

K

## Digestive System Review

Indicate whether the following phrases are **true** or **false**. If **false** then **correct** the phrase.

1. Disaccharides such as maltose, lactose, and sucrose are formed by bonding two glucose molecules together by *dehydration synthesis*. T
2. The most common type of lipid is composed of two structural units; a glycerol molecule and three fatty acids joined by *dehydration synthesis*. T
3. A qualitative test for proteins involves the use of *Benedict's reagent*. F  
Buret reagent
4. Monosaccharides can be detected in food by means of *Benedict's reagent*.  
T
5. The breakdown or emulsification of fats by bile salts is an example of *physical* digestion.  
T
6. Animals store carbohydrates in the form of *fat*. F glycogen
7. Fats are emulsified by bile when food passes through the *liver*. F duodenum
8. A(n) *stethoscope* can be used to look inside the body for diagnosis of ulcers and early detection of colon cancer. F Endoscope
9. When a person chews gum, saliva is produced as a result of *hormonal* stimulation of the salivary glands. F Neural Nervous system.

Circle the **correct** answer for the following multiple choice questions.

1. Which of the following atoms is not found in carbohydrates?

A. carbon  
B. hydrogen  
C. oxygen  
D. nitrogen

2. Which of the following sugars is **not** a monosaccharide?

A. fructose  
B. galactose  
C. glucose  
D. lactose

3. When two monosaccharides are bonded to form a disaccharide, what else is produced?

- A. water
- B. carbon dioxide
- C. ATP
- D. carbon monoxide

4. Which of these is **not** true of lipids? Lipids

- A. store energy
- B. aid in the absorption of minerals
- C. aid in the absorption of vitamins
- D. act as a raw material for synthesis of hormones

5. Many people prefer a margarine that spreads like butter. What chemical process is used commercially to make the plant lipids more solid?

- A. dehydration synthesis
- B. hydrogenation
- C. dehydrogenation
- D. freezing

6. The dietary nutrient that has been linked with heart disease when consumed in excess is the

- A. carbohydrate.
- B. lipid.
- C. protein.
- D. vitamin.

7. Which of the following has been directly linked to atherosclerosis?

- A. low-density lipoprotein (LDL)
- B. high-density-lipoprotein (HDL)
- C. trans fats
- D. polyunsaturated lipids

8. What chemical reagent is commonly used to test for the presence of lipids?

- A. Lugol's
- B. Benedict's
- C. Biuret
- D. brown paper

9. Which of the following is not found in digestive fluids in the stomach?

- A. amylase
- B. hydrochloric acid
- C. pepsin
- D. mucus

10. Which of the following is **not** a function of the liver?

- A. production of bile salts
- B. manufacture of blood proteins from amino acids
- C. neutralization of the acids released by the stomach
- D. glucose conversion into glycogen and vice versa

11. When patients have their gall bladders removed, they should initially be placed on a diet that is low in which of the following?

- A. carbohydrates
- B. lipids
- C. proteins
- D. vitamins

12. What is the role of the bicarbonate ion in the digestive process?

- A. to stimulate the release of gastric juices
- B. to initiate the digestion of starches
- C. to lower the pH of material entering the small intestine from the stomach
- D. to raise the pH of material entering the small intestine from the stomach

13. When digested, which of the following substances would yield a mixture of amino acids?

- A. carbohydrate
- B. lipid
- C. protein
- D. vitamin

14. When starch is broken down during digestion, which of the following is the product?

- A. cellulose
- B. maltose
- C. glycogen
- D. sucrose

15. What fatty acids and glycerol chemically combine, what is produced?

- A. a triglyceride and water
- B. a saturated fat
- C. cholesterol
- D. a phospholipid

16. From the following list, which is an example of a monosaccharide?

- A. glycogen
- B. fructose
- C. maltose
- D. sucrose

17. When two amino acid molecules are bonded together and a water molecule is removed, the reaction is called which of the following?

- A. dehydration synthesis
- B. hydrogenation
- C. hydrolysis
- D. oxidation-reduction

18. There are four elements that make up all amino acids. Two of these are carbon and hydrogen. The other two are

- A. sulfur and nitrogen
- B. sulfur and oxygen
- C. nitrogen and oxygen
- D. phosphorus and nitrogen

19. What reagent is commonly used to test for the presence of monosaccharides?

- A. Lugol's
- B. Benedict's
- C. Biuret
- D. Sudan IV

20. Which of the following statements is **not** a function of saliva?

- A. It lubricates the food passage.
- B. It contains the enzyme amylase.
- C. It helps grind and tear food.
- D. It dissolves food particles.

21. Starch digestion in the mouth occurs best when the pH range is

- A. 2.0-3.0
- B. 3.0-5.0
- C. approximately 7.0
- D. 8.0-10.0

22. The pH of the stomach usually ranges

- A. between 2.0 and 3.0
- B. between 3.0 and 5.0
- C. approximately 7.0
- D. between 9.0 and 10.0

23. Which of the following is **not** a function of the large intestine?

- A. absorption of water
- B. absorption of glucose
- C. absorption of vitamins and minerals
- D. temporary storage of wastes

Fill in the blank.

