of these

2. Digestive motility

   A. is accomplished by smooth muscle contractions
   B. is accomplished by smooth and voluntary muscle contractions
   C. may be propulsive in nature
   D. is accomplished by smooth and voluntary muscle contractions and may be propulsive in nature.
   E. is accomplished by smooth muscle contractions and may be propulsive in nature

3. Secretions from digestive organs include

   A. enzymes
   B. bile
   C. mucus
   D. hormones
   E. all of these

4. Which is the primary absorptive organ of the digestive system?

   A. salivary glands
   B. oral cavity
   C. stomach
   D. small intestine
   E. colon

5. Which statement is incorrect?

   A. The myenteric plexus is located in the submucosa.
   B. The intrinsic plexuses innervate smooth muscle cells and exocrine and endocrine glands.
   C. The plexuses are influenced by extrinsic nerves.
   D. The plexuses coordinate local digestive tract activity.
   E. There are two major networks of nerve fibers forming the plexuses of the gut.

6. Which statement is incorrect?

   A. In general, parasympathetic stimulation is excitatory to the digestive system.
   B. Parasympathetic innervation to the digestive tract comes primarily through the vagus nerve.
   C. Parasympathetic innervation is part of the extrinsic nerve supply to the digestive tract.
   D. Parasympathetic stimulation of the salivary glands produces a saliva rich in mucus.
   E. Parasympathetic stimulation increases salivary, gastric, pancreatic, and biliary secretion.

7. Fats are digested to

   A. amino acids
   B. cellulose
   C. fatty acids and glycerol
   D. fructose
   E. monosaccharides

8. Proteins are primarily digested to and absorbed as

   A. amino acids
   B. polypeptides
   C. fatty acids and glycerol
   D. monosaccharides
   E. vitamins

9. Milk sugar is digested to

   A. glucose and fructose
   B. glucose and galactose
   C. sucrose and glucose
   D. maltose
   E. cellulose

10. Digestion of polysaccharides

    A. is accomplished using enzymes
    B. utilizes hydrolysis
    C. utilizes dehydration
    D. is accomplished using enzymes and utilizes hydrolysis
    E. is accomplished using enzymes and utilizes dehydration

11. Which of the following organs is not a digestive tract organ?

    A. esophagus
    B. stomach
    C. pancreas
    D. small intestine
    E. large intestine

12. Which tissue layer provides for primary digestive motility?

    A. mucosa
    B. submucosa
    C. muscularis mucosae
    D. muscularis externa
    E. mesentery

13. The serosa is the

    A. abdominal cavity containing the stomach
    B. blood supply to the stomach
    C. inner lining of the digestive tract
    D. layer of smooth muscle of the digestive tract
    E. outer connective-tissue covering of the digestive tract

14. The intrinsic nerve plexuses

    A. produce spontaneous depolarization of the smooth muscle cells in the wall of the digestive tract
    B. are located in the mucosa
    C. coordinate local activity in the digestive tract
    D. produce spontaneous depolarization of the smooth muscle cells in the wall of the digestive tract and coordinate local activity in the digestive tract
    E. none of these

15. Carbohydrates are absorbed as

    A. polysaccharides
    B. disaccharides
    C. monosaccharides
    D. amino acids
    E. fatty acids

16. The enteric nervous system includes

    A. the myenteric plexus.
    B. the submucosal plexus.
    C. vagal nerve efferents.
    D. the myenteric plexus and the submucosal plexus.
    E. the myenteric plexus and vagal nerve efferents.

17. The BER refers to the

    A. basic eating reflex ensuring that food is moved along the digestive tract at an appropriate rate.
    B. basic electrical rhythm consisting of spontaneous, rhythmic, wavelike fluctuations in membrane potential.
    C. basic emptying reflex, which governs the rate of gastric emptying.
    D. bowel evacuation reflex or defecation reflex.
    E. None of these

18. 9,500 ml of fluid is absorbed from the digestive tract daily. The ultimate source of most of this fluid is

A. food and fluid ingested during meals.
B. stored within secretory cells of the digestive tract.
C. the plasma.
D. the accessory digestive organs.
E. metabolic water.

19. Which statement regarding control of digestive processes is incorrect?

A. Short reflexes influence motility and secretion in localized areas.
B. All elements of the short reflexes are contained within the digestive organ's wall.
C. Hormones play a role.
D. Osmoreceptors monitor the acidity of the luminal contents.
E. There are stretch receptors in the walls of digestive organs.

20. Chewing increases which of the following secretions?

A. Salivary secretion
B. Gastric secretion
C. Pancreatic secretion
D. Salivary secretion and Gastric secretion
E. All of these

21. Which of the following is accomplished by chewing?

A. Grinding and breaking up food
B. Mixing food with saliva to facilitate swallowing
C. Reflexively increasing salivary and gastric secretions
D. Reflexively increasing pancreatic and bile secretions
E. All of these

22. Salivary secretion is

A. entirely under neural control (i.e., there is no hormonal control of salivary secretion).
B. a passive secretion.
C. stimulated by the parasympathetic nervous system and inhibited by the sympathetic nervous system.
D. entirely under neural control (i.e., there is no hormonal control of salivary secretion)and a passive secretion.
E. entirely under neural control (i.e., there is no hormonal control of salivary secretion)and stimulated by the parasympathetic nervous system and inhibited by the sympathetic nervous system.

23. Which of the following is not a function of saliva?

A. Facilitates swallowing
B. Serves as a solvent for molecules that stimulate taste buds
C. Dissolves glucose to facilitate its absorption by the oral mucosa
D. Has antibacterial action
E. Aids speech

24. Which of the following is not a component of saliva?

A. amylase
B. mucus
C. pepsin
D. lysozyme
E. water

25. Which statement is incorrect?

A. Salivation is entirely under neural control.
B. Parasympathetic stimulation and sympathetic stimulation both increase salivary secretion.
C. The acquired salivary reflex occurs upon stimulation of chemoreceptors and/or pressure receptors in the mouth.
D. Parasympathetic stimulation produces a watery saliva rich in enzymes.
E. The salivary center is located in the medulla.

26. Which of the following is entirely under nervous control and has *no* hormonal regulatory component?

A. salivary secretion
B. gastric secretion
C. pancreatic secretion
D. liver secretion
E. none of these (all have a hormonal regulatory component)

27. Swallowing

A. includes the movement of the bolus from the mouth to the stomach
B. includes only the movement of the bolus from the mouth to the esophagus
C. is a sequentially programmed, multiple response, all-or-none reflex
D. includes the movement of the bolus from the mouth to the stomach and is a sequentially programmed, multiple response, all-or-none reflex
E. includes only the movement of the bolus from the mouth to the esophagus and is a sequentially programmed, multiple response, all-or-none reflex

28. The swallowing center is located in the

A. cerebral cortex
B. medulla
C. hypothalamus
D. throat
E. spinal cord

29. During the oropharyngeal phase of swallowing, food is prevented from

A. reentering the mouth by elevation of the uvula
B. entering the nasal passages by closure of the nasopharyngeal sphincter
C. entering the trachea primarily by the epiglottis blocking the opening between the vocal cords
D. reentering the mouth by elevation of the uvula and entering the trachea primarily by the epiglottis blocking the opening between the vocal cords
E. none of these

30. The pharyngoesophageal sphincter is normally closed to prevent

A. air from entering the esophagus during breathing
B. gastric contents from refluxing back into the esophagus
C. vomiting
D. esophageal secretions from leaking into the stomach
E. food from entering the pharynx

31. What prevents food from entering the nasal passages during swallowing?

A. elevation of the uvula
B. contraction of the pharyngeal muscles
C. positioning of the tongue
D. tight apposition of the vocal cords over the glottis
E. elevation of the epiglottis over the nasopharynx

32. What helps prevent food from entering the trachea during swallowing?

A. elevation of the uvula
B. contraction of the pharyngeal muscles
C. positioning of the tongue
D. tight apposition of the vocal cords over the glottis
E. elevation of the epiglottis over the pharyngoesophageal sphincter

33. Secondary peristaltic waves in the esophagus

A. occur when a large or sticky bolus becomes stuck in the esophagus
B. are coordinated by the swallowing center
C. are coordinated by extrinsic nerve signals
D. occur when a large or sticky bolus becomes stuck in the esophagus, and are coordinated by the swallowing center
E. occur when a large or sticky bolus becomes stuck in the esophagus, and are coordinated by extrinsic nerve signals

34. If peristalsis in the esophagus is insufficient to carry an especially large bolus of food through the esophagus to the stomach, what happens to dislodge this trapped food?

A. A secondary peristaltic wave is initiated by the swallowing center.
B. A secondary peristaltic wave is initiated by distention of the esophagus, mediated by the intrinsic nerve plexuses.
C. The food remains in the esophagus until the swallowing mechanism is voluntarily initiated once again.
D. Increased esophageal mucus secretion occurs to lubricate the stuck bolus so that it can slide to the stomach.
E. Food never becomes stuck in the esophagus because it is very distensible.

