

Lab 9: skeletal muscle physiology



**ASSIGN
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LAB 9: Skeletal Muscle Physiology Electrical Stimulation

1. Complete the following statements by filling in your answers on the appropriate lines below. A motor unit consists of a ___1___ and all the ___2___ it innervates. Whole muscle contraction is a(n) ___3___ response. A ___4___ is the response of a muscle to a single, brief threshold stimulus. When the frequency of stimulation is so high that the muscle tracing shows fused peaks, ___5___ has been achieved. ___6___ is the stimulus strength at which the first observable muscle contraction occurs. The phenomenon, called ___7___, brings more and more muscle fibers into play.

1. ___motor neuron___ 2. ___muscle fibers___ 3. ___involuntary___ 4. ___Muscle twitch___ 5. ___complete tetanus___ 6. ___threshold stimulus___ 7. ___recruitment___

KEY: A. complete tetanus B. involuntary C. motor neuron D. muscle fibers E. muscle twitch F. recruitment G. threshold stimulus H. voluntary

2. Name each phase of a typical muscle twitch, and, on the following line, describe what is happening in each phase.

a. ___Latent period___ the first moments after stimulation when excitation contraction is occurring

b. ___Period of Contraction___ the muscle shortens if the tension is great enough to overcome the load.

c. ___Period of Relaxation___ Calcium ions is pumped back into sarcoplasmic reticulum and muscle tension decreases to baseline level.

___ Isometric Contraction

3. Identify the following conditions by choosing one of the key terms listed on the right.

Key: ___Passive force___ is generated by muscle tissue when it is being stretched

a. Total force ___Active force___ is produced during muscle contraction

b. Active force ___Total force___ is measured by recording instrumentation during contraction

c. Passive force

4. Highlight the correct response in the parentheses for each statement. An increase in resting length results in a(n) (increase / decrease) in passive force. As the total

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force increased, the active force (increased / decreased). 5. Explain what happens to muscle force production at extremes of length (too short or too long). (Hint: Think about sarcomere structure and actin and myosin interactions) Muscle too short: Muscle force produced is reduced and they lose their strength as they cannot contract. Muscle too long: Muscle force production is reduced because of insufficient overlap of actin and myosin. There isn't maximal cross bridge formation. Terms 6. Select the LETTER of the condition from column B that most correctly identifies the term in column A. Column A Column B 1. Muscle twitch 2. Wave summation 3. Multiple motor unit summation 4. Resting length 5. Resistance 6. concentric isotonic contraction (shortening) 7. Eccentric isotonic contraction (lengthening) 8. Motor unit 9. tetanus A. Many cells responding to one neuron B. Affects the speed of a muscle contraction C. A single contraction of intact muscle D. Recruitment E. The addition of one twitch to another F. Muscle length changing due to relaxation G. Recording shows no evidence of muscle relaxation H. The peak tension developed is less than the resistance I. Changing muscle length due to active forces

Muscle Anatomy 7. What does this picture represent? 12. Name the indicated structures: 1. 2. band 3. Z disc 4. MITOCHONDRIA 5. MYOFIBRILS 6. SARCOPLASM 7. Endomysium 8. T tubule 9. SARCOPLASMIC RETICULUM 10. OPENINGS OF T-TUBULES 8. Name the indicated structures. A. Tendon B. Epi mysium C. Endo mysium D. MUSCLE FIBER (CELL) F. Peri mysium G. Bone H. EPIMYSIUM I. MUSCLE FIBER J. Endo mysium K. Peri mysium 9. Name the indicated structures. A.

band___ B. _A band___ C. _Thin actin___ filament D. _Thick myosin ___
filament