
Introduction to Muscles

Warm Up- Monday

1. Think of one good thing that happened to you over break.
2. On the left hand side of your next open page, write a big "Unit 4".
3. Write the essential question on the top of the right page.
4. Record the warm up beneath the EQ.
5. Warm Up: List as many different functions of muscles.

Functions of Muscles

Place a checkmark to any functions you got correct, cross out any you got wrong and add to your list if you missed one.

- Produces movement: all movements are because of muscle contraction!
- Maintaining posture
- Stabilizing joints (pull on bones for movements and help strengthen joints)
- Generate heat

Special characteristics of muscles

- Excitability: receive and respond to stimulus
- Contractility: able to shorten when stimulated
- Extensibility: ability to stretch when stimulated
- Elasticity: can recoil and return to resting length

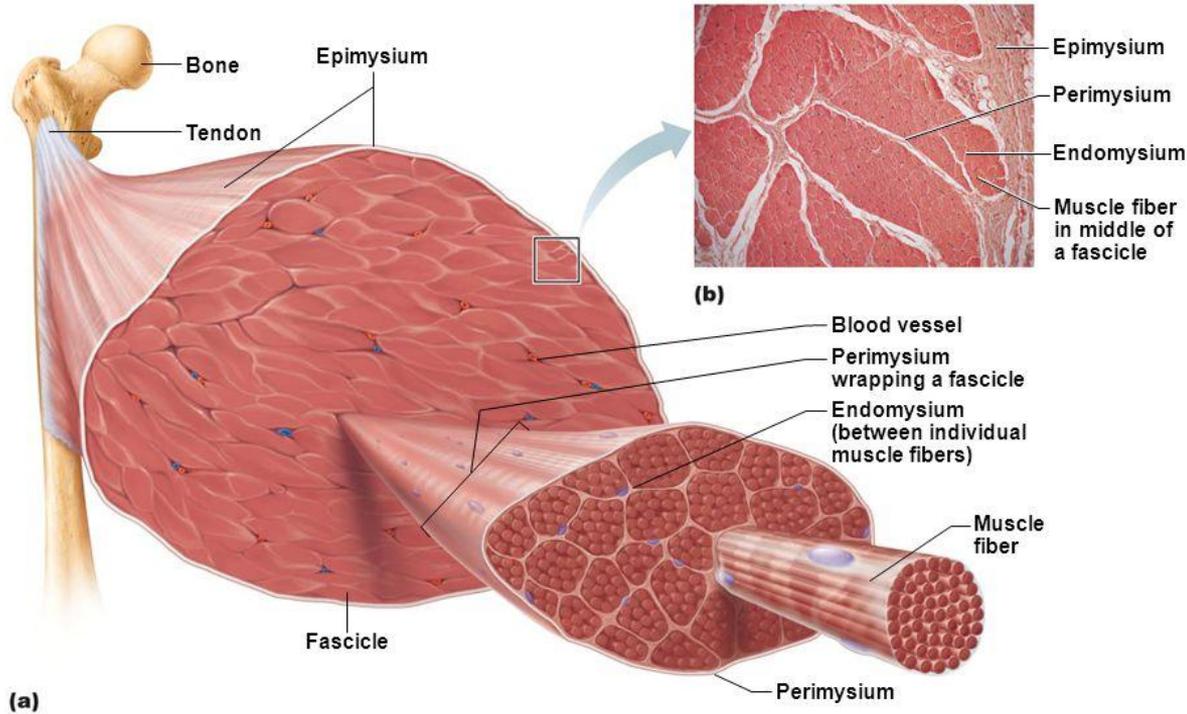
→ BRING YOUR BOOKS ON WEDNESDAY.

Warm Up- Wednesday

Decide if the following movements are controlled by voluntary or involuntary muscles.

