

Critical Thinking Essays Unit #4 BIOL 430

1. If you are lifting a 10lb weight, provide a physiological explanation as to why you can continue to hold the weight for a long period of time without experiencing fatigue.
2. Draw and label the three phases of a muscle twitch on a myogram.
3. Explain the steps that initiate a muscle contraction beginning with an action potential arriving at the neuromuscular junction until the muscle fiber shortens. Include all details and mechanisms covered in class.
4. Which type of skeletal muscle fibers would you expect a sprinter to have? A marathoner? Why?
5. The reactions showing creatine kinase catalyzing the creatine/creatine-phosphate reaction proceed in both directions. What then determines the direction that the reaction goes at any given moment? (Hint: think about what we discussed in the first unit on reversible reactions.)
6. When curare, a South American arrow poison, is placed on a nerve-muscle preparation, the muscle does not contract when the nerve is stimulated, even though a neurotransmitter is still being released from the nerve. Give a possible explanation for the action of curare (be sure to include specific details explaining how and why).
7. What is the response of a muscle fiber to an increase in the firing rate of a neuron at the neuromuscular junction? How does the nervous system increase the force of contraction in a muscle composed of many motor units?
8. Without ATP, relaxed muscle cannot contract and a contracted muscle cannot relax. Explain why.
9. Botulism occurs when a bacterium, *Clostridium botulinum*, releases a neurotoxin that prevents motor neurons (at neuromuscular junctions) from releasing ACh. In view of this, what early signs of botulism would you predict to observe? Explain why a person could die of suffocation.