35. The gastroesophageal sphincter is normally closed to prevent

A. air from entering the esophagus during breathing
B. gastric contents from refluxing into the esophagus
C. vomiting
D. esophageal leaking into the stomach
E. food from entering the pharynx

36. The major chemical digestive activity occurring in the stomach is

A. digestion of starch
B. digestion of protein
C. digestion of fat
D. absorption of monosaccharides
E. digestion of vitamins

37. Receptive relaxation refers to relaxation of the

A. pharyngoesophageal sphincter during swallowing
B. pyloric sphincter when the duodenum is prepared to receive the chyme
C. external anal sphincter when the individual is receptive to the defecation reflex
D. stomach as it starts to fill, thereby allowing an increase in volume with very little increase in pressure
E. none of these

38. Which of the following factors will not influence the rate at which a meal will empty from the stomach?

A. fat in the duodenum
B. acid in the duodenum
C. caffeine in the duodenum
D. hypertonicity of the duodenal contents
E. distention of the duodenum

39. Gastric mixing

A. occurs primarily in the body of the stomach
B. occurs as a result of the stomach's contents being tumbled back and forth in the fundus because of vigorous peristaltic contractions
C. mixes the food with gastric secretions to convert it to a finely divided liquid form known as chyme
D. occurs as a result of the stomach's contents being tumbled back and forth in the fundus because of vigorous peristaltic contractions. and mixes the food with gastric secretions to convert it to a finely divided liquid form known as chime
E. All of these

40. Which of the following factors is the most potent stimulus for inhibition of gastric motility?

A. fat in the duodenum
B. acid in the duodenum
C. acid in the stomach
D. distention of the stomach
E. hypertonicity of the duodenal contents

41. The pyloric sphincter is located between the

A. esophagus and stomach
B. oral cavity and esophagus
C. large intestine and rectum
D. small intestine and large intestine
E. stomach and small intestine

42. Bile acts on

A. distention of the stomach
B. gastrin
C. carbohydrate in the stomach
D. fat in the duodenum
E. fat in the stomach

43. Peristaltic antral contractions

A. occur at a rate of 3/min
B. are responsible for emptying food into the duodenum
C. are responsible for mixing food and gastric enzymes within the antrum
D. are the result of smooth muscle contractions
E. all of these

44. Which statement regarding gastric motility and emptying is incorrect?

A. Increased fluidity allows more rapid emptying.
B. Presence of acid and fat in the stomach initiates the enterogastric reflex.
C. Increased gastric volume stimulates motility.
D. Vagal activity stimulates motility.
E. Distention of the stomach initiates short reflexes.

45. Which of the following breakfasts would remain in the stomach the longest?

A. toast, orange juice, and coffee
B. black coffee
C. fried eggs, bacon, and hash browns
D. bowl of cereal with skim milk
E. boiled egg, toast, and juice

46. Hormones acting in the small intestine include

A. secretin and cholecystokinin
B. secretin and gastrin
C. cholecystokinin and gastrin
D. all of these
E. none of these

47. During the cephalic phase of gastric secretion:

A. Thinking about, seeing, and smelling food reflexively increases gastric secretion.
B. Vagal stimulation of the gastric glands occurs.
C. Gastrin is released.
D. Chewing food reflexively increases gastric secretion.
E. All of these.

48. The chief cells of the gastric mucosa secrete

A. bicarbonate ions
B. HCl
C. pepsinogen
D. sucrase
E. trypsin

49. The parietal cells of the gastric mucosa secrete

A. HCl
B. pepsinogen
C. intrinsic factor
D. HCl and pepsinogen
E. HCl and intrinsic factor

50. Which of the following statements concerning HCl secretion by the stomach is correct?

A. HCl inactivates salivary amylase and the pancreatic enzymes.
B. HCl activates pepsinogen.
C. It establishes a low pH in the stomach.
D. Oxyntic cells are responsible for it.
E. All of these.

51. Which factor below does not slow down gastric activities?

A. enterogastric reflex
B. enterogastrones
C. secretin
D. gastrin
E. cholecystokinin

52. Stomach acid is neutralized

A. in the duodenum
B. with trypsin
C. by solutions secreted from the antrum
D. in the duodenum and with trypsin
E. none of these

53. Intrinsic factor is

A. secreted by the parietal cells in the stomach
B. necessary for absorption of vitamin B_{12}
C. abundant in pernicious anemia
D. secreted by the parietal cells in the stomach and necessary for absorption of vitamin B_{12}
E. none of these

54. Pernicious anemia can occur when:

A. The stomach has been removed.
B. The terminal ileum has been removed.
C. There is a deficiency of intrinsic factor.
D. All of these
E. The stomach has been removed and there is a deficiency of intrinsic factor.

55. Which of the following is a precursor to an enzyme that functions in the stomach?

A. pepsinogen
B. HCl
C. intrinsic factor
D. gastrin
E. mucus

56. After pepsinogen is activated, it

A. autocatalytically activates more pepsinogen
B. activates the pancreatic proteolytic enzymes in the duodenal lumen after gastric emptying has occurred
C. inhibits the pyloric gland area in a negative-feedback fashion
D. autocatalytically activates more pepsinogen and activates the pancreatic proteolytic enzymes in the duodenal lumen after gastric emptying has occurred
E. none of these

57. Inhibition of gastric secretion following a meal is accomplished by

A. the enterogastric reflex
B. inhibition of the pyloric gland area by vagal stimulation
C. a high concentration of H^+, which directly inhibits the release of gastrin
D. the enterogastric reflex and a high concentration of H^+, which directly inhibits the release of gastrin
E. all of these

58. As food leaves the stomach, gastric secretion is reduced. Which of the following factors does not contribute to this reduction?

A. fat in the duodenum
B. low gastric pH
C. distention of the duodenum
D. high concentration of acid in the stomach or duodenum
E. pepsinogen in the duodenum

59. The pyloric gland area of the stomach antrum

A. secretes gastrin
B. is inhibited when gastric pH falls too high
C. is stimulated by the presence of glucose
D. all of these
E. is inhibited when gastric pH falls too high and by the presence of glucose.

60. The pyloric gland area of the stomach antrum secretes

A. histamine
B. gastrin
C. intrinsic factor
D. histamine and gastrin
E. histamine and intrinsic factor

61. Alcohol

A. inhibits gastric secretion
B. can be absorbed more rapidly from the small intestine than from the stomach
C. inhibits gastric emptying through the enterogastric reflex
D. inhibits gastric secretion and can be absorbed more rapidly from the small intestine than from the stomach
E. all of these

62. Which statement regarding control of pancreatic secretion is correct?

A. Gastrin stimulates release of neutralization solution.
B. CCK stimulates release of enzymes.
C. Secretin stimulates release of bicarbonate.
D. All of these.
E. CCK stimulates release of enzymes, and secretin stimulates release of bicarbonate.

63. Which of the following does not occur during vomiting?

A. The diaphragm contracts.
B. The abdominal muscles contract.
C. The stomach contracts.
D. Respiration is inhibited.
E. The glottis is closed.

64. During vomiting

A. The diaphragm contracts.
B. The abdominal muscles contract.
C. The stomach contracts.
D. The diaphragm and the abdominal muscles contract.
E. The abdominal muscles and the stomach contracts.

65. Peptic ulcers

A. are usually caused by excessive neural stimulation
B. are usually caused by bacterial infection
C. compromise the mucosal barrier and stomach wall
D. are usually caused by excessive neural stimulation and by bacterial infection
E. are usually caused by bacterial infection and compromise the mucosal barrier and stomach wall

66. Cholecystokinin

A. is secreted by the endocrine portion of the pancreas
B. stimulates pancreatic enzyme secretion
C. causes contraction of the gallbladder
D. stimulates pancreatic enzyme secretion and causes contraction of the gallbladder
E. none of these

67. Chymotrypsinogen

A. is activated by enterokinase
B. once activated, is involved in protein digestion
C. is secreted by the endocrine pancreas
D. all of these
E. none of these

68. The hormone secretin is released by endocrine cells in the duodenal mucosa in response to

A. distention of the stomach
B. carbohydrate in the duodenum
C. acid in the duodenum
D. gastrin secreted by the pyloric gland area of the stomach
E. none of these

69. Which of the following substances is absorbed by the stomach?

A. glucose
B. caffeine
C. aspirin
D. amino acids
E. fatty acids

70. Which statement is incorrect?

A. Trypsinogen is secreted in an inactive form.
B. Pancreatic amylase digests carbohydrate.
C. Pancreatic lipase is responsible for triglyceride digestion.
D. Except for trypsinogen, other proteolytic enzymes are secreted in active form.
E. Trypsinogen is activated by enterokinase.

71. Which of the following is not a function of the liver?

A. metabolic processing of carbohydrates, proteins, and fats
B. secretion of proteolytic digestive enzymes
C. detoxification and/or degradation of body wastes, hormones, drugs, and foreign compounds
D. synthesis of plasma proteins essential to the clotting process
E. storage of glycogen, fats, iron, copper, and many vitamins

72. Which statement is correct?

A. The most potent stimulus for secretin secretion is the presence of fat in the duodenum.
B. Secretin stimulates pancreatic enzyme secretion.
C. Secretin stimulates the secretion of bicarbonate.
D. Secretin stimulates the acinar cells.
E. None of these.

73. Which of the following is an active proteolytic enzyme?

A. pepsinogen
B. chymotrypsinogen
C. procarboxypeptidase
D. secretin
E. none of these

74. Bile salts

A. aid fat digestion
B. aid fat absorption through micelle formation
C. are made in the gall bladder
D. aid fat digestion and absorption through micelle formation
E. all of these

75. Which of the following stimulates gallbladder contraction?

A. CCK
B. secretin
C. sympathetic stimulation
D. CCK and secretin
E. CCK and sympathetic stimulation

76. Select the incorrect statement about the pancreas.

A. It has endocrine tissue.
B. It has exocrine tissue.
C. It secretes an alkaline fluid.
D. It secretes pepsinogen.
E. It secretes trypsinogen.

77. Which of the following are functions of aqueous $NaHCO_3$ secreted by the pancreas into the duodenum?

A. neutralization of acidic gastric contents emptied into the duodenum
B. prevention of irritation of the duodenal mucosa
C. active digestion of fat molecules into fatty acids
D. neutralization of acidic gastric contents emptied into the duodenum, and prevention of irritation of the duodenal mucosa
E. none of these

78. Which of the following is the most important stimulus for contraction of the gallbladder?

A. CCK
B. mechanical contraction of the small intestine
C. sympathetic stimulation
D. an increase in bile secretion by the liver
E. bile salts

79. Venous flow into the liver is via the

A. hepatic vein
B. hepatic portal system
C. sinusoidal system
D. mesenteric system
E. none of these

80. The typical coloration of the feces is due to

A. bile salts
B. undigested cellulose
C. aqueous $NaHCO_3$ secretion
D. modified bilirubin
E. disintegrated epithelial cells

81. The formation of a lipid emulsion

A. facilitates digestion of fat by lipase
B. is accomplished by bile salts
C. takes place in the stomach
D. all of these
E. facilitates digestion of fat by lipase and is accomplished by bile salts

82. Which of the following enters the duodenum?

A. pancreatic secretions
B. bile
C. gastrin
D. pancreatic secretions and Bile
E. all of these

83. The small intestinal digestive enzymes

A. are secreted into the lumen, where they perform their function
B. act intracellularly within the brush borders
C. complete the digestion of carbohydrates
D. complete the digestion of carbohydrates, and are secreted into the lumen, where they perform their function
E. act intracellularly within the brush borders and complete the digestion of carbohydrates

84. ____ do(es) not enter the duodenal lumen.

