

19. Fad diets are unhealthy because they involve eating only a limited variety of foods. Therefore you are completely cutting out carbohydrates, fats or proteins from your diet. You need all of these nutrients to perform different jobs in a healthy body.
20. Diagram
21. Sequence of organs that food passes through: mouth, esophagus, stomach, small intestine, large intestine and anus.
22. a. The liver represents the bank.
b. Glucagon represents the withdrawal slip.

Chapter 9 Review Questions

1. a. lysosome
2. a. Mechanical digestion begins in the mouth and ends in the stomach, while chemical digestion begins in the mouth and ends in the small intestine.
3. c. hydrolysis.
4. c. rhythmic muscular contractions that assists with the movement of food
5. d. hemoglobin.
6. a. bile
7. d. an emulsifier.
8. a. Proteases have active sites that only proteins can fit.
9. a. bile
10. d. Structure W - detoxifies blood by removing and metabolizing alcohol
11. c. cholecystokinin
12. b. proteins.
13. c. X and Y
14. a. W
15. c. structure Y.
16. a. structure T.
17. b. increasing the temperature to 40°C
18. b. the mouth and the small intestine.
19. b. pancreas
20. c. pH = 8
21. c. maltose
22. b. the products would not form at all
23. c. nuclease and nucleic acid at pH 8.0
24. b. fatty acid by diffusion in the small intestine
25. b. pepsin
26. c. small intestine
27. d. pancreatic juices
28. b. B
29. c. hydrochloric acid.
30. d. sodium bicarbonate.
31. c. C
32. c. Absorption of glucose from the small intestine.
33. c. Only Person X has diabetes.
34. a. 0 h to 1 h
35. c. homeostatic mechanisms.
36. a. insulin
37. d. (glycogen)
38. d. Person X does not have the insulin receptors on tissue cells that function properly.
39. b. the use of ex vivo gene therapy
40. d. the alpha cells of the pancreas release glucagon into the blood
41. d. stomach cells have receptors on the cell membrane that bind to gastrin
42. b. B
43. c. II and III only
44. a. I and II only
45. a. the sequence of DNA nitrogenous bases.
46. a. 3
b. 5
c. 7
d. 7
e. 4
f. 2
g. 2
h. 1
i. 7
j. 10
k. 9
l. 4
m. 7
n. 9
o. 1
p. 6
q. 8
r. 2
s. 9
t. 1
- 47.

Secretion	Site of Production	Function
Bile	Liver	Emulsify fats
Hydrochloric Acid	Stomach	Promotes digestion of protein; kills bacteria
Digestive Enzymes	Mouth, stomach, small intestine, pancreas	breaks macromolecules down into subunits
Sodium Bicarbonate	Pancreas and small intestine	Neutralizes acid chyme

48. The advantage is food can be regurgitated (vomiting) when you are sick or have ingested something harmful.
49. It has a protective layer of mucus that prevents the hydrochloric acid from digesting itself.
50. The advantage is food can be regurgitated (vomiting) when you are sick or have ingested something harmful

51. The muscular stomach wall can move the food along and physically churn it so that food mixes with the gastric juices breaking it down into small pieces. The hydrochloric acid and pepsin content of the stomach help digest the food chemically.
52. Structurally, the small intestine is smaller in diameter, but much longer than the large intestine. Functionally, the small intestine's job is to digest the food, breaking the macromolecules down into monomers. The small intestine absorbs nutrients, while the large intestine absorbs water, salts and vitamins.
53. Starch is first broken down in the mouth by salivary amylase into maltose. Starch is again digested in the small intestine where it is broken down into maltose by pancreatic amylase. Maltose is then hydrolyzed into glucose by the enzyme maltase.
54. The concentration of glycerol, fatty acids, amino acids and sugars increases as they enter the blood capillaries of the villi.
55. The stomach produces gastrin which causes the stomach to churn and secrete gastric juices. The gastric glands produce gastric juice containing pepsinogen, hydrochloric acid and mucus. In the presence of HCl, pepsinogen is converted to pepsin. Pepsin is then used to digest proteins.
56. If sodium bicarbonate was not present in the duodenum, the acid chyme from the stomach would damage the lining of the small intestine because would be there to neutralize the acid chyme.
57. a. Diagram
 b. The villus is found in the small intestine.
 c. The function of the villus is to absorb glycerol and fatty acids.
 d. The villus is made up of many folds and ridges. This increases the surface area to promote absorption of fats.
 e. If the liver was not functioning properly, the absorption of fats would decrease because fats would not be emulsified due to the absence of bile.
58. Pancreatic juice consists of sodium bicarbonate, pancreatic amylase, lipase, peptidase, nuclease, and trypsin. The function of sodium bicarbonate is to neutralize the acid chyme that enters the small intestine from the stomach. Pancreatic amylase breaks starch down into maltose. Lipase breaks fats down into glycerol and fatty acids. Peptidase breaks peptides down into amino acids. Nuclease breaks down nucleic acids into nucleotides. Trypsin breaks proteins down into peptides.
59. Drawing
60. [CentreCIRCLE] Similarities between pepsin and trypsin: proteases; digestive enzymes; involved in hydrolysis; breaks proteins down into peptides. Differences between pepsin and trypsin: [LEFT CIRCLE Pepsin] produced by the stomach; secreted in the stomach; has an optimum pH of 2. [RIGHT CIRCLE Trypsin] produced by the pancreas; secreted in the small intestine; has an optimum pH of 8.5].

61. Graph

62.

	Insulin	Glucagon
Type of Molecule	Hormone	Hormone
Secreted By	Beta cells in the pancreas	Alpha cells in the pancreas
Secreted in response to	High blood glucose levels	Low blood glucose levels
Function	To lower the blood glucose levels	To increase the blood glucose levels

63. a. blood glucose level drops below normal: blood glucose level drops below normal → alpha cells of the pancreas secrete glucagon → stimulates the release of glycogen in the liver and muscle → glycogen is converted to glucose → blood glucose rises to normal level
- b. blood glucose levels rises above normal: blood glucose level rises above normal → beta cells of the pancreas secrete insulin → stimulates glucose uptake by cells and glycogen formation → glucose is converted to glycogen in the liver → blood glucose falls to normal range

64.

Hormone	What stimulates the release of the hormone?	Where is it produced?	Where does it act?	What does it do?
Gastrin	Protein	Stomach	Gastric glands of the Stomach	Stimulates gastric glands to secrete gastric juices
Secretin	Hydrochloric acid in acid chyme	Duodenum (small intestine)	Pancreas Liver Gallbladder	Stimulates the pancreas to secrete pancreatic juices; stimulates liver to produce bile; stimulates gall bladder to release bile

Cholecystokinin (CCK)	Partially digested protein and fat	Duodenum (small intestine)	Pancreas Liver Gallbladder	Stimulates the pancreas to secrete pancreatic juices; stimulates liver to produce bile; stimulates gall bladder to release bile
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65. a. 3
b. 8
c. 6
d. 7
e. 5
f. 1
g. 2
h. 4

66. Concept Map

67. Test Tube 1: control; no digestion will take place because no enzyme is present; Test Tube 2: no digestion will take place because pepsin is not in an acidic conditions; Test Tube 3: no digestion will take place; denaturation of the egg white will occur; Test Tube 4: digestion of the egg white into peptides will occur because pepsin is in an acidic environment provided by the hydrochloric acid. Only test tube 4 containing pepsin, HCl, and water should result in the breakdown of the egg white. The other tubes lack a necessary component of this reaction mix.

68. X = maltase; Y = peptidase; Z = lipase

69. pH = 8.5

70. Reaction X involves maltase; maltose (substrate) → glucose (product) + glucose (product); Reaction Y involves peptidase; peptide (substrate) → amino acid (product) + amino acid (product); Reaction Z involves lipase: triglyceride (substrate) → glycerol (product) + 3 fatty acids (product)

71. maltase

72. maltose → glucose + glucose

73. You would expect side A to have glucose present and side B to just have water present.

74. You would use Benedict Solution to do the test.

75. The traditional diet will allow Aboriginal people to be healthier. With low carbohydrate diets, they can control their blood glucose levels and therefore regulate their diabetes.

76.

Food	Calories	Resting	Running	Swimming
French fries (large serving)	400	400 calories + 2000 calories / day × 24 h/day = 4.8 hr	4.8 h + 10 MET = 0.48 h or 29min	4.8 h + 7 MET = 0.69 h or 41 min
Pepperoni pizza (2 slices)	460	460 calories + 2000 calories / day × 24 h/day = 5.52 hr	5.52 h + 10 MET = 0.552 h or 33 min	5.52 h + 7 MET = 0.78 h or 47 min
Vanilla Milkshake	350	350 calories + 2000 calories / day × 24 h/day = 4.2 hr	4.2 h + 10 MET = 0.42 h or 25.2 min	4.2 h + 7 MET = 0.6 h or 36 min

77. a. By reducing the size of the stomach in gastric stapling (restrictive) surgery, this prevents the person from eating large quantities of food. This will then lead to weight loss.

b. With the smaller stomach, a person would feel full after a small meal. In addition to this, by bypassing the upper portion of the stomach, less food and nutrients will be absorbed.

Chapter 10 Diagnostic Questions

- b. blood vessels, blood, and the heart.
- a. water.
- d. the hemoglobin molecule in the red blood cells.
- a. the heme group
- d. oxygen molecules, carbon dioxide molecules and hydrogen ions.
- b. away from the heart.
- b. side streets.
- a. veins.
- d. capillaries.
- a. clot blood.
- a. atria.
- c. oxygen-rich blood.
- d. lungs.
- c. left ventricle.
- a. aorta.
- d. right atrium.
- d. 4 chambers.
- c. septum.
- c. the pulmonary circuit and the systemic circuit.
- b. the umbilical cord
- d. the placenta.
- c. They are both vascular systems.
- d. white blood cells
- a. liver