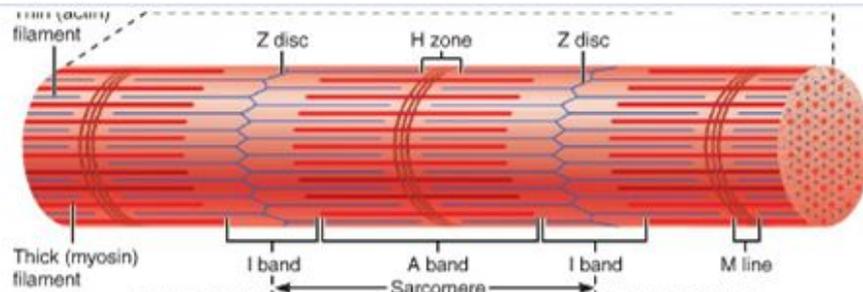
1. Raising your hand in class
2. Your heart beating
3. Blinking your eyes
4. Large intestine walls pushing food through your tract
5. Planking

Figure 9.1 Connective tissue sheaths of skeletal muscle: epimysium, perimysium, and endomysium.

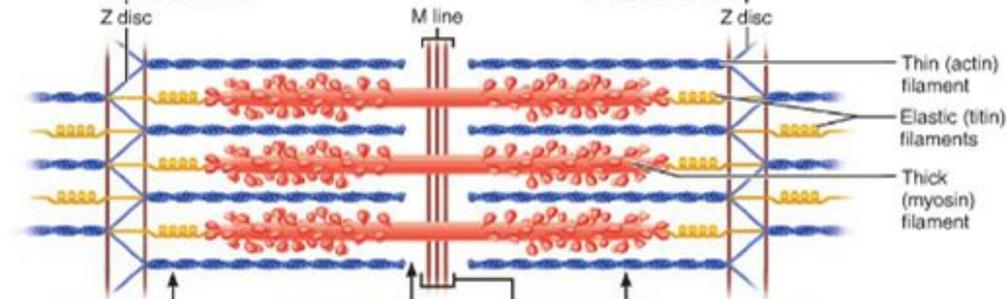


Muscle →
Fascicle → Muscle
Fiber (cell) →
Myofibril
(segment) →
Sarcomere
(contractile unit)
→ Myofilament

(c) Small part of one myofibril enlarged to show the myofilaments responsible for the banding pattern. Each sarcomere extends from one Z disc to the next.



(d) Enlargement of one sarcomere (sectioned lengthwise). Notice the myosin heads on the thick filaments.



(e) Cross-sectional view of a sarcomere cut through in different locations.