A. Trypsinogen
B. Bile salts
C. Disaccharidases
D. Gastric contents
E. Amylase

85. The primary factor responsible for moving the chyme forward in the small intestine is

A. mass movement
B. migrating motility complex
C. a gradient in the frequency of segmentation along the length of the small intestine
D. sequential ring-like contractions that move progressively forward along the length of the small intestine in a stripping motion, pushing the chyme ahead of the contraction
E. stimulation of the intestinal smooth muscle by enterokinase

86. Segmentation

A. is the primary motility in the small intestine during digestion of a meal
B. is both mixing and propulsive
C. refers to sequential ring-like contractions that sweep downward, creating a stripping motion that pushes the chyme forward
D. is the primary motility in the small intestine during digestion of a meal, and is both mixing and propulsive
E. all of these

87. Epithelial cells are continually being shed from the villi because

A. The intracellular enzymes digest important cellular constituents, causing the cells to disintegrate and slough.
B. The body needs a continual supply of protein derived from the digestion of these cells.
C. New cells are produced continually in the crypts at the base of the villi and then they migrate upward.
D. Acid entering the small intestine from the stomach constantly destroys the small intestinal lining, causing the cells to slough.
E. None of these.

88. Which of the following is not secreted into the duodenal lumen?

A. aminopeptidase
B. jipase
C. trypsinogen
D. procarboxypeptidase
E. amylase

89. Which control mechanism brings about segmentation of the terminal portion of the small intestine?

A. gastroileal reflex
B. distention of the stomach
C. secretin action
D. gastroileal reflex and distention of the stomach
E. none of these

90. Where is digestion completed?

A. stomach
B. small intestine lumen
C. on the brush borders of the small intestine epithelial cells
D. colon
E. rectum

91. Which statement is correct?

A. Carbohydrate is absorbed by active transport in the small intestine and enters the blood.
B. Fat is absorbed by active transport in the small intestine and enters the lymph.
C. Protein is absorbed primarily by pinocytosis.
D. The water-soluble vitamins are carried in the micelles, which are water-soluble.
E. Chylomicrons dissolve in the lipid portion of the plasma membrane to enable fat to enter the intestinal cell from the lumen.

92. Which of the following is absorbed by receptor mediated endocytosis in the terminal ileum?

A. fatty acids and monoglycerides
B. bile
C. Vitamin B_{12}
D. amino acids
E. all of these

93. Absorption of which of the following is linked to active sodium absorption at the basolateral border of the epithelial cell?

A. water
B. glucose
C. galactose
D. amino acids
E. all of these

94. Which of the following does not directly enter the blood upon being absorbed from the digestive tract?

A. glucose
B. monoglycerides and free fatty acids
C. amino acids
D. alcohol
E. Vitamin B_{12}

95. The primary site of absorption in the digestive system is the

A. stomach
B. small intestine
C. colon
D. esophagus
E. mouth

96. How long does it take for an epithelial cell to migrate from the base of the villi to the tip?

A. three hours
B. three days
C. one day
D. three months
E. several weeks

97. Which of the following correctly describes carbohydrate absorption by intestinal cells?

A. The absorbable units of carbohydrate are monosaccharides.
B. Fructose is absorbed by facilitated diffusion.
C. Glucose is absorbed by Na^+ and energy-dependent secondary active transport.
D. Carbohydrates are absorbed into the blood.
E. All of these.

98. Which of the following substances is a product from the chemical breakdown of starch?

A. amino acids
B. glucose
C. monoglycerides
D. bile salts
E. fatty acids

99. The enzyme that breaks down table sugar is

A. maltase
B. lactase
C. sucrase
D. enterokinase
E. peptidase

100. Which is not a brush border enzyme?

A. enterokinase
B. aminopeptidase
C. lipase
D. lactase
E. maltase

101. Lactose intolerance

A. is caused by lack of a specific disaccharidase
B. is caused by lack of lactose
C. results in bacterial metabolism of lactose
D. is caused by lack of a specific disaccharidase and by lack of lactose
E. is caused by lack of a specific disaccharidase and results in bacterial metabolism of lactose.

102. Chylomicrons are

A. aggregations of triglycerides formed within intestinal epithelial cells and covered with a layer of lipoprotein, which renders them water-soluble
B. aggregations of bile salts, monoglycerides, and free fatty acids
C. small fat globules held apart by the action of bile salts
D. secreted in the succus entericus
E. digested by bacteria in the colon

103. Of the fluid entering the small intestine, ____ percent is reabsorbed.

A. 100
B. 95
C. 85
D. 50
E. < 50 percent

104. The intestinal feature responsible for increasing the absorptive surface area the most are

A. circular folds
B. villi
C. microvilli
D. crypts
E. none of these

105. Lipids

A. are broken down by pepsin
B. are absorbed into lacteals
C. become part of micelles in the duodenum
D. are broken down by pepsin and are absorbed into lacteals
E. are absorbed into lacteals and become part of micelles in the duodenum

106. Fat soluble vitamins

A. are digested by lipases
B. are actively absorbed
C. are absorbed in micelles
D. are absorbed through the digestive tract
E. are passively absorbed with anions

107. Which statement is incorrect?

A. Absorption of salt and water converts the colonic contents into fecal material.
B. Colonic bacteria digest cellulose for their own growth and reproduction.
C. When mass movements of the colon propel feces into the rectum, stimulation of the stretch receptors in the rectal wall reflexively causes contraction of the internal and external anal sphincters to prevent defecation from occurring until an opportune time.
D. No digestive enzymes are secreted by the colon.
E. Haustral contractions in the colon are a type of mixing motility.

108. Which statement is correct?

A. The colon has as much absorptive capacity as the small intestine.
B. The final stages of carbohydrate and protein digestion occur in the colon.
C. Colonic movements are slower than movements in the small intestine.
D. The colon has as much absorptive capacity as the small intestine, and colonic movements are slower than movements in the small intestine
E. all of these

109. Select the terminal portion of the colon.

A. ascending
B. descending
C. pyloric
D. sigmoid
E. transverse

110. The defecation reflex

A. is initiated when mass movements force fecal material into the rectum, stimulating stretch receptors in the rectal wall
B. involves relaxation of the internal anal sphincter
C. involves contraction of the sigmoid colon and rectum
D. can be overridden by voluntary contraction of the external anal sphincter
E. all of these

111. Which of the following structures secrete mucus?

A. salivary glands
B. esophagus
C. stomach
D. colon
E. all of these

112. Distention of the stomach

A. triggers the gastrocolic reflex
B. encourages motility in the intestines
C. results in salivation
D. triggers the gastrocolic reflex and encourages motility in the intestines
E. encourages motility in the intestines and results in salivation

113. Which of the following is not a side effect of constipation?

A. headache
B. nausea
C. gradual buildup of toxins
D. lack of appetite
E. all of these

114. The symptoms of constipation are due to

A. inhibition of gastric emptying
B. absorption of toxins of bacterial origin from the colon
C. prolonged distention of the large intestine by the fecal mass
D. exhaustion due to frequent straining movements in an effort to initiate the defecation reflex
E. accumulation of large amounts of fluid in the colon

115. The major metabolic waste product eliminated in the feces is bilirubin.

True False

116. The outer muscle layer of the digestive tract consists of circular smooth muscle.

True False

117. The ultimate source of the fluids secreted into the digestive tract is the plasma.

True False

118. The large intestine consists of the duodenum, jejunum, and ileum.

True False

119. The function of mixing movements is to promote digestion and facilitate absorption.

True False

120. The contents of the digestive tract are technically outside of the body.

True False

121. The main sympathetic nerve supply to the digestive tract is the vagus.

True False

122. In general, sympathetic stimulation is excitatory to digestive activity.

True False

123. The myenteric plexus is a nerve network located in the submucosa.

True False

124. The intrinsic nerve plexuses innervate smooth muscle and exocrine gland cells but do not influence endocrine gland cells within the digestive system.

True False

125. Slow-wave potentials are always accompanied by contractile activity.

True False

126. Stimulation of the taste buds increases gastric secretions.

True False

127. The only function of chewing is to break food up into smaller pieces and soften it by mixing it with saliva to facilitate swallowing.

True False

128. Deglutition refers to the process of chewing.

True False

129. After the food has been chewed and mixed with salivary secretion, it is referred to as chyme.

True False

130. Protein digestion is initiated by salivary amylase.

True False

131. Sympathetic stimulation inhibits salivary secretion.

True False

132. There is continuous salivary secretion due to constant low-level stimulation by the parasympathetic nerve endings within the salivary glands.

True False

133. Parasympathetic and sympathetic stimulation both increase salivary secretion, contrary to the usual antagonistic activity of these two components of the autonomic nervous system.

True False

134. Parasympathetic stimulation of the salivary glands produces a large volume of watery saliva high in enzyme concentration.

True False

135. The epiglottis opens the glottis during the swallowing reflex.

True False

136. Swallowing propels a bolus of food from the mouth through the pharynx and esophagus into the stomach via a complex, sequential, multiple-response reflex.

True False

137. The swallowing center does not initiate and coordinate secondary peristaltic waves.

True False

138. The pharyngoesophageal sphincter is normally closed and its main function is to prevent esophageal secretions from entering the pharynx during breathing.

