

# [Lab 9: skeletal muscle physiology](https://assignbuster.com/lab-9-skeletal-muscle-physiology/)

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 occuring\_\_\_ 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 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 \_\_C\_\_ 1. Muscle twitch \_E\_\_\_ 2. Wave summation \_B\_\_\_ 3. Multiple motor unit summation \_\_F\_\_ 4. Resting length \_D\_\_\_ 5. Resistance \_I\_\_\_ 6. concentric isotonic contraction (shortening) \_H\_\_\_ 7. Eccentric isotonic contraction (lengthening) \_A\_\_\_ 8. Motor unit \_G\_\_\_ 9. tetanus A. Many cells responding to one neuron B. Affects the speed of a muscle contration 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? \_Muuscle fiber\_\_\_ 12. Name the indicated structures: 1. \_nucleus\_\_\_ 2. \_I 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. \_I band\_\_\_ B. \_A band\_\_\_ C. \_Thin actin\_\_\_ filament D. \_Thick myosin \_\_\_ filament