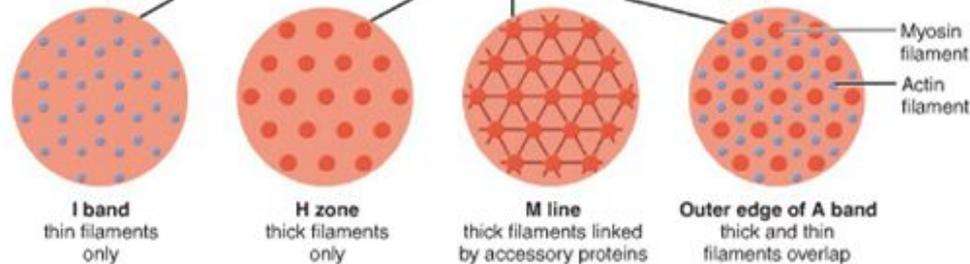
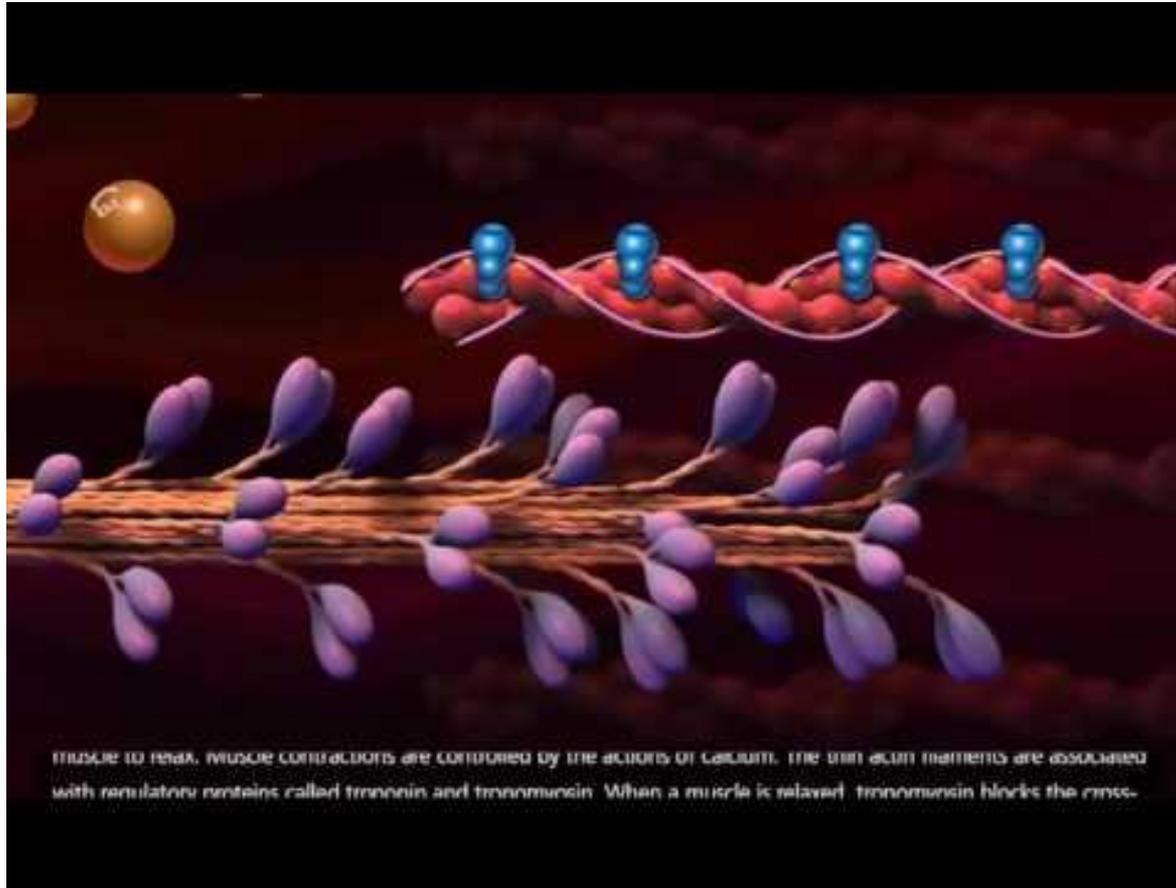


Figure 9.2 Microscopic anatomy of a skeletal muscle fiber. (See *A Brief Atlas of the Human Body*, Plate 28.)



MUSCLE TO RELAX, MUSCLE CONTRACTIONS ARE CONTROLLED BY THE ACTIONS OF CALCIUM. THE THIN ACTIN FILAMENTS ARE ASSOCIATED WITH REGULATORY PROTEINS CALLED TROPONIN AND TROPOMYOSIN. WHEN A MUSCLE IS RELAXED, TROPOMYOSIN BLOCKS THE CROSS-

Warm Up- Friday

What is calcium's role in a muscle contraction?

Warm Up- Friday

What is calcium's role in a muscle contraction?

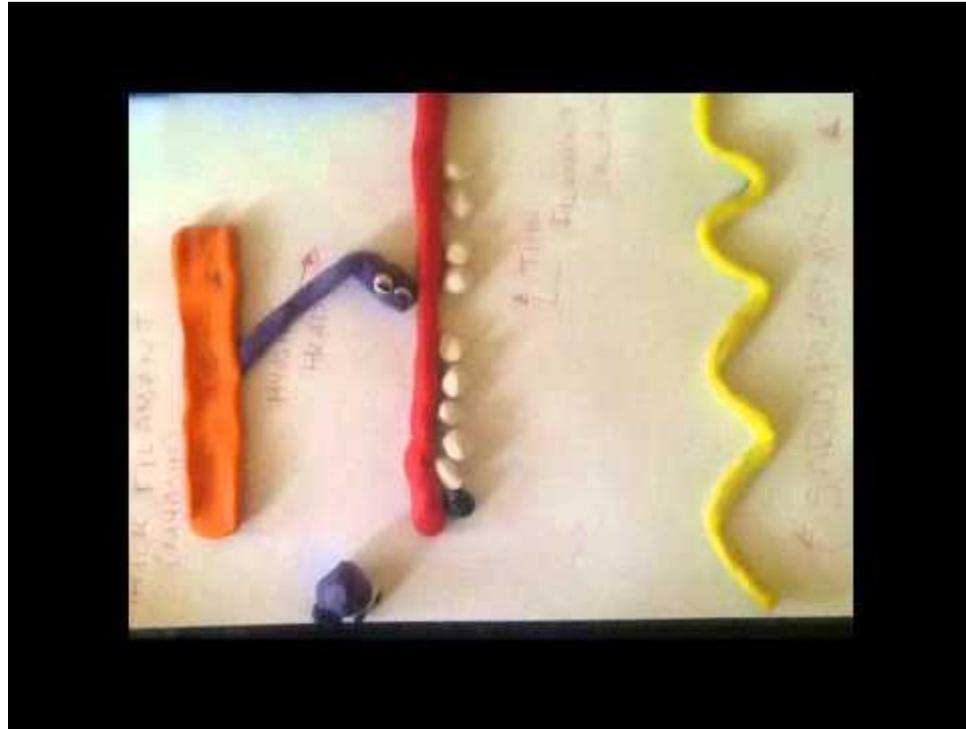
Answer: calcium makes the active site available so that myosin can bind to actin (binds to troponin, changing shape exposing active site)

Warm Up- Wednesday

Decide if the following movements are controlled by voluntary or involuntary muscles.

1. Raising your hand in class- voluntary
2. Your heart beating-involuntary
3. Blinking your eyes- involuntary
4. Large intestine walls pushing food through your tract- involuntary
5. Planking- voluntary

Good Example- Good visuals, labels and voice over explanations



Good use of visuals, and labels but no descriptions.



Good Example: Good visuals, labels & written explanations



Creating Stop Motion

- All labels and descriptions will need to be created by you
- Make sure the beginning of your stop motion is a couple of slides of your names
- Use your phones and download Stop Motion Studio or StO- MO (both are free)
- When you are finished either upload to youtube OR save to your camera and then upload it to your drive OR email it to Mrs. Beckham

Work Time Instructions: Project due Monday

1. Work through the blue handout to define vocabulary and answer the required questions.
2. Once completed decide on your method of how you want to demonstrate muscle contraction: video, stop motion or skit.
3. Information on class website contains helpful book pages, youtube videos, and tutorials on how to use the technology.
4. Make sure your final product includes labels and explanations for the process.
5. Share on google drive with Mrs. Beckham when finished.

Warm Up: Monday- welcome back!

Decide if you want option 1 or option 2:

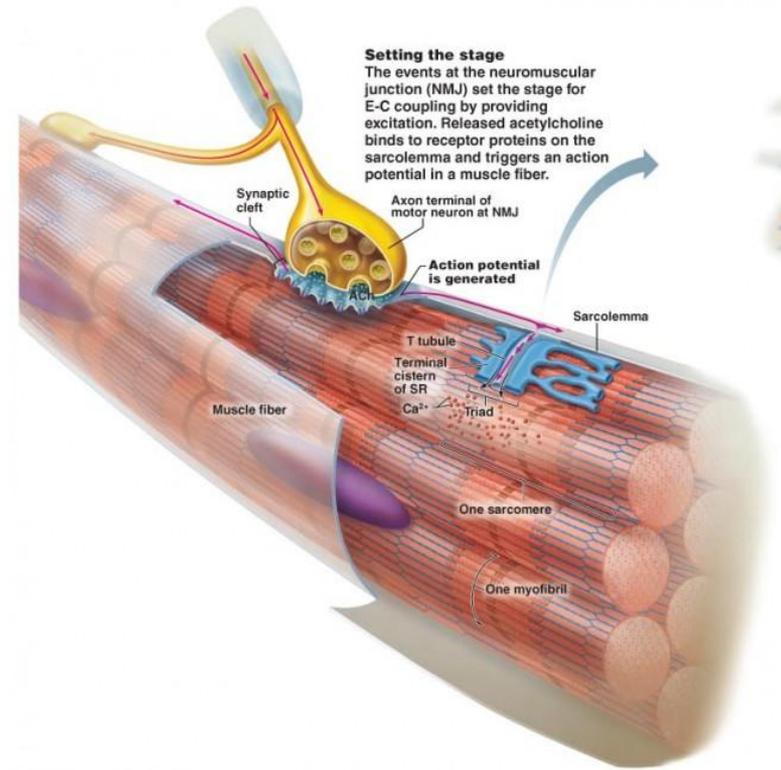
Option 1: Set a 20 minute timer- when it goes off project work time will be completed and we will take notes.

Option 2: Start with taking notes- if we finish early you will have more time to work on your project or make up work if you were absent on Friday. (If we don't finish early, we will stop lecture at the 20 minute marker.)

IF YOU WERE ABSENT FRIDAY: Make up project posted on website underneath guidelines.

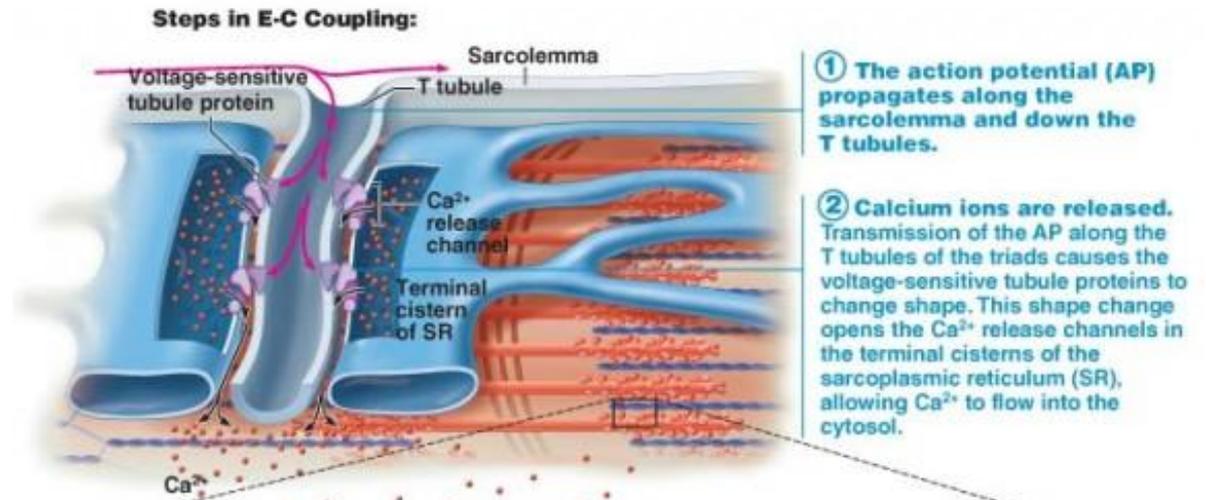
Muscle Contraction Steps

1. Nerve cells of spinal cord attach to each muscle fiber creating a neuromuscular junction
2. The nerve releases acetylcholine, a neurotransmitter

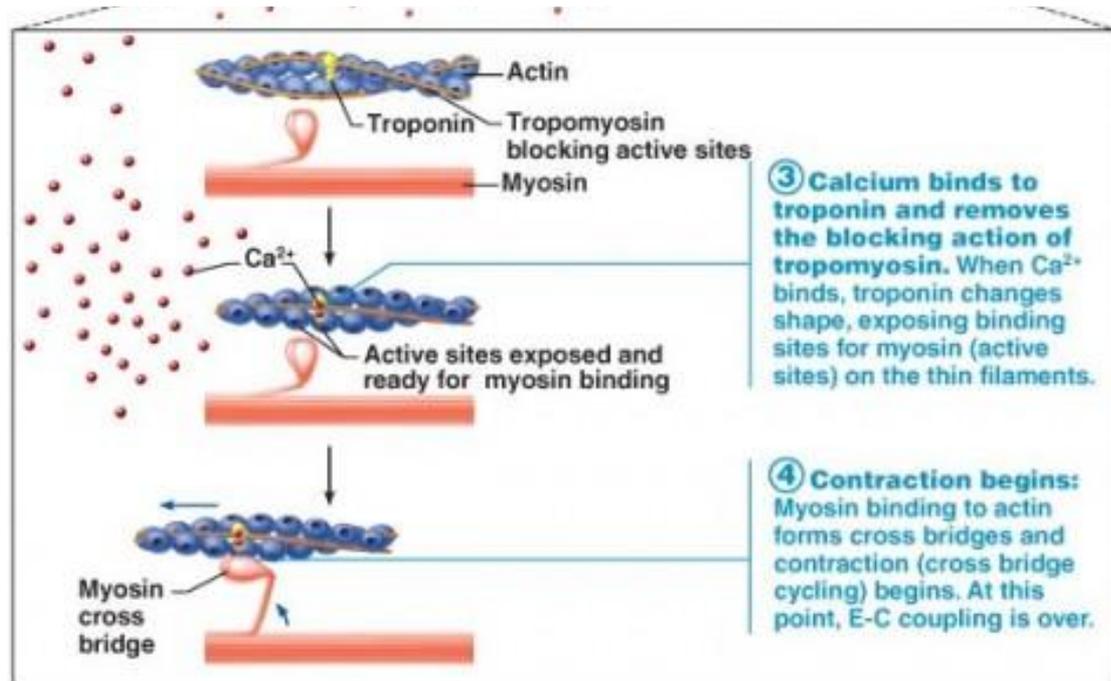


3. Acetylcholine binds to the sarcolemma and causes an action potential or electrical impulse through the muscle fiber

4. The action potential causes the T tubules in the sarcoplasmic reticulum releases calcium

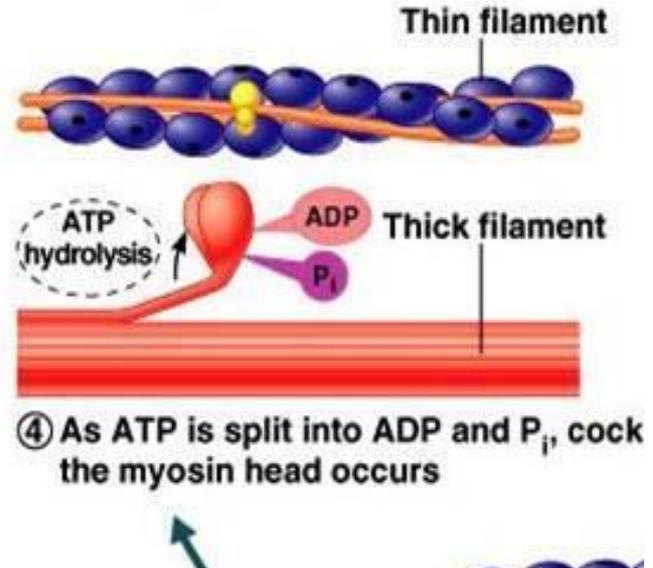


5. Calcium ions bind to troponin changing its shape removes blocking action of tropomyosin of active sites



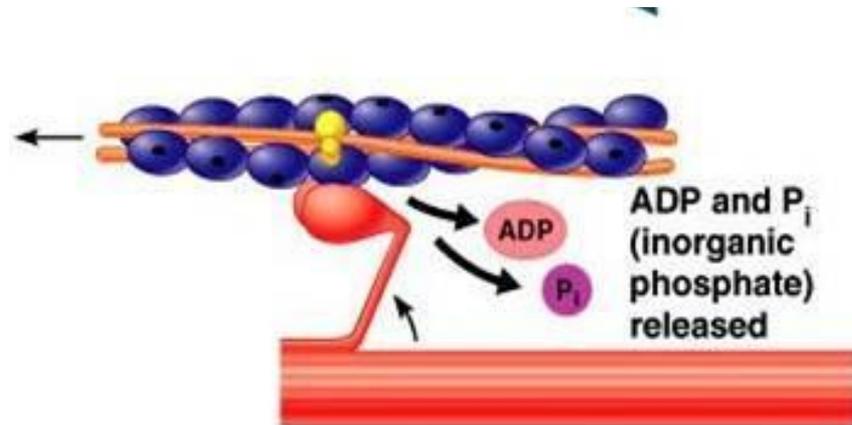
6. ATP (energy) is split into ADP + P energizing the myosin head

7. Myosin head moves to the cocked position and is attracted to the binding site



8. Myosin and actin form cross bridge

9. Phosphate is released starting power stroke



② Working stroke—the myosin head pivots and bends as it pulls on the actin filament, sliding it toward the M line

10. ATP binds to myosin head causing it to release actin

11. Process continues until calcium removed from t-tubules

12. Troponin/ tropomyosin go back to original shape and block binding site