True False

139. Respiration is inhibited throughout the entire time that swallowing is taking place.

True False

140. Salivary amylase and the pancreatic enzymes are inactivated by acid.

True False

141. The stomach mucosa is thrown into folds known as villi.

True False

142. The most important function of the stomach is to begin protein digestion.

True False

143. Peristaltic waves occur continuously in the stomach at a rate of three contractions per minute, keeping pace with the BER.

True False

144. Gastric secretion does not begin until the arrival of food in the stomach.

True False

145. Chyme is produced in the stomach.

True False

146. Gastric mixing takes place primarily in the antrum of the stomach.

True False

147. The rate of gastric emptying depends entirely on the volume and fluidity of gastric contents.

True False

148. The enterogastric reflex promotes gastric emptying.

True False

149. The rate of gastric emptying is influenced by factors both in the stomach and in the duodenum.

True False

150. The primary factor governing the rate of gastric emptying is the volume of the gastric contents.

True False

151. Factors in the duodenum influence the rate of gastric emptying.

True False

152. The presence of protein in the stomach stimulates the release of histamine, which in turn promotes HCl and pepsinogen secretion.

True False

153. Gastric secretion occurs only when food is present in the stomach.

True False

154. Enterogastrones are produced by the stomach.

True False

155. Gastrin is not secreted during the cephalic phase of gastric secretion.

True False

156. HCl activates pepsinogen.

True False

157. The parietal cells secrete both pepsinogen and intrinsic factor.

True False

158. Intrinsic factor is necessary for the absorption of vitamin B_{12}.

True False

159. H^+ ions are actively secreted against a large concentration gradient into the stomach; Cl^- secretion follows passively.

True False

160. As the gastric pH falls very low, the pyloric gland area is inhibited.

True False

161. The process of digestion starts as food enters the stomach.

True False

162. Vomiting is caused by reverse peristalsis.

True False

163. Pepsin formation in the stomach is autocatalytic.

True False

164. Alcohol can be absorbed by the stomach mucosa more quickly than by the small intestine mucosa.

True False

165. Vomiting is initiated by stimulation of chemoreceptors in the medulla.

True False

166. The enterogastric reflex and enterogastrones inhibit gastric motility but stimulate gastric secretion.

True False

167. The pancreas is the primary site of digestive enzyme production.

True False

168. Glucagon is produced by the liver.

True False

169. All the pancreatic enzymes are secreted in inactive form.

True False

170. The pancreas secretes enzymes involved in the digestion of all three categories of foodstuff.

True False

171. Chymotrypsinogen is activated by enterokinase.

True False

172. The principal clinical manifestation of pancreatic exocrine insufficiency is incomplete protein digestion resulting from the deficiency of the powerful pancreatic proteolytic enzymes.

True False

173. The liver receives venous blood coming directly from the digestive tract and arterial blood coming from the aorta.

True False

174. In cirrhosis, damaged hepatocytes are permanently replaced by an overgrowth of connective tissue.

True False

175. Glycogen is made and stored in the liver.

True False

176. Bile is secreted continuously by the gallbladder.

True False

177. Bile is secreted by the liver and is stored in the gallbladder.

True False

178. Bile salts are important in fat digestion and absorption.

True False

179. Bilirubin aids fat digestion and absorption.

True False

180. CCK causes relaxation of the sphincter of Oddi.

True False

181. Bile salts are derivatives of cholesterol.

True False

182. The primary factor responsible for forward propulsion of chyme through the small intestine is mass movements.

True False

183. The ileocecal juncture serves as a barrier to prevent bacteria-laden contents of the large intestine from contaminating the small intestine.

True False

184. Excessive small intestinal motility can lead to constipation because there is less time for absorption to take place.

True False

185. The main motility seen in the small intestine during digestion of a meal is the migrating motility complex.

True False

186. The main function of the ileocecal valve/sphincter is to prevent small intestinal contents from entering the large intestine before digestion of food is completed.

True False

187. The small intestinal epithelium actively secretes digestive enzymes into the intestinal lumen.

True False

188. Digestive enzymes produced by the small intestine are not secreted into the lumen.

True False

189. Microvilli establish a brush border in the small intestine.

True False

190. Migration of a new intestinal epithelial cell from the crypt at the base of the villus to the tip of the villus requires about three weeks.

True False

191. Protein digestion begins in the stomach under the influence of pepsinogen; it continues in the duodenal lumen under the influence of pancreatic proteolytic enzymes; and it is completed intracellularly in the small intestinal brush border.

True False

192. Most of the fluid presented to the small intestine for absorption has been ingested in the most recent meal.

True False

193. Amino acids and glucose are both absorbed by secondary active transport by the small intestinal epithelial cells.

True False

194. Fat is absorbed into the lymph in the form of micelles.

True False

195. Sodium can be absorbed both actively and passively.

True False

196. Lipase breaks down proteins via hydrolysis.

True False

197. Chylomicrons are aggregates of bile salts, monoglycerides, and free fatty acids.

True False

198. Considerable vitamin absorption occurs passively in the stomach.

True False

199. Haustral contractions propel the feces one-third to three-quarters the length of the colon in a few seconds.

True False

200. Colonic secretion contains no digestive enzymes.

True False

201. Humans are not capable of digesting cellulose, but some of the enteric bacteria have this capability.

True False

202. Most of the digestive secretions do not remain in the fecal material.

True False

203. The primary absorption of nutrients, water, and electrolytes takes place in the large intestine, converting chyme to fecal material.

True False

204. During defecation, the internal anal sphincter relaxes.

True False

205. Defecation is a spinal reflex.

True False

206. Receptive relaxation refers to the voluntary relaxation of the external anal sphincter when the individual is receptive to the defecation reflex.

True False

207. Upon arrival of a new meal in the stomach, the gastrocolic reflex pushes the colonic contents into the rectum, triggering the defecation reflex to eliminate the remains of a preceding meal.

True False

208. Symptoms associated with constipation are attributable to toxins absorbed from the retained fecal material.

True False

209. **Complete each of the following statments.**

The four basic digestive processes are _____, _____, _____, and _____.

_____

210. **Complete each of the following statments.**

In general, the parasympathetic nervous system is _____ (excitatory or inhibitory) to the digestive tract, whereas the sympathetic nervous system is _____.

_____

211. **Complete each of the following statments.**

The _____ is the layer that lines the inside surface of the digestive tract.

_____

212. **Complete each of the following statments.**

The _____ is a common passageway for both the digestive and respiratory systems.

_____

213. **Complete each of the following statments.**

The primary wave of peristalsis in the esophagus is initiated by the _____. If this primary wave fails to push the bolus to the stomach, a secondary peristaltic wave is initiated by the _____.

_____

214. **Complete each of the following statments.**

The parotid glands are one of three pairs of _____ glands.

_____

215. **Complete each of the following statments.**

Gastric storage takes place in the _____ (what part?) of the stomach, whereas gastric mixing takes place in the _____.

_____

216. **Complete each of the following statments.**

The most potent stimulus for inhibiting gastric motility and emptying is _____ in the _____ lumen.

_____

217. **Complete each of the following statments.**

The three gastrointestinal hormones that function as enterogastrones are _____, _____, and _____.

_____

218. **Complete each of the following statments.**

The most potent stimulus for gastrin release is _____. Gastrin, in turn, is a powerful stimulus for _____ in the stomach. The PGA is directly inhibited from releasing gastrin by _____.

_____

219. **Complete each of the following statments.**

The presence of _____ in the stomach is the main stimulus to enhance gastric secretion.

_____

220. **Complete each of the following statments.**

Carbohydrate digestion takes place in the _____ (what part?) of the stomach under the influence of _____ (what enzyme?), whereas protein digestion takes place in the _____ under the influence of _____.

_____

221. **Complete each of the following statments.**

A(n) _____ ulcer is an erosion of the stomach wall.

_____

222. **Complete each of the following statments.**

The pancreatic _____ secretion neutralizes acidic gastric contents in the duodenal lumen.

_____

223. **Complete each of the following statments.**

Secretin stimulates the pancreatic _____ cells to secrete _____, whereas CCK stimulates the pancreatic _____ cells to secrete _____.

_____

224. **Complete each of the following statments.**

The islets of _____ are the endocrine cells of the pancreas.

_____

225. **Complete each of the following statments.**

When worn-out red blood cells are destroyed and the hemoglobin is degraded to a yellow pigment known as _____, which is excreted into the bile.

_____

226. **Complete each of the following statments.**

Excessive accumulation of bilirubin in the body produces the condition of _____.

_____

227. **Complete each of the following statments.**

_____ cells are the resident macrophages of the liver.

_____

228. **Complete each of the following statments.**

The primary mixing and propulsive motility of the small intestine is _____.

_____

229. **Complete each of the following statments.**

A(n) _____ is an aggregation of bile salts and lecithin.

_____

230. **Complete each of the following statments.**

The three modifications of the small intestine mucosa that greatly increase the surface area available for absorption are _____, _____, and _____.

_____

231. **Complete each of the following statments.**

The _____ is the shortest part of the small intestine.

_____

232. **Complete each of the following statments.**

The extent of absorption of the electrolytes _____ and _____ is regulated depending on the body's needs.

_____

233. **Complete each of the following statments.**

_____ contractions are responsible for mixing the colonic contents, whereas _____ periodically propel the contents long distances.

_____

234. **Complete each of the following statments.**

Colonic secretion consists of a(n) _____ solution.

_____

235. **Complete each of the following statments.**

_____ are the microscopic projections of the absorptive cells of the small intestine.

_____

236. **Complete each of the following statments.**

Chylomicrons are large, coated droplets of _____.

