Sports Nutrition for Health Professionals 3rd edition Muth Test Bank

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Chapter 1: Carbohydrates

Multiple Choice

1. Which type of monosaccharide do body cells use for energy?
A. Fructose
B. Glucose
C. Galactose
D. Lactose

ANS: B
Rationale: Lactose is a disaccharide, and fructose and galactose must be converted to glucose for the cells to use for energy.

DIF: 1
OBJ: 1-1
KEY: monosaccharide | glucose | energy sources

2. In what form does the body store carbohydrates?
A. Glycogen
B. Fat
C. Cellulite
D. Amylopectin

ANS: A
Rationale: The body stores carbohydrates as glycogen in the liver and muscles.

DIF: 1
OBJ: 1-1 | 1-4
KEY: glycogen | carbohydrate storage

3. Which of the following is a naturally occurring, plant-based, noncaloric sweetener?
A. Stevia
B. Sorbitol
C. Saccharin
D. Neotame

ANS: A
Rationale: The stevia plant produces a noncaloric, all-natural sweetener.

DIF: 1
OBJ: 1-1
KEY: stevia | noncaloric sweeteners

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4. Which type of carbohydrate is structurally composed of a chain of 3 to 10 simple sugars?
A. Amylose
B. Galactose
C. Amylopectin
D. Oligosaccharide

ANS: D
Rationale: Oligosaccharides are chains of 3 to 10 monosaccharides. Amylose and amylopectin are examples of polysaccharide starches, and galactose is a monosaccharide.

DIF: 1
OBJ: 1-2
KEY: oligosaccharide

5. Which type of starch is easily digested?
A. Amylose
B. Amylopectin
C. Cellulose
D. Glycogen

ANS: B
Rationale: Amylose is resistant to digestion. Cellulose is a basically indigestible fiber, and glycogen is not a form of starch.

DIF: 1
OBJ: 1-2
KEY: starch | carbohydrate structure

6. What deficiency will cause the painful gastrointestinal symptoms associated with lactose intolerance?
A. Alpha-dextrinase deficiency
B. Pancreatic amylase deficiency
C. Lactase deficiency
D. Trehalase deficiency

ANS: C
Rationale: The enzyme lactase is responsible for breaking lactose into its component parts. The inability to break down lactose results in painful gastrointestinal symptoms like abdominal cramps, bloating, diarrhea, and flatulence.

DIF: 2
OBJ: 1-4
KEY: lactose intolerance | carbohydrate digestion

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7. Approximately how many grams of glycogen can the body store for energy use?
A. 90 to 100 g
B. 150 to 300 g
C. 340 to 710 g
D. 800 to 900 g

ANS: C
Rationale: The body can store approximately 340 to 710 grams of glycogen (90 to 110 g in the liver and 250 to 600 g in the muscles). Any additional glucose not needed for normal body activity is converted to fat for storage.

DIF: 2
OBJ: 1-4
KEY: glycogen | carbohydrate storage

8. What organ produces the enzymes responsible for maintaining blood sugar levels within normal limits?
A. Pancreas
B. Liver
C. Gallbladder
D. Small intestine

ANS: A
Rationale: Insulin and glucagon, the hormones responsible for regulating blood sugar, are produced in the pancreas.

DIF: 2
OBJ: 1-5
KEY: blood sugar

9. According to acceptable macronutrient distribution ranges (AMDRs), how many grams of carbohydrate should an athlete on a 3,000-calorie diet consume daily?
A. 130 to 200 g/day
B. 225 to 325 g/day
C. 338 to 488 g/day
D. 500 to 650 g/day

ANS: C
Rationale: AMDR is 45% to 65% of calories from carbohydrates. For an individual consuming a 3,000-calorie diet, that is 1,350 to 1,950 calories. Carbohydrates carry 4 calories per gram.

DIF: 3
OBJ: 1-5
KEY: recommended intake | AMDR | acceptable macronutrient distribution range

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10. What is the glycemic load (GL) of a small orange (15 grams carbohydrate [CHO]) with a glycemic index (GI) of 40?
A. 2.2
B. 4.5
C. 6.0
D. 8.3

ANS: C
Rationale: GL = (GI × g CHO)/100; GL = (40 × 15 g CHO)/100; GL = 6.0

DIF: 3
OBJ: 1-6
KEY: glycemic load

11. What is the best way for an athlete to spare protein and avoid gluconeogenesis?
A. Limit glycogen stores.
B. Consume water only during training sessions in excess of 45 minutes in duration.
C. Consume high amounts of fiber on training days.
D. Consume adequate carbohydrates to fuel performance.

ANS: D
Rationale: Gluconeogenesis occurs when there is limited glucose or glycogen available as an energy source.

DIF: 2
OBJ: 1-8
KEY: gluconeogenesis

12. What type of bond joins monosaccharides together to form disaccharides, oligosaccharides, and polysaccharides?
A. Glycosidic bond
B. Glucogenic bond
C. Carbon double bond
D. Glycerol bond

ANS: A
Rationale: Glycosidic bonds connect monosaccharides together to form the other types of carbohydrate chains.

DIF: 1
OBJ: 1-1
KEY: glycosidic bond

13. Which of the following is a benefit attributed to fructooligosaccharides that are found naturally in some fruits and vegetables and are commercially produced as reduced-calorie sweeteners?

