Unit 3 Study Guide: Exercise

1. Discuss the benefits of physical activity and the evidence that Americans are insufficiently active. Defend the statement that physical activity levels vary with demographic factors such as age, gender, ethnicity, and region using data provided in class.

2. Define the term "physical fitness" and its components according to the U.S. Department of Health and Human Services guidelines. Discuss how exercise improves physical fitness, with special attention to the components that are improved by aerobic/endurance training vs. those improved by strength/resistance training. Individually, what specific benefits do each of those types of training provide?

3. Describe the structure of a muscle, including the tissues it's made of and its hierarchical organization.

4. What stimulates muscle contraction? Define the term "motor unit" and discuss how power generation and precise control are related to motor unit structure and function (i.e., the number of muscle fibers per motor unit; the number of motor units recruited to contract).

5. What is Botox and how does it eliminate facial wrinkles?

6. Describe the energetic pathways muscles use to provide the ATP needed for contraction. Your discussion should include the role of stored ATP, creatine phosphate, anaerobic respiration, aerobic respiration, and the different types of fuel (glycogen in the muscles, glycogen delivered via the blood, fats delivered via the blood) the pathways use. Also include an approximate time frame (duration) for each. Under what conditions will muscles be limited to anaerobic respiration? Under what conditions will they switch to aerobic respiration?

7. What is muscle fatigue and under what conditions will it occur?

8. Compare and contrast slow oxidative and fast glycolytic muscle fibers in terms of their structure and energetics. Be sure to discuss the types of activities for which each is specialized. Which type of fiber/activity is "helped" by creatine phosphate supplementation? Why?

9. Describe the fiber type composition of most of our whole muscles. What determines how many of each type of fiber we have? What determines how large those fibers are?

10. Write a chronology of metabolic events that occur during a 1-hour, moderate-intensity aerobic workout. Be sure to include the types of respiration and fuel

sources involved.

11. How many calories does 1 pound of fat contain? What is the recommended approach to weight control in terms of calorie reduction and exercise? What roles do strength and aerobic training play in a program to control/reduce weight? Be as specific as possible.

12. Why is aerobic exercise important for cardiopulmonary health? What frequency and duration of aerobic exercise are currently recommended to improve/maintain cardiopulmonary health?

13. Define the term “maximum aerobic capacity” and explain its relationship to exercise intensity. At what intensity do muscles begin to switch from aerobic to anaerobic metabolism? In terms of MAC, what corresponds to “moderate to vigorous” exercise intensity?

14. If we can’t measure exercise intensity directly, what indirect measures can we use? Describe each, including how it relates to MAC, how to use it to estimate exercise intensity, and what levels correspond to “moderate to vigorous” intensity.

15. What is the overall recommendation for physical activity to improve/maintain cardiopulmonary health. Does this recommendation apply to everyone? Why or why not?