

Muscle Questions

1. Consider muscle tension: (8)
 - a. Describe the two different mechanisms we can use to increase muscle tension.
 - b. Draw a graph that describes one of the above mechanisms.
 - c. When muscle tension does not exceed the resistance and a muscle does not change length, what type of contraction is occurring?

2. Consider energy conversion and use in a skeletal muscle cell: (7)
 - a. What molecule (call it molecule X from now on) provides the energy necessary to do work?
 - b. What two **metabolic pathways** can skeletal muscle cells use to produce molecule X?
 - c. **Where** in the cell does each pathway occur?
 - d. **How much** (lots or little) of molecule X does each pathway produce?
 - e. Which pathway(s) requires O₂?

3. Working muscles fatigue either because they **lack** something (like a car running out of gas), or because they've got **too much** of something. (3)
 - a. Tell me what **two** things muscle cells might lack.
 - b. What **one** thing they might have too much of.

4. The muscle I use to do a pull-up and the muscles I use to sneer at you are very different in size and shape. Please tell me: (8)
 - a. What muscle would I **mainly** use to squint?
 - b. How many **motor units** (qualitatively) do you expect that muscle to have?
 - c. How many **muscle fibers** (qualitatively) do you expect each motor neuron to control & **why**?
 - d. What muscle would I **mainly** use to do a pull-up?
 - e. How many **motor units** (qualitatively) do you expect that muscle to have?
 - f. How many **muscle fibers** (qualitatively) do you expect each motor neuron to control & **why**?

5. Consider a muscle contraction: (3)
 - a. What ridiculously important ion is used in both the pre-synaptic motor neuron AND the post-synaptic muscle cell when an action potential stimulates a muscle contraction?
 - b. What does the ion do in each case?