1. Plant oils are often treated by a process known as hydrogenation to make them more solid in the production of margarine. As a result, unsaturated lipids are converted into more harmful trans fats.
2. The lipid that has been linked to heart disease but is necessary for the production of some hormones is cholesterol.
3. Once food enters the mouth, the action of the tongue and teeth form it into a mass called a bolus.
4. After being swallowed, the bolus is carried along the digestive tract by a process known as peristalsis.
5. Inactive pepsinogen is converted into active pepsin by hydrochloric acid.

6. Jaundice is the result of the collection of excess bile pigments in the skin and is often used to detect diseases of the liver.
7. Of the twenty amino acids that make up proteins the body is not able to make eight of these. The amino acids that must be obtained from the diet are known as essential amino acids.
8. The small intestine is lined with small projections called villi which increase the surface area for absorption.
9. The activities of the digestive organs are controlled by hormones, such as gastrin and cholecystokinin.

### Matching

A variety of nutrients are needed in a healthy diet. **Match** each of the dietary materials with one of its functions. No item is repeated.

- |    |                |    |              |
|----|----------------|----|--------------|
| A. | sugar          | D. | lipid        |
| B. | polysaccharide | E. | nucleic acid |
| C. | protein        | F. | water        |

- |          |    |  |
|----------|----|--|
| <b>B</b> | 1. | storage of energy in the liver               |
| <b>F</b> | 2. | solvent for chemical reactions               |
| <b>D</b> | 3. | structural component of the cell membrane    |
| <b>A</b> | 4. | primary source of energy                     |
| <b>E</b> | 5. | regulates cell activity                      |
| <b>C</b> | 6. | raw material for production of some hormones |

Many important biological compounds are formed from smaller molecules. **Match** the components with the larger molecules they make up.

- |    |  |
|----|--|
| A. | glucose + glucose                          |
| B. | glucose + galactose                        |
| C. | glucose + fructose                         |
| D. | glycerol + 3 fatty acids                   |
| E. | amino acids                                |
| F. | glycerol + phosphate group + 2 fatty acids |
| G. | many linked glucose molecules              |

- |          |    |              |
|----------|----|--------------|
| <b>D</b> | 1. | triglyceride |
| <b>B</b> | 2. | lactose      |
| <b>F</b> | 3. | phospholipid |
| <b>A</b> | 4. | maltose      |
| <b>C</b> | 5. | sucrose      |
| <b>G</b> | 6. | cellulose    |
| <b>E</b> | 7. | protein      |

Match the structures below with their functions as part of the digestive system.

- |    |                 |    |                 |
|----|-----------------|----|-----------------|
| A. | large intestine | D. | liver           |
| B. | stomach         | E. | mouth           |
| C. | pancreas        | F. | small intestine |

- D 1. production of bile to break down fats  
F 2. absorption of most nutrients  
A 3. absorption of water and storage of undigested food  
E 4. starch digestion begins here  
C 5. release bicarbonate ions to neutralize acid  
B 6. protein digestion begins here and absorption of some drugs and alcohol

### Written Response

1. A recent popular diet suggested that eliminating fats from the diet while eating unlimited carbohydrates would result in weight loss. Briefly explain why such a diet would not result in weight loss and may even lead to weight gain.

- Not work - carbs get used for energy then are stored as glycogen - excess carbohydrates get stored in body as lipids.

2. Cholesterol is necessary for health but also can be a cause of health problems. Explain how it can be both good and bad, with specific examples of both.

good - raw material used by cell to make some hormones e) testosterone, estrogen  
- part of cell membrane  
Bad - block blood vessels, ↑ blood pressure, ↓ blood flow, cause heart attacks + stroke

3. You have been given a sample to analyze for the presence of a monosaccharide. The sample may have been contaminated with a toxic substance, so tasting the sample is not a possibility. Describe the method that you would use to detect a monosaccharide and the result that would indicate the presence of such a sugar.

- Add 1ml Benedict's to 3ml of sample  
- Heat in water bath  
- colour change from blue to yellow/orange is positive

4. Explain why the movement of food or liquids along the digestive tract continues whether you are standing up, lying down, or hanging upside down.

- peristalsis

5. Explain the importance of cellulose in the human diet.

- cannot be digested  
- adds "bulk"  
- moves food along & cleaning intestines out

6. Describe the differences between saturated and unsaturated fats. How do saturated fats affect cholesterol levels?

Saturated  
- single bonds  
- solid at room temp.  
- could cause increase in LDL (bad cholest.)

unsaturated  
- double bond  
- generally liquid at room temp.

7. It is known that excessive consumption of alcohol can remove the mucus lining from the stomach. What is the role of the mucus and what medical problem could result if this mucus is removed too often?

- mucus protects the stomach lining from digestive enzymes and hydrochloric acid  
- stomach ulcers may result.