_____

Chapter 16 a--The Digestive System Key

1. Mixing movements

A. promote digestion by mixing food with digestive juices
B. facilitate absorption by exposing luminal contents to absorptive surfaces
C. take place only in the stomach
D. promote digestion by mixing food with digestive juices and facilitate absorption by exposing luminal contents to absorptive surfaces
E. all of these

2. Digestive motility

A. is accomplished by smooth muscle contractions
B. is accomplished by smooth and voluntary muscle contractions
C. may be propulsive in nature
D. is accomplished by smooth and voluntary muscle contractions and may be propulsive in nature.
E. is accomplished by smooth muscle contractions and may be propulsive in nature

3. Secretions from digestive organs include

A. enzymes
B. bile
C. mucus
D. hormones
E. all of these

4. Which is the primary absorptive organ of the digestive system?

A. salivary glands
B. oral cavity
C. stomach
D. small intestine
E. colon

5. Which statement is incorrect?

A. The myenteric plexus is located in the submucosa.
B. The intrinsic plexuses innervate smooth muscle cells and exocrine and endocrine glands.
C. The plexuses are influenced by extrinsic nerves.
D. The plexuses coordinate local digestive tract activity.
E. There are two major networks of nerve fibers forming the plexuses of the gut.

6. Which statement is incorrect?

A. In general, parasympathetic stimulation is excitatory to the digestive system.
B. Parasympathetic innervation to the digestive tract comes primarily through the vagus nerve.
C. Parasympathetic innervation is part of the extrinsic nerve supply to the digestive tract.
D. Parasympathetic stimulation of the salivary glands produces a saliva rich in mucus.
E. Parasympathetic stimulation increases salivary, gastric, pancreatic, and biliary secretion.

7. Fats are digested to

A. amino acids
B. cellulose
C. fatty acids and glycerol
D. fructose
E. monosaccharides

8. Proteins are primarily digested to and absorbed as

A. amino acids
B. polypeptides
C. fatty acids and glycerol
D. monosaccharides
E. vitamins

9. Milk sugar is digested to

A. glucose and fructose
B. glucose and galactose
C. sucrose and glucose
D. maltose
E. cellulose

10. Digestion of polysaccharides

A. is accomplished using enzymes
B. utilizes hydrolysis
C. utilizes dehydration
D. is accomplished using enzymes and utilizes hydrolysis
E. is accomplished using enzymes and utilizes dehydration

11. Which of the following organs is not a digestive tract organ?

A. esophagus
B. stomach
C. pancreas
D. small intestine
E. large intestine

12. Which tissue layer provides for primary digestive motility?

A. mucosa
B. submucosa
C. muscularis mucosae
D. muscularis externa
E. mesentery

13. The serosa is the

A. abdominal cavity containing the stomach
B. blood supply to the stomach
C. inner lining of the digestive tract
D. layer of smooth muscle of the digestive tract
E. outer connective-tissue covering of the digestive tract

14. The intrinsic nerve plexuses

A. produce spontaneous depolarization of the smooth muscle cells in the wall of the digestive tract
B. are located in the mucosa
C. coordinate local activity in the digestive tract
D. produce spontaneous depolarization of the smooth muscle cells in the wall of the digestive tract and coordinate local activity in the digestive tract
E. none of these

15. Carbohydrates are absorbed as

A. polysaccharides
B. disaccharides
C. monosaccharides
D. amino acids
E. fatty acids

16. The enteric nervous system includes

A. the myenteric plexus.
B. the submucosal plexus.
C. vagal nerve efferents.
D. the myenteric plexus and the submucosal plexus.
E. the myenteric plexus and vagal nerve efferents.

17. The BER refers to the

A. basic eating reflex ensuring that food is moved along the digestive tract at an appropriate rate.
B. basic electrical rhythm consisting of spontaneous, rhythmic, wavelike fluctuations in membrane potential.
C. basic emptying reflex, which governs the rate of gastric emptying.
D. bowel evacuation reflex or defecation reflex.
E. None of these

18. 9,500 ml of fluid is absorbed from the digestive tract daily. The ultimate source of most of this fluid is

A. food and fluid ingested during meals.
B. stored within secretory cells of the digestive tract.
C. the plasma.
D. the accessory digestive organs.
E. metabolic water.

19. Which statement regarding control of digestive processes is incorrect?

A. Short reflexes influence motility and secretion in localized areas.
B. All elements of the short reflexes are contained within the digestive organ's wall.
C. Hormones play a role.
D. Osmoreceptors monitor the acidity of the luminal contents.
E. There are stretch receptors in the walls of digestive organs.

20. Chewing increases which of the following secretions?

A. Salivary secretion
B. Gastric secretion
C. Pancreatic secretion
D. Salivary secretion and Gastric secretion
E. All of these

21. Which of the following is accomplished by chewing?

A. Grinding and breaking up food
B. Mixing food with saliva to facilitate swallowing
C. Reflexively increasing salivary and gastric secretions
D. Reflexively increasing pancreatic and bile secretions
E. All of these

22. Salivary secretion is

A. entirely under neural control (i.e., there is no hormonal control of salivary secretion).
B. a passive secretion.
C. stimulated by the parasympathetic nervous system and inhibited by the sympathetic nervous system.
D. entirely under neural control (i.e., there is no hormonal control of salivary secretion)and a passive secretion.
E. entirely under neural control (i.e., there is no hormonal control of salivary secretion)and stimulated by the parasympathetic nervous system and inhibited by the sympathetic nervous system.

23. Which of the following is not a function of saliva?

A. Facilitates swallowing
B. Serves as a solvent for molecules that stimulate taste buds
C. Dissolves glucose to facilitate its absorption by the oral mucosa
D. Has antibacterial action
E. Aids speech

24. Which of the following is not a component of saliva?

A. amylase
B. mucus
C. pepsin
D. lysozyme
E. water

25. Which statement is incorrect?

A. Salivation is entirely under neural control.
B. Parasympathetic stimulation and sympathetic stimulation both increase salivary secretion.
C. The acquired salivary reflex occurs upon stimulation of chemoreceptors and/or pressure receptors in the mouth.
D. Parasympathetic stimulation produces a watery saliva rich in enzymes.
E. The salivary center is located in the medulla.

26. Which of the following is entirely under nervous control and has *no* hormonal regulatory component?

A. salivary secretion
B. gastric secretion
C. pancreatic secretion
D. liver secretion
E. none of these (all have a hormonal regulatory component)

27. Swallowing

A. includes the movement of the bolus from the mouth to the stomach
B. includes only the movement of the bolus from the mouth to the esophagus
C. is a sequentially programmed, multiple response, all-or-none reflex
D. includes the movement of the bolus from the mouth to the stomach and is a sequentially programmed, multiple response, all-or-none reflex
E. includes only the movement of the bolus from the mouth to the esophagus and is a sequentially programmed, multiple response, all-or-none reflex

28. The swallowing center is located in the

A. cerebral cortex
B. medulla
C. hypothalamus
D. throat
E. spinal cord

29. During the oropharyngeal phase of swallowing, food is prevented from

A. reentering the mouth by elevation of the uvula
B. entering the nasal passages by closure of the nasopharyngeal sphincter
C. entering the trachea primarily by the epiglottis blocking the opening between the vocal cords
D. reentering the mouth by elevation of the uvula and entering the trachea primarily by the epiglottis blocking the opening between the vocal cords
E. none of these

30. The pharyngoesophageal sphincter is normally closed to prevent

A. air from entering the esophagus during breathing
B. gastric contents from refluxing back into the esophagus
C. vomiting
D. esophageal secretions from leaking into the stomach
E. food from entering the pharynx

31. What prevents food from entering the nasal passages during swallowing?

A. elevation of the uvula
B. contraction of the pharyngeal muscles
C. positioning of the tongue
D. tight apposition of the vocal cords over the glottis
E. elevation of the epiglottis over the nasopharynx

32. What helps prevent food from entering the trachea during swallowing?

A. elevation of the uvula
B. contraction of the pharyngeal muscles
C. positioning of the tongue
D. tight apposition of the vocal cords over the glottis
E. elevation of the epiglottis over the pharyngoesophageal sphincter

33. Secondary peristaltic waves in the esophagus

A. occur when a large or sticky bolus becomes stuck in the esophagus
B. are coordinated by the swallowing center
C. are coordinated by extrinsic nerve signals
D. occur when a large or sticky bolus becomes stuck in the esophagus, and are coordinated by the swallowing center
E. occur when a large or sticky bolus becomes stuck in the esophagus, and are coordinated by extrinsic nerve signals

34. If peristalsis in the esophagus is insufficient to carry an especially large bolus of food through the esophagus to the stomach, what happens to dislodge this trapped food?

A. A secondary peristaltic wave is initiated by the swallowing center.
B. A secondary peristaltic wave is initiated by distention of the esophagus, mediated by the intrinsic nerve plexuses.
C. The food remains in the esophagus until the swallowing mechanism is voluntarily initiated once again.
D. Increased esophageal mucus secretion occurs to lubricate the stuck bolus so that it can slide to the stomach.
E. Food never becomes stuck in the esophagus because it is very distensible.

35. The gastroesophageal sphincter is normally closed to prevent

A. air from entering the esophagus during breathing
B. gastric contents from refluxing into the esophagus
C. vomiting
D. esophageal leaking into the stomach
E. food from entering the pharynx

36. The major chemical digestive activity occurring in the stomach is

A. digestion of starch
B. digestion of protein
C. digestion of fat
D. absorption of monosaccharides
E. digestion of vitamins

37. Receptive relaxation refers to relaxation of the

A. pharyngoesophageal sphincter during swallowing
B. pyloric sphincter when the duodenum is prepared to receive the chyme
C. external anal sphincter when the individual is receptive to the defecation reflex
D. stomach as it starts to fill, thereby allowing an increase in volume with very little increase in pressure
E. none of these

38. Which of the following factors will not influence the rate at which a meal will empty from the stomach?

A. fat in the duodenum
B. acid in the duodenum
C. caffeine in the duodenum
D. hypertonicity of the duodenal contents
E. distention of the duodenum

39. Gastric mixing

A. occurs primarily in the body of the stomach
B. occurs as a result of the stomach's contents being tumbled back and forth in the fundus because of vigorous peristaltic contractions
C. mixes the food with gastric secretions to convert it to a finely divided liquid form known as chyme
D. occurs as a result of the stomach's contents being tumbled back and forth in the fundus because of vigorous peristaltic contractions. and mixes the food with gastric secretions to convert it to a finely divided liquid form known as chime
E. All of these

40. Which of the following factors is the most potent stimulus for inhibition of gastric motility?

A. fat in the duodenum
B. acid in the duodenum
C. acid in the stomach
D. distention of the stomach
E. hypertonicity of the duodenal contents

41. The pyloric sphincter is located between the

A. esophagus and stomach
B. oral cavity and esophagus
C. large intestine and rectum
D. small intestine and large intestine
E. stomach and small intestine

42. Bile acts on

A. distention of the stomach
B. gastrin
C. carbohydrate in the stomach
D. fat in the duodenum
E. fat in the stomach

43. Peristaltic antral contractions

A. occur at a rate of 3/min
B. are responsible for emptying food into the duodenum
C. are responsible for mixing food and gastric enzymes within the antrum
D. are the result of smooth muscle contractions
E. all of these

44. Which statement regarding gastric motility and emptying is incorrect?

A. Increased fluidity allows more rapid emptying.
B. Presence of acid and fat in the stomach initiates the enterogastric reflex.
C. Increased gastric volume stimulates motility.
D. Vagal activity stimulates motility.
E. Distention of the stomach initiates short reflexes.

45. Which of the following breakfasts would remain in the stomach the longest?

A. toast, orange juice, and coffee
B. black coffee
C. fried eggs, bacon, and hash browns
D. bowl of cereal with skim milk
E. boiled egg, toast, and juice

46. Hormones acting in the small intestine include

A. secretin and cholecystokinin
B. secretin and gastrin
C. cholecystokinin and gastrin
D. all of these
E. none of these

47. During the cephalic phase of gastric secretion:

A. Thinking about, seeing, and smelling food reflexively increases gastric secretion.
B. Vagal stimulation of the gastric glands occurs.
C. Gastrin is released.
D. Chewing food reflexively increases gastric secretion.
E. All of these.

48. The chief cells of the gastric mucosa secrete

A. bicarbonate ions
B. HCl
C. pepsinogen
D. sucrase
E. trypsin

49. The parietal cells of the gastric mucosa secrete

A. HCl
B. pepsinogen
C. intrinsic factor
D. HCl and pepsinogen
E. HCl and intrinsic factor

50. Which of the following statements concerning HCl secretion by the stomach is correct?

A. HCl inactivates salivary amylase and the pancreatic enzymes.
B. HCl activates pepsinogen.
C. It establishes a low pH in the stomach.
D. Oxyntic cells are responsible for it.
E. All of these.

51. Which factor below does not slow down gastric activities?

A. enterogastric reflex
B. enterogastrones
C. secretin
D. gastrin
E. cholecystokinin

52. Stomach acid is neutralized

A. in the duodenum
B. with trypsin
C. by solutions secreted from the antrum
D. in the duodenum and with trypsin
E. none of these

53. Intrinsic factor is

A. secreted by the parietal cells in the stomach
B. necessary for absorption of vitamin B_{12}
C. abundant in pernicious anemia
D. secreted by the parietal cells in the stomach and necessary for absorption of vitamin B_{12}
E. none of these

54. Pernicious anemia can occur when:

A. The stomach has been removed.
B. The terminal ileum has been removed.
C. There is a deficiency of intrinsic factor.
D. All of these
E. The stomach has been removed and there is a deficiency of intrinsic factor.

55. Which of the following is a precursor to an enzyme that functions in the stomach?

A. pepsinogen
B. HCl
C. intrinsic factor
D. gastrin
E. mucus

56. After pepsinogen is activated, it

A. autocatalytically activates more pepsinogen
B. activates the pancreatic proteolytic enzymes in the duodenal lumen after gastric emptying has occurred
C. inhibits the pyloric gland area in a negative-feedback fashion
D. autocatalytically activates more pepsinogen and activates the pancreatic proteolytic enzymes in the duodenal lumen after gastric emptying has occurred
E. none of these

57. Inhibition of gastric secretion following a meal is accomplished by

A. the enterogastric reflex
B. inhibition of the pyloric gland area by vagal stimulation
C. a high concentration of H^+, which directly inhibits the release of gastrin
D. the enterogastric reflex and a high concentration of H^+, which directly inhibits the release of gastrin
E. all of these

58. As food leaves the stomach, gastric secretion is reduced. Which of the following factors does not contribute to this reduction?

A. fat in the duodenum
B. low gastric pH
C. distention of the duodenum
D. high concentration of acid in the stomach or duodenum
E. pepsinogen in the duodenum

59. The pyloric gland area of the stomach antrum

A. secretes gastrin
B. is inhibited when gastric pH falls too high
C. is stimulated by the presence of glucose
D. all of these
E. is inhibited when gastric pH falls too high and by the presence of glucose.

60. The pyloric gland area of the stomach antrum secretes

A. histamine
B. gastrin
C. intrinsic factor
D. histamine and gastrin
E. histamine and intrinsic factor

61. Alcohol

A. inhibits gastric secretion
B. can be absorbed more rapidly from the small intestine than from the stomach
C. inhibits gastric emptying through the enterogastric reflex
D. inhibits gastric secretion and can be absorbed more rapidly from the small intestine than from the stomach
E. all of these

62. Which statement regarding control of pancreatic secretion is correct?

A. Gastrin stimulates release of neutralization solution.
B. CCK stimulates release of enzymes.
C. Secretin stimulates release of bicarbonate.
D. All of these.
E. CCK stimulates release of enzymes, and secretin stimulates release of bicarbonate.

63. Which of the following does not occur during vomiting?

A. The diaphragm contracts.
B. The abdominal muscles contract.
C. The stomach contracts.
D. Respiration is inhibited.
E. The glottis is closed.

64. During vomiting

A. The diaphragm contracts.
B. The abdominal muscles contract.
C. The stomach contracts.
D. The diaphragm and the abdominal muscles contract.
E. The abdominal muscles and the stomach contracts.

65. Peptic ulcers

A. are usually caused by excessive neural stimulation
B. are usually caused by bacterial infection
C. compromise the mucosal barrier and stomach wall
D. are usually caused by excessive neural stimulation and by bacterial infection
E. are usually caused by bacterial infection and compromise the mucosal barrier and stomach wall

66. Cholecystokinin

A. is secreted by the endocrine portion of the pancreas
B. stimulates pancreatic enzyme secretion
C. causes contraction of the gallbladder
D. stimulates pancreatic enzyme secretion and causes contraction of the gallbladder
E. none of these

67. Chymotrypsinogen

A. is activated by enterokinase
B. once activated, is involved in protein digestion
C. is secreted by the endocrine pancreas
D. all of these
E. none of these

68. The hormone secretin is released by endocrine cells in the duodenal mucosa in response to

A. distention of the stomach
B. carbohydrate in the duodenum
C. acid in the duodenum
D. gastrin secreted by the pyloric gland area of the stomach
E. none of these

69. Which of the following substances is absorbed by the stomach?

A. glucose
B. caffeine
C. aspirin
D. amino acids
E. fatty acids

70. Which statement is incorrect?

A. Trypsinogen is secreted in an inactive form.
B. Pancreatic amylase digests carbohydrate.
C. Pancreatic lipase is responsible for triglyceride digestion.
D. Except for trypsinogen, other proteolytic enzymes are secreted in active form.
E. Trypsinogen is activated by enterokinase.

71. Which of the following is not a function of the liver?

A. metabolic processing of carbohydrates, proteins, and fats
B. secretion of proteolytic digestive enzymes
C. detoxification and/or degradation of body wastes, hormones, drugs, and foreign compounds
D. synthesis of plasma proteins essential to the clotting process
E. storage of glycogen, fats, iron, copper, and many vitamins

72. Which statement is correct?

A. The most potent stimulus for secretin secretion is the presence of fat in the duodenum.
B. Secretin stimulates pancreatic enzyme secretion.
C. Secretin stimulates the secretion of bicarbonate.
D. Secretin stimulates the acinar cells.
E. None of these.

73. Which of the following is an active proteolytic enzyme?

A. pepsinogen
B. chymotrypsinogen
C. procarboxypeptidase
D. secretin
E. none of these

74. Bile salts

A. aid fat digestion
B. aid fat absorption through micelle formation
C. are made in the gall bladder
D. aid fat digestion and absorption through micelle formation
E. all of these

75. Which of the following stimulates gallbladder contraction?

A. CCK
B. secretin
C. sympathetic stimulation
D. CCK and secretin
E. CCK and sympathetic stimulation

76. Select the incorrect statement about the pancreas.

A. It has endocrine tissue.
B. It has exocrine tissue.
C. It secretes an alkaline fluid.
D. It secretes pepsinogen.
E. It secretes trypsinogen.

77. Which of the following are functions of aqueous $NaHCO_3$ secreted by the pancreas into the duodenum?

A. neutralization of acidic gastric contents emptied into the duodenum
B. prevention of irritation of the duodenal mucosa
C. active digestion of fat molecules into fatty acids
D. neutralization of acidic gastric contents emptied into the duodenum, and prevention of irritation of the duodenal mucosa
E. none of these

78. Which of the following is the most important stimulus for contraction of the gallbladder?

A. CCK
B. mechanical contraction of the small intestine
C. sympathetic stimulation
D. an increase in bile secretion by the liver
E. bile salts

79. Venous flow into the liver is via the

A. hepatic vein
B. hepatic portal system
C. sinusoidal system
D. mesenteric system
E. none of these

80. The typical coloration of the feces is due to

A. bile salts
B. undigested cellulose
C. aqueous $NaHCO_3$ secretion
D. modified bilirubin
E. disintegrated epithelial cells

81. The formation of a lipid emulsion

A. facilitates digestion of fat by lipase
B. is accomplished by bile salts
C. takes place in the stomach
D. all of these
E. facilitates digestion of fat by lipase and is accomplished by bile salts

82. Which of the following enters the duodenum?

A. pancreatic secretions
B. bile
C. gastrin
D. pancreatic secretions and Bile
E. all of these

83. The small intestinal digestive enzymes

A. are secreted into the lumen, where they perform their function
B. act intracellularly within the brush borders
C. complete the digestion of carbohydrates
D. complete the digestion of carbohydrates, and are secreted into the lumen, where they perform their function
E. act intracellularly within the brush borders and complete the digestion of carbohydrates

84. ____ do(es) not enter the duodenal lumen.

A. Trypsinogen
B. Bile salts
C. Disaccharidases
D. Gastric contents
E. Amylase

85. The primary factor responsible for moving the chyme forward in the small intestine is

A. mass movement
B. migrating motility complex
C. a gradient in the frequency of segmentation along the length of the small intestine
D. sequential ring-like contractions that move progressively forward along the length of the small intestine in a stripping motion, pushing the chyme ahead of the contraction
E. stimulation of the intestinal smooth muscle by enterokinase

86. Segmentation

A. is the primary motility in the small intestine during digestion of a meal
B. is both mixing and propulsive
C. refers to sequential ring-like contractions that sweep downward, creating a stripping motion that pushes the chyme forward
D. is the primary motility in the small intestine during digestion of a meal, and is both mixing and propulsive
E. all of these

87. Epithelial cells are continually being shed from the villi because

A. The intracellular enzymes digest important cellular constituents, causing the cells to disintegrate and slough.
B. The body needs a continual supply of protein derived from the digestion of these cells.
C. New cells are produced continually in the crypts at the base of the villi and then they migrate upward.
D. Acid entering the small intestine from the stomach constantly destroys the small intestinal lining, causing the cells to slough.
E. None of these.

88. Which of the following is not secreted into the duodenal lumen?

A. aminopeptidase
B. jipase
C. trypsinogen
D. procarboxypeptidase
E. amylase

89. Which control mechanism brings about segmentation of the terminal portion of the small intestine?

A. gastroileal reflex
B. distention of the stomach
C. secretin action
D. gastroileal reflex and distention of the stomach
E. none of these

90. Where is digestion completed?

A. stomach
B. small intestine lumen
C. on the brush borders of the small intestine epithelial cells
D. colon
E. rectum

91. Which statement is correct?

A. Carbohydrate is absorbed by active transport in the small intestine and enters the blood.
B. Fat is absorbed by active transport in the small intestine and enters the lymph.
C. Protein is absorbed primarily by pinocytosis.
D. The water-soluble vitamins are carried in the micelles, which are water-soluble.
E. Chylomicrons dissolve in the lipid portion of the plasma membrane to enable fat to enter the intestinal cell from the lumen.

92. Which of the following is absorbed by receptor mediated endocytosis in the terminal ileum?

A. fatty acids and monoglycerides
B. bile
C. Vitamin B_{12}
D. amino acids
E. all of these

93. Absorption of which of the following is linked to active sodium absorption at the basolateral border of the epithelial cell?

A. water
B. glucose
C. galactose
D. amino acids
E. all of these

94. Which of the following does not directly enter the blood upon being absorbed from the digestive tract?

A. glucose
B. monoglycerides and free fatty acids
C. amino acids
D. alcohol
E. Vitamin B_{12}

95. The primary site of absorption in the digestive system is the

A. stomach
B. small intestine
C. colon
D. esophagus
E. mouth

96. How long does it take for an epithelial cell to migrate from the base of the villi to the tip?

A. three hours
B. three days
C. one day
D. three months
E. several weeks

97. Which of the following correctly describes carbohydrate absorption by intestinal cells?

A. The absorbable units of carbohydrate are monosaccharides.
B. Fructose is absorbed by facilitated diffusion.
C. Glucose is absorbed by Na^+ and energy-dependent secondary active transport.
D. Carbohydrates are absorbed into the blood.
E. All of these.

98. Which of the following substances is a product from the chemical breakdown of starch?

A. amino acids
B. glucose
C. monoglycerides
D. bile salts
E. fatty acids

99. The enzyme that breaks down table sugar is

A. maltase
B. lactase
C. sucrase
D. enterokinase
E. peptidase

100. Which is not a brush border enzyme?

A. enterokinase
B. aminopeptidase
C. lipase
D. lactase
E. maltase

101. Lactose intolerance

A. is caused by lack of a specific disaccharidase
B. is caused by lack of lactose
C. results in bacterial metabolism of lactose
D. is caused by lack of a specific disaccharidase and by lack of lactose
E. is caused by lack of a specific disaccharidase and results in bacterial metabolism of lactose.

102. Chylomicrons are

A. aggregations of triglycerides formed within intestinal epithelial cells and covered with a layer of lipoprotein, which renders them water-soluble
B. aggregations of bile salts, monoglycerides, and free fatty acids
C. small fat globules held apart by the action of bile salts
D. secreted in the succus entericus
E. digested by bacteria in the colon

103. Of the fluid entering the small intestine, ____ percent is reabsorbed.

A. 100
B. 95
C. 85
D. 50
E. < 50 percent

104. The intestinal feature responsible for increasing the absorptive surface area the most are

A. circular folds
B. villi
C. microvilli
D. crypts
E. none of these

105. Lipids

A. are broken down by pepsin
B. are absorbed into lacteals
C. become part of micelles in the duodenum
D. are broken down by pepsin and are absorbed into lacteals
E. are absorbed into lacteals and become part of micelles in the duodenum

106. Fat soluble vitamins

A. are digested by lipases
B. are actively absorbed
C. are absorbed in micelles
D. are absorbed through the digestive tract
E. are passively absorbed with anions

107. Which statement is incorrect?

A. Absorption of salt and water converts the colonic contents into fecal material.
B. Colonic bacteria digest cellulose for their own growth and reproduction.
C. When mass movements of the colon propel feces into the rectum, stimulation of the stretch receptors in the rectal wall reflexively causes contraction of the internal and external anal sphincters to prevent defecation from occurring until an opportune time.
D. No digestive enzymes are secreted by the colon.
E. Haustral contractions in the colon are a type of mixing motility.

108. Which statement is correct?

A. The colon has as much absorptive capacity as the small intestine.
B. The final stages of carbohydrate and protein digestion occur in the colon.
C. Colonic movements are slower than movements in the small intestine.
D. The colon has as much absorptive capacity as the small intestine, and colonic movements are slower than movements in the small intestine
E. all of these

109. Select the terminal portion of the colon.

A. ascending
B. descending
C. pyloric
D. sigmoid
E. transverse

110. The defecation reflex

A. is initiated when mass movements force fecal material into the rectum, stimulating stretch receptors in the rectal wall
B. involves relaxation of the internal anal sphincter
C. involves contraction of the sigmoid colon and rectum
D. can be overridden by voluntary contraction of the external anal sphincter
E. all of these

111. Which of the following structures secrete mucus?

A. salivary glands
B. esophagus
C. stomach
D. colon
E. all of these

112. Distention of the stomach

A. triggers the gastrocolic reflex
B. encourages motility in the intestines
C. results in salivation
D. triggers the gastrocolic reflex and encourages motility in the intestines
E. encourages motility in the intestines and results in salivation

113. Which of the following is not a side effect of constipation?

A. headache
B. nausea
C. gradual buildup of toxins
D. lack of appetite
E. all of these

114. The symptoms of constipation are due to

A. inhibition of gastric emptying
B. absorption of toxins of bacterial origin from the colon
C. prolonged distention of the large intestine by the fecal mass
D. exhaustion due to frequent straining movements in an effort to initiate the defecation reflex
E. accumulation of large amounts of fluid in the colon

115. The major metabolic waste product eliminated in the feces is bilirubin.

TRUE

116. The outer muscle layer of the digestive tract consists of circular smooth muscle.

FALSE

117. The ultimate source of the fluids secreted into the digestive tract is the plasma.

TRUE

118. The large intestine consists of the duodenum, jejunum, and ileum.

FALSE

119. The function of mixing movements is to promote digestion and facilitate absorption.

TRUE

120. The contents of the digestive tract are technically outside of the body.

TRUE

121. The main sympathetic nerve supply to the digestive tract is the vagus.

FALSE

122. In general, sympathetic stimulation is excitatory to digestive activity.

FALSE

123. The myenteric plexus is a nerve network located in the submucosa.

FALSE

124. The intrinsic nerve plexuses innervate smooth muscle and exocrine gland cells but do not influence endocrine gland cells within the digestive system.

FALSE

125. Slow-wave potentials are always accompanied by contractile activity.

FALSE

126. Stimulation of the taste buds increases gastric secretions.

TRUE

127. The only function of chewing is to break food up into smaller pieces and soften it by mixing it with saliva to facilitate swallowing.

FALSE

128. Deglutition refers to the process of chewing.

FALSE

129. After the food has been chewed and mixed with salivary secretion, it is referred to as chyme.

FALSE

130. Protein digestion is initiated by salivary amylase.

FALSE

131. Sympathetic stimulation inhibits salivary secretion.

FALSE

132. There is continuous salivary secretion due to constant low-level stimulation by the parasympathetic nerve endings within the salivary glands.

TRUE

133. Parasympathetic and sympathetic stimulation both increase salivary secretion, contrary to the usual antagonistic activity of these two components of the autonomic nervous system.

TRUE

134. Parasympathetic stimulation of the salivary glands produces a large volume of watery saliva high in enzyme concentration.

TRUE

135. The epiglottis opens the glottis during the swallowing reflex.

FALSE

136. Swallowing propels a bolus of food from the mouth through the pharynx and esophagus into the stomach via a complex, sequential, multiple-response reflex.

TRUE

137. The swallowing center does not initiate and coordinate secondary peristaltic waves.

TRUE

138. The pharyngoesophageal sphincter is normally closed and its main function is to prevent esophageal secretions from entering the pharynx during breathing.

FALSE

139. Respiration is inhibited throughout the entire time that swallowing is taking place.

FALSE

140. Salivary amylase and the pancreatic enzymes are inactivated by acid.

TRUE

141. The stomach mucosa is thrown into folds known as villi.

FALSE

142. The most important function of the stomach is to begin protein digestion.

FALSE

143. Peristaltic waves occur continuously in the stomach at a rate of three contractions per minute, keeping pace with the BER.

FALSE

144. Gastric secretion does not begin until the arrival of food in the stomach.

FALSE

145. Chyme is produced in the stomach.

TRUE

146. Gastric mixing takes place primarily in the antrum of the stomach.

TRUE

147. The rate of gastric emptying depends entirely on the volume and fluidity of gastric contents.

FALSE

148. The enterogastric reflex promotes gastric emptying.

FALSE

149. The rate of gastric emptying is influenced by factors both in the stomach and in the duodenum.

TRUE

150. The primary factor governing the rate of gastric emptying is the volume of the gastric contents.

FALSE

151. Factors in the duodenum influence the rate of gastric emptying.

TRUE

152. The presence of protein in the stomach stimulates the release of histamine, which in turn promotes HCl and pepsinogen secretion.

FALSE

153. Gastric secretion occurs only when food is present in the stomach.

FALSE

154. Enterogastrones are produced by the stomach.

FALSE

155. Gastrin is not secreted during the cephalic phase of gastric secretion.

FALSE

156. HCl activates pepsinogen.

TRUE

157. The parietal cells secrete both pepsinogen and intrinsic factor.

FALSE

158. Intrinsic factor is necessary for the absorption of vitamin B_{12}.

TRUE

159. H^+ ions are actively secreted against a large concentration gradient into the stomach; Cl^- secretion follows passively.

FALSE

160. As the gastric pH falls very low, the pyloric gland area is inhibited.

TRUE

161. The process of digestion starts as food enters the stomach.

FALSE

162. Vomiting is caused by reverse peristalsis.

FALSE

163. Pepsin formation in the stomach is autocatalytic.

TRUE

164. Alcohol can be absorbed by the stomach mucosa more quickly than by the small intestine mucosa.

FALSE

165. Vomiting is initiated by stimulation of chemoreceptors in the medulla.

FALSE

166. The enterogastric reflex and enterogastrones inhibit gastric motility but stimulate gastric secretion.

FALSE

167. The pancreas is the primary site of digestive enzyme production.

TRUE

168. Glucagon is produced by the liver.

FALSE

169. All the pancreatic enzymes are secreted in inactive form.

FALSE

170. The pancreas secretes enzymes involved in the digestion of all three categories of foodstuff.

TRUE

171. Chymotrypsinogen is activated by enterokinase.

FALSE

172. The principal clinical manifestation of pancreatic exocrine insufficiency is incomplete protein digestion resulting from the deficiency of the powerful pancreatic proteolytic enzymes.

FALSE

173. The liver receives venous blood coming directly from the digestive tract and arterial blood coming from the aorta.

TRUE

174. In cirrhosis, damaged hepatocytes are permanently replaced by an overgrowth of connective tissue.

TRUE

175. Glycogen is made and stored in the liver.

TRUE

176. Bile is secreted continuously by the gallbladder.

FALSE

177. Bile is secreted by the liver and is stored in the gallbladder.

TRUE

178. Bile salts are important in fat digestion and absorption.

TRUE

179. Bilirubin aids fat digestion and absorption.

FALSE

180. CCK causes relaxation of the sphincter of Oddi.

TRUE

181. Bile salts are derivatives of cholesterol.

TRUE

182. The primary factor responsible for forward propulsion of chyme through the small intestine is mass movements.

FALSE

183. The ileocecal juncture serves as a barrier to prevent bacteria-laden contents of the large intestine from contaminating the small intestine.

TRUE

184. Excessive small intestinal motility can lead to constipation because there is less time for absorption to take place.

FALSE

185. The main motility seen in the small intestine during digestion of a meal is the migrating motility complex.

FALSE

186. The main function of the ileocecal valve/sphincter is to prevent small intestinal contents from entering the large intestine before digestion of food is completed.

FALSE

187. The small intestinal epithelium actively secretes digestive enzymes into the intestinal lumen.

FALSE

188. Digestive enzymes produced by the small intestine are not secreted into the lumen.

TRUE

189. Microvilli establish a brush border in the small intestine.

TRUE

190. Migration of a new intestinal epithelial cell from the crypt at the base of the villus to the tip of the villus requires about three weeks.

FALSE

191. Protein digestion begins in the stomach under the influence of pepsinogen; it continues in the duodenal lumen under the influence of pancreatic proteolytic enzymes; and it is completed intracellularly in the small intestinal brush border.

TRUE

192. Most of the fluid presented to the small intestine for absorption has been ingested in the most recent meal.

FALSE

193. Amino acids and glucose are both absorbed by secondary active transport by the small intestinal epithelial cells.

TRUE

194. Fat is absorbed into the lymph in the form of micelles.

FALSE

195. Sodium can be absorbed both actively and passively.

TRUE

196. Lipase breaks down proteins via hydrolysis.

FALSE

197. Chylomicrons are aggregates of bile salts, monoglycerides, and free fatty acids.

FALSE

198. Considerable vitamin absorption occurs passively in the stomach.

FALSE

199. Haustral contractions propel the feces one-third to three-quarters the length of the colon in a few seconds.

FALSE

200. Colonic secretion contains no digestive enzymes.

TRUE

201. Humans are not capable of digesting cellulose, but some of the enteric bacteria have this capability.

TRUE

202. Most of the digestive secretions do not remain in the fecal material.

TRUE

203. The primary absorption of nutrients, water, and electrolytes takes place in the large intestine, converting chyme to fecal material.

FALSE

204. During defecation, the internal anal sphincter relaxes.

TRUE

205. Defecation is a spinal reflex.

TRUE

206. Receptive relaxation refers to the voluntary relaxation of the external anal sphincter when the individual is receptive to the defecation reflex.

FALSE

207. Upon arrival of a new meal in the stomach, the gastrocolic reflex pushes the colonic contents into the rectum, triggering the defecation reflex to eliminate the remains of a preceding meal.

TRUE

208. Symptoms associated with constipation are attributable to toxins absorbed from the retained fecal material.

FALSE

209. **Complete each of the following statments.**

The four basic digestive processes are _____, _____, _____, and _____.

motility, secretion, digestion, absorption

210. **Complete each of the following statments.**

In general, the parasympathetic nervous system is _____ (excitatory or inhibitory) to the digestive tract, whereas the sympathetic nervous system is _____.

excitatory, inhibitory

211. **Complete each of the following statments.**

The _____ is the layer that lines the inside surface of the digestive tract.

mucosa

212. **Complete each of the following statments.**

The _____ is a common passageway for both the digestive and respiratory systems.

pharynx

213. **Complete each of the following statments.**

The primary wave of peristalsis in the esophagus is initiated by the _____. If this primary wave fails to push the bolus to the stomach, a secondary peristaltic wave is initiated by the _____.

swallowing center, intrinsic nerve plexus

214. **Complete each of the following statments.**

The parotid glands are one of three pairs of _____ glands.

salivary

215. **Complete each of the following statments.**

Gastric storage takes place in the _____ (what part?) of the stomach, whereas gastric mixing takes place in the _____.

body, antrum

216. **Complete each of the following statments.**

The most potent stimulus for inhibiting gastric motility and emptying is _____ in the _____ lumen.

fat, duodenal

217. **Complete each of the following statments.**

The three gastrointestinal hormones that function as enterogastrones are _____, _____, and _____.

secretin, cholecystokinin, gastric inhibitory peptide

218. **Complete each of the following statments.**

The most potent stimulus for gastrin release is _____. Gastrin, in turn, is a powerful stimulus for _____ in the stomach. The PGA is directly inhibited from releasing gastrin by _____.

protein in the stomach, hydrochloric acid and pepsinogen secretion, high hydrogen-ion concentration

219. **Complete each of the following statments.**

The presence of _____ in the stomach is the main stimulus to enhance gastric secretion.

protein

220. **Complete each of the following statments.**

Carbohydrate digestion takes place in the _____ (what part?) of the stomach under the influence of _____ (what enzyme?), whereas protein digestion takes place in the _____ under the influence of _____.

body, salivary amylase, antrum, pepsin

221. **Complete each of the following statments.**

A(n) _____ ulcer is an erosion of the stomach wall.

peptic

222. **Complete each of the following statments.**

The pancreatic _____ secretion neutralizes acidic gastric contents in the duodenal lumen.

alkaline

223. **Complete each of the following statments.**

Secretin stimulates the pancreatic _____ cells to secrete _____, whereas CCK stimulates the pancreatic _____ cells to secrete _____.

duct, alkaline fluid, acinar, enzymes

224. **Complete each of the following statments.**

The islets of _____ are the endocrine cells of the pancreas.

Langerhans

225. **Complete each of the following statments.**

When worn-out red blood cells are destroyed and the hemoglobin is degraded to a yellow pigment known as _____, which is excreted into the bile.

bilirubin

226. **Complete each of the following statments.**

Excessive accumulation of bilirubin in the body produces the condition of _____.

jaundice

227. **Complete each of the following statments.**

_____ cells are the resident macrophages of the liver.

Kupffer

228. **Complete each of the following statments.**

The primary mixing and propulsive motility of the small intestine is _____.

segmentation

229. **Complete each of the following statments.**

A(n) _____ is an aggregation of bile salts and lecithin.

micelle

230. **Complete each of the following statments.**

The three modifications of the small intestine mucosa that greatly increase the surface area available for absorption are _____, _____, and _____.

circular folds, villi, microvilli

231. **Complete each of the following statments.**

The _____ is the shortest part of the small intestine.

duodenum

232. **Complete each of the following statments.**

The extent of absorption of the electrolytes _____ and _____ is regulated depending on the body's needs.

iron, calcium

233. **Complete each of the following statments.**

_____ contractions are responsible for mixing the colonic contents, whereas _____ periodically propel the contents long distances.

Haustral, mass movements

234. **Complete each of the following statments.**

Colonic secretion consists of a(n) _____ solution.

alkaline mucus

235. **Complete each of the following statments.**

_____ are the microscopic projections of the absorptive cells of the small intestine.

Microvilli

236. **Complete each of the following statments.**

Chylomicrons are large, coated droplets of _____.

fat