

BIO 131 PAL
Week 5 - PROBLEM SET 2

SKELETAL MUSCLE

1. The progressive paralysis of *myasthenia gravis* results from the immune system's misguided attack on certain post-synaptic receptors. Clearly explain a proposed mechanism, as well as other symptoms you would expect to find in an afflicted individual. [Hint: consider the receptors that must be affected]

2. Which neurotransmitter is secreted by somatic motor neurons? Where else is it found? How does the body know to respond appropriately?

3. Fast-glycolytic muscle fibers have few mitochondria, few capillaries, and a high glycogen content. Explain why these characteristics make sense for this type of muscle fiber.

4. Your friend Brutus is an active weightlifter, and is very proud of his bulging muscles. Which of the following statements regarding Brutus is FALSE?
 - A. His muscle hypertrophy is primarily due to an increase in the number of contractile proteins (actin and myosin) within the existing muscle fibers.
 - B. The muscle fibers that hypertrophied are mostly fast-glycolytic.
 - C. Brutus has many more muscle fibers within each muscle than he did before beginning his weight-training.
 - D. If he stopped lifting, his muscles would become smaller and weaker because of disuse atrophy.
 - E. If Brutus had taken anabolic steroids to assist him in making larger muscles, he would likely have serious reproductive, cardiovascular, and behavioral problems.

5. Let's say you want to demonstrate three different levels of contraction, so you use a similar motion to pick up a pencil, a chair, and then a 5 gallon container full of water (like they have on water coolers).

A. Describe how you would be able to adjust the force of your contraction.

B. Draw an EMG for the bicep muscle in each situation

C. If you began working out, making your bicep muscle bulkier, how would the EMGs from above change? Explain why.

6. Differentiate between an endplate potential and an action potential. For each: what brings them about, which channels/ions are involved?

7. Fill in the blanks:

The Neuromuscular Junction:

