

Basic epidemiology

1. Define “overweight” and “obesity” based on the body mass index. Under what condition(s) might using the BMI be misleading?
2. Defend the statement that the U.S. is experiencing an obesity epidemic using data presented in class. What health risks are associated with obesity? What are some of the economic consequences of this problem nationally?
3. Compare and contrast Type 1 and Type 2 diabetes. What are the other names for each form of this disease? Which is the most common?
4. What are the complications usually associated with diabetes? How much has the incidence of the disease changed since 1991? Describe some of the national health care costs associated with this disease.
5. What demographic/ethnic groups are at highest risk of diabetes? Is the age of onset of Type 2 diabetes changing? If so, how?
6. What is cardiovascular disease? What are the #1 and #3 causes of death in the U.S.?
7. What’s the good news about cardiovascular disease? What’s the bad news? Be as specific as possible.
8. How are overweight/obesity, diabetes, and cardiovascular disease related?

Metabolism, nutrition, diet and health

1. From what atom are the important macromolecules of our bodies built? Where in a molecule is chemical energy found? What general chemical process requires energy? What general chemical process releases energy?
2. What are the primary functions of carbohydrates? What is the simplest form of carbohydrate? What specific simple form of carbohydrate comprises “blood sugar”?
3. What are complex sugars? Compare and contrast sucrose and high fructose corn syrup.
4. What is a complex carbohydrate? What are the three major forms of complex carbs? What is the function of each? What is the basic building block of each? Why can’t we digest cellulose?
5. What are nucleic acids? What are their basic building blocks? What are the two basic nucleic acids in our cells, and what is the general function of each?

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6. Describe the structure of fats. What is a triglyceride? Compare and contrast saturated, unsaturated, and trans fats in terms of their structure and physical properties. What is Olestra and what are its properties?
7. What are phospholipids? What are steroids? What is cholesterol, and what are some of its functions?
8. List and briefly describe the major types of proteins discussed in class. What are the basic building blocks of proteins and how many are there?
9. Describe protein structure using the hierarchical framework described in class. Describe the relationship between protein structure and protein function. Define “denaturation” and list some of the conditions that can cause it.
10. Define “metabolism”. What are enzymes? Describe how enzymes work, and explain how they regulate cellular metabolism.
11. Describe the structure of ATP and explain why it is considered “the energy currency of the cell” in terms of its energetic properties. Explain the connection(s) among food energy, ATP, ADP, and cellular metabolism, and cellular respiration.
12. In general terms, where do glucose, pyruvate, lactic acid, ethanol, and carbon dioxide “fit” in cellular respiration? How many carbons does each have?
13. Under what conditions do cells use anaerobic respiration? Describe this process, including where it takes place, the sets of reactions involved, the starting compound, the ending compound, and the approximate amount of ATP produced. Why must fermentation accompany glycolysis under anaerobic conditions? Compare and contrast lactic acid and ethanol fermentation.
14. Under what conditions do cells use aerobic respiration? Describe this process, including where it takes place, the sets of reactions involved, the starting compound, the ending compound, and the approximate amount of ATP produced. How are electrons important in this process? What is the role of oxygen?
15. All else being equal, when cells have access to oxygen, which form of respiration “should” they choose and why?
16. Is glucose the only molecule cells can use in cellular respiration? Explain your answer.

Diet, nutrition & digestion

1. Define the terms “diet”, “digestion” and “nutrition.”

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2. What are the five classes of molecules our bodies need to function properly? Describe how these molecules are categorized based on their origin and their function. What is an “essential nutrient”? What are the essential nutrients (be as specific as possible) our bodies need?
3. What is basal metabolism (basal metabolic rate)? What does it include? What does it exclude? For adult humans, what is normal BMR? Be sure to define all terms as appropriate.
4. Under what general conditions do we store energy as fat? Under what general conditions do we lose fat? Does it matter what the source of the energy is?
5. Why are carbohydrates important nutrients? Why are fats important nutrients? What is an acceptable fat composition for a healthy woman? For a healthy man? Is having too little fat ever unhealthy? Explain.
6. Why is a deficiency in any one amino acid a problem for protein synthesis? Compare and contrast complete and incomplete proteins. How do vegetarians get “complete” or complementary proteins?
7. Is protein deficiency a global problem? Is it a problem for Americans? Explain.
8. What is a vitamin? Using the table in the text, list at least 6 different functions of vitamins. How many vitamins have been identified as necessary in humans? Compare and contrast fat soluble and water soluble vitamins. Which vitamins can we synthesize (and how)? Is heavy supplementation necessary? Explain.
9. What are minerals? Can we synthesize any of the minerals we need? Compare and contrast macrominerals and trace minerals and give examples of each (use the table in the book in addition to the examples used in class). Describe the functions of sodium, potassium, and calcium. Which do we tend to consume in excess (and how do we get all that extra)? Which are we prone to be deficient in?
10. Discuss the importance of trace minerals using iron as an example. Describe its function and explain the problems caused both by iron deficiency and iron overload.
11. List and briefly describe the four stages of food processing. Describe the basic components of the human digestive system and their general functions. What does it mean when we describe the alimentary canal as “regionally differentiated”?
12. Describe the fate of a bite of hamburger (with bun) as it passes through the digestive system, beginning with the first bite and ending with elimination. Be sure to describe in detail what happens to each component of the bite as it passes through each of the structures we described in class. Also describe the structural adaptations of each

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part of the digestive system as we discussed them in class.

13. Discuss the following disorders of the digestive system: hiatal hernia, gastroesophageal reflux disease (GERD), gastric ulcer, duodenal ulcer, and any others I added in during class.
14. What are some common causes of diarrhea and constipation? Why would a course of strong antibiotics potentially result in Vitamin K deficiency?
15. Describe the 2005 dietary guidelines for Americans. How were the recommendations developed, and what are their key elements?
16. Describe the daily dietary recommendations for a 19-30 year-old woman who is moderately active. Be sure to include the total number of recommended calories and specific daily intake recommendations (don't forget serving sizes and equivalents) for each of the major food groups. For a woman who requires 2000 calories per day and who follows the dietary guidelines, how many discretionary calories should she consume? What should those calories consist of?
17. How will the eating habits of the average American change if s/he is to meet the new dietary guidelines? Provide a general statement and support it with specific details from each of the major food groups.