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A. Increased triglyceride levels
B. Relief of constipation
C. Decreased glycogen storage
D. Increased amino acid production

ANS: B
Rationale: Fructooligosaccharide use has been associated with constipation relief, improved triglyceride levels, and decreased production of foul-smelling digestive by-products.

DIF: 2
OBJ: 1-1
KEY: fructooligosaccharides

14. Which enzyme begins the process of carbohydrate digestion?
A. Pancreatic amylase
B. Insulin
C. Salivary amylase
D. Glucagon

ANS: C
Rationale: Digestion of carbohydrates begins in the mouth when salivary amylase breaks large polysaccharides into oligosaccharides and disaccharides.

DIF: 1
OBJ: 1-4
KEY: salivary amylase | carbohydrate digestion

15. What substance is released by the pancreas into the duodenum to create a more alkaline environment to allow the digestive enzymes to perform their assigned functions in carbohydrate digestion?
A. Insulin
B. Glucagon
C. Pancreatic amylase
D. Bicarbonate

ANS: D
Rationale: Bicarbonate results in a more alkaline environment, so digestive enzymes can function in the acidity of the materials moving into the small intestine from the stomach.

DIF: 2
OBJ: 1-4
KEY: bicarbonate | carbohydrate digestion

Multiple Response

16. Which of the following statements describes what happens after digested sugars are delivered to the liver through the portal system? *Select all that apply.*
A. Fructose and galactose are converted to glucose.
B. Glucose is converted to glycogen and stored in the pancreas for later use.
C. Glucose enters the bloodstream based on body needs.
D. Glucose is converted to fat based on body needs.

ANS: A, C, D
Rationale: Sugars may be converted to glycogen, but glycogen is stored in the muscles and liver, not the pancreas.

DIF: 3
OBJ: 1-4
KEY: portal system | glycogen | carbohydrate absorption

17. Which of the following are considered health benefits associated with high-viscosity fiber consumption? *Select all that apply.*
A. Increased feeling of fullness
B. Decreased fat absorption
C. Decreased cholesterol levels
D. Decreased insulin resistance

ANS: A, B, C, D
Rationale: High-viscosity, or soluble, fiber typically slows gastric emptying, which contributes to feelings of fullness and better regulation of blood sugar levels. In addition, it interferes with fat and cholesterol absorption and recirculation. This fiber is also linked in improving cells' sensitivity to insulin, therefore decreasing insulin resistance and type 2 diabetes risk.

DIF: 3
OBJ: 1-7
KEY: high-viscosity fiber | soluble fiber

True/False

18. All types of carbohydrates provide 4 calories per gram.

ANS: False
Rationale: Most carbohydrates provide 4 calories per gram; however, dietary fiber contributes approximately 1.5 to 2.5 calories per gram.

DIF: 1
OBJ: 1-1
KEY: calorie

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19. Research indicates that consuming foods with a lower glycemic load may offer significant health benefits, including weight control and decreased risk of diabetes and heart disease.

ANS: True
Rationale: Significant health benefits are associated with consuming foods that have a low glycemic load because of their nutrient density and the stability they provide to blood sugar and insulin levels.

DIF: 1
OBJ: 1-6
KEY: glycemic load

20. The average American exceeds the daily recommendations for fiber intake.

ANS: False
Rationale: Americans consume far less than the recommended fiber intake of 14 grams per 1,000 calories, or 25 to 35 grams per day.

DIF: 1
OBJ: 1-7
KEY: fiber

Completion

21. Place the steps of carbohydrate digestion in order (1 to 10).
_____ 1. Enzyme action is inhibited due to acidic environment, and bolus is converted to chyme.
_____ 2. Chyme passes into the duodenum, and pancreatic enzymes help to break glycosidic bonds.
_____ 3. Salivary amylase begins to break polysaccharides into oligosaccharides and disaccharides.
_____ 4. Bolus moves into the stomach.
_____ 5. Brush border enzymes break carbohydrates into monosaccharides, and absorption occurs into the microvilli.
_____ 6. Undigested carbohydrates move into the large intestine.
_____ 7. Chyme passes into the jejunum and ileum.
_____ 8. Some fiber is partially digested by bacteria through fermentation, and the remaining fiber is excreted.
_____ 9. Monosaccharides absorbed into the bloodstream pass through portal circulation for distribution or storage.
_____ 10. Bolus passes through the esophagus.

ANS: 3, 10, 4, 1, 2, 5, 7, 9, 6, 8
DIF: 3
OBJ: 1-4
KEY: carbohydrate digestion

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Short Answer

22. Describe the manner in which insulin and glucagon regulate blood sugar levels.

ANS: When blood sugar levels begin to rise, insulin aids in the uptake of glucose and conversion of carbohydrates into fat for long-term storage. Glucagon is released when blood sugar levels decrease; it increases blood sugar levels by regulating the breakdown of glycogen into glucose and the conversion of fat into fuel to maintain blood glucose levels while conserving glycogen.

DIF: 3
OBJ: 1-5
KEY: insulin | glucagon

23. Why is glycemic load a more accurate representation of the impact of a particular food on blood sugar response than glycemic index?

ANS: Glycemic load accounts for portion size, whereas glycemic index only measures the impact of a food on blood sugar levels compared with a reference amount of 50 grams of carbohydrate. Foods can have a high glycemic index but a small typical portion size and therefore a low glycemic load. In addition, very few foods are composed solely of carbohydrates. The fat, protein, and fiber in a food also lowers the glycemic load.

DIF: 2
OBJ: 1-6
KEY: glycemic load | glycemic index

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