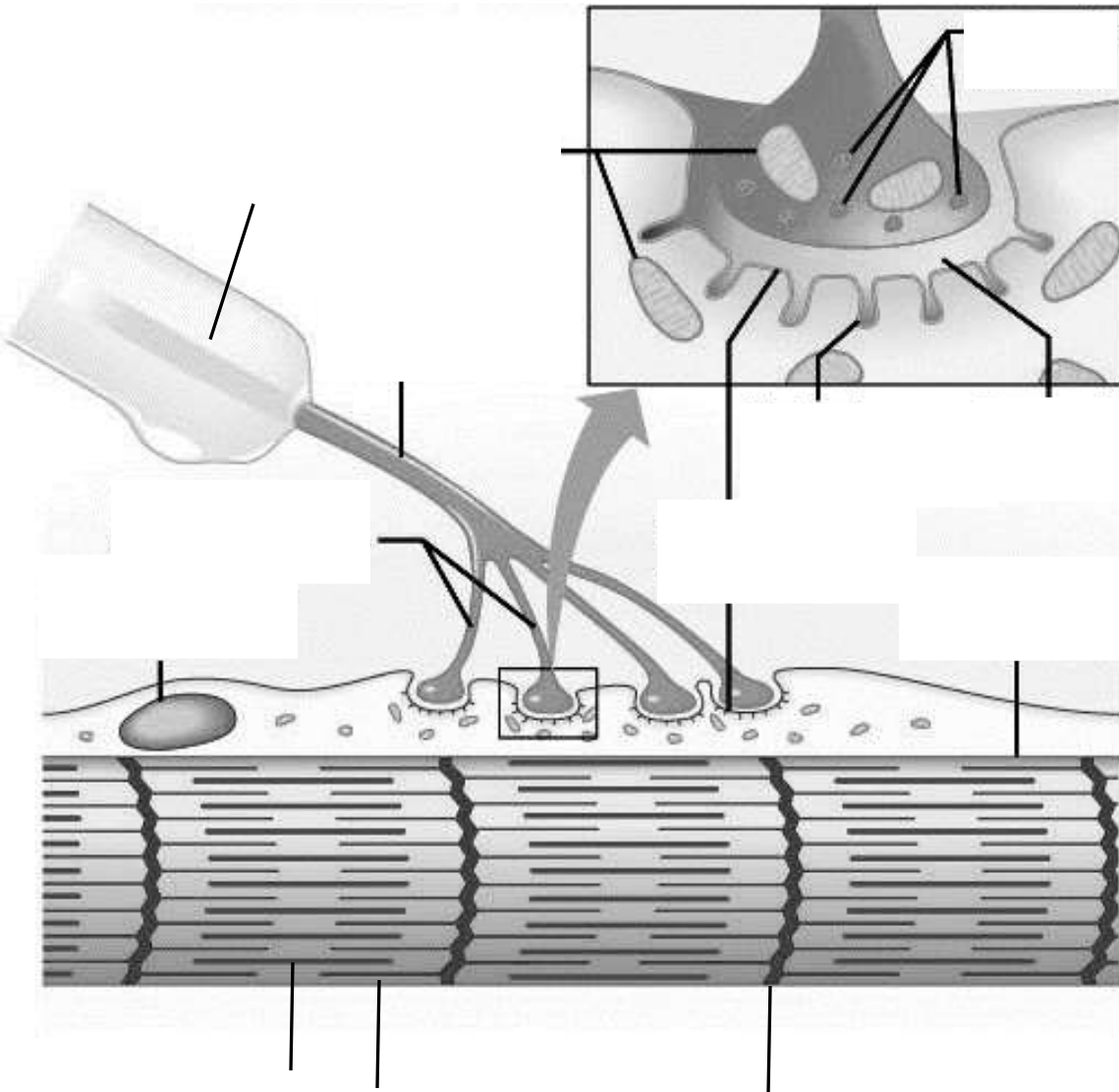


Skeletal Muscle Contractions

Skeletal muscle contraction occurs at the neuromuscular junction.

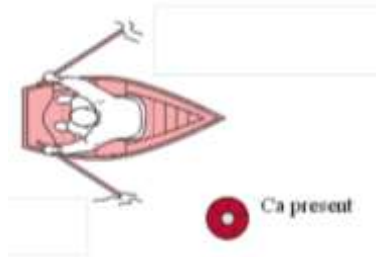
1. Label the following neuromuscular junction.



2. What is the name of the stimulus that travels down the axon to the muscle fiber?
3. Does the terminal (end) of the axon enter the muscle fiber?
4. The signal goes from electrical to chemical to electrical to chemical... Where does each of these changes occur?
5. Does acetylcholine enter the muscle fiber?
6. Fill in the blanks in the following metaphor for muscle contractions.

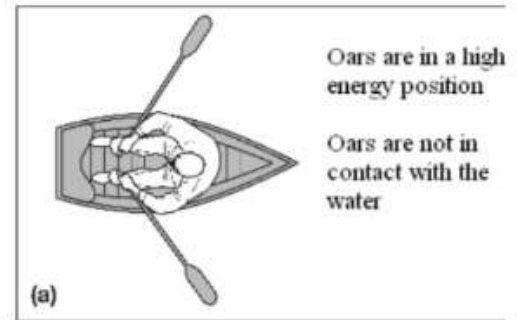
