

## EoC Answers for Majors Nutrition Class Test website

### Chapter 4 Answers

1.     **b.** the potential of foods to raise blood glucose and insulin levels.
2.     **d.** carbon, hydrogen, and oxygen.
3.     **d.** sweetened soft drinks.
4.     **a.** monosaccharides.
5.     **a.** phenylketonuria.
6.     False. Sugar alcohols are considered nutritive sweeteners because they contain 2 to 4 kcal of energy per gram.
7.     True.
8.     False. A person with lactose intolerance has a difficult time tolerating milk and other dairy products. This person does not have an allergy to milk, as he or she does not exhibit an immune response indicative of an allergy. Instead, this person does not digest lactose completely, which causes intestinal distress and symptoms such as gas, bloating, diarrhea, and nausea.
9.     False. Plants store glucose as starch.
10.    False. Salivary amylase breaks starches into maltose and shorter polysaccharides.

#### **11. Describe the role of insulin in regulating blood glucose levels.**

Insulin is a hormone secreted by the by the beta cells of the pancreas in response to increased blood levels of glucose. When we eat a meal, our blood glucose level rises. But glucose in our blood cannot help the nerves, muscles, and other tissues function unless it can cross into them. Glucose molecules are too large to cross the cell membranes of our tissues independently. To get in, glucose needs assistance from insulin. Insulin is transported in the blood to the cells of tissues throughout the body, where it stimulates special molecules located in the cell membrane to transport glucose into the cell. Insulin can be thought of as a key that opens the gates of the cell membrane, and carries the glucose into the cell interior, where it can be used for energy. Insulin also stimulates the liver and muscles to take up glucose.

#### **12. Identify at least four ways in which fiber helps us maintain a healthy digestive system.**

- a. Fiber adds bulk to the stools, which aids in efficient excretion of feces.
- b. Fiber keeps stools moist and soft, helping to prevent hemorrhoids and constipation.
- c. Fiber gives the gut muscles something to push on, making it easier to eliminate stools. Diverticulosis can result in part from trying to eliminate small, hard stools.
- d. Fiber may bind with cancer-causing agents and speed their elimination from the colon, which could in turn reduce the risk for colon cancer.

**13. Your niece Lilly is six years old and is learning about MyPyramid in her first-grade class. She points out the “grains” group on the left side of the pyramid and proudly lists representative food choices: “crackers, pancakes, bagels, and spaghetti.” Explain to Lilly, in words she could understand, the difference between fiber-rich carbohydrates and highly processed carbohydrates, and why fiber-rich carbohydrates are more healthful food choices.**

Grain-based foods contain carbohydrates, and sometimes these foods are processed, meaning that many of the important nutrients we need for health are taken out of them. Fiber-rich carbohydrates contain not only more fiber, which is important for the health of our digestive tract, but they also contain many vitamins and minerals that we need to be healthy. The foods you listed here are examples of foods in the “grains” group that are processed. Examples of healthier fiber-rich alternative choices include whole wheat saltine crackers, whole wheat or pumpernickel bagels, brown rice, and whole wheat spaghetti.

**14. When Ben Parker (from the chapter-opening scenario) returns from his doctor’s appointment with the news that he has been diagnosed with type 2 diabetes and must lose weight, his wife looks skeptical. “I thought that diabetes runs in families,” she says. “No one in your family has diabetes, and your whole family is overweight! So how come your doctor thinks losing weight will solve your problems?” Defend the statement that obesity can trigger type 2 diabetes.**

Ben explains to his wife that his doctor told him that diabetes more commonly runs in families, but just because no one in the family has diabetes does not mean that someone cannot get it. Being overweight increases a person’s risk for this type of diabetes even if no one else in the family has it. Since Ben is overweight, he is more at risk for type 2 diabetes than he would be if was not overweight. Overweight and obesity trigger insulin insensitivity, or insulin resistance, which in turn causes the pancreas to produce greater amounts of insulin so that glucose can enter the cells and be used for energy. Eventually, type 2 diabetes develops because either 1) an increasing degree of insulin insensitivity; 2) the pancreas can no longer secrete enough insulin; or 3) the pancreas has entirely stopped producing insulin.

**15. Create a table listing molecular composition and food sources of each of the following carbohydrates: glucose, fructose, lactose, and sucrose.**

<b>Carbohydrate</b>	<b>Molecular Composition</b>	<b>Food Sources</b>
Glucose	Six carbon atoms, twelve hydrogen atoms, six oxygen atoms	Fruits, vegetables, grains, dairy products; does not generally occur alone in foods, but attaches to other sugars to form disaccharides and complex carbohydrates
Fructose	Six carbon atoms, twelve hydrogen atoms, six oxygen atoms	Fruits and some vegetables
Lactose	One glucose molecule and one galactose molecule	Milk and other dairy products

Sucrose	One glucose molecule and one fructose molecule	Honey, maple syrup, fruits, vegetables, table sugar, brown sugar, powdered sugar
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## Chapter 10 Answers

1. **d.** It is destroyed by exposure to high heat.
2. **b.** an atom loses an electron.
3. **a.** cardiovascular disease.
4. **d.** nitrates.
5. **a.** vitamin A.
6. True.
7. True.
8. False. Vitamin C helps regenerate vitamin E.
9. True.
10. False. Pregnant women should not consume beef liver very often, as it can lead to vitamin A toxicity and potentially serious birth defects.

### 11. Explain how free radicals damage cell membranes and lead to cell death.

Free radicals steal electrons from the stable lipid molecules in our cell membranes, which can destroy the integrity of the membrane, leading to membrane dysfunction and potential cell death.

### 12. Describe the process by which cancer occurs, beginning with the initial insult and ending with metastasis of the cancer to widespread body tissues.

Cancer development has three primary steps: initiation, promotion, and progression. During the initiation step, the DNA of normal cells is mutated, causing permanent changes in the cell. During the promotion step, the genetically altered cells repeatedly divide, locking the mutated DNA into each new cell's genetic instructions. During the progression step, the cancerous cells grow out of control and invade surrounding tissues. These cells then metastasize, or spread to other sites of the body.

### 13. Explain how vitamin E reduces our risk for heart disease.

There are a number of ways that vitamin E reduces our risk for heart disease. Vitamin E protects LDLs from oxidation, thus helping to reduce the build up of plaque in our blood vessel walls. Vitamin E may also help reduce low-grade inflammation. Vitamin E is known to reduce blood coagulation and the formation of blood clots, which will reduce the risk of a blood clot clogging a blood vessel and causing a stroke or heart attack.

### 14. Discuss the contribution of trace minerals such as selenium to the prevention of oxidation.

Trace minerals such as selenium, copper, iron, zinc, and manganese are part of the antioxidant enzyme systems that convert free radicals to less damaging substances that are excreted by our bodies. Selenium is part of the glutathione peroxidase enzyme

system, copper, zinc, and manganese are part of the superoxide dismutase enzyme complex, and iron is a part of the structure of catalase.

**15. Your mother has a heart condition that requires her to take the prescription drug Coumadin, an anticoagulant. While chatting with you over lunch one day, she mentions that she has started taking an antioxidant supplement that is supposed to “boost cardiovascular health.” You ask to see the supplement, and note that it contains 500 mg vitamin E as alpha-tocopherol; 500 mg of vitamin C; and 100 µg of selenium. Should you be concerned? Why or why not?**

Yes, you should be concerned. Vitamin E acts as an anticoagulant, and combined with the prescription anticoagulant Coumadin, the effects are magnified which could cause uncontrollable bleeding. This could lead to both internal bleeding and prevent the cessation of bleeding caused by a cut or other external injury. In some people, long-term use of standard vitamin E supplements may cause hemorrhaging in the brain, leading to a type of stroke called hemorrhagic stroke. It would be prudent to tell your mother about your concerns, and suggest that she stop taking the supplement until she has discussed with her health care provider the potential interactions with her medication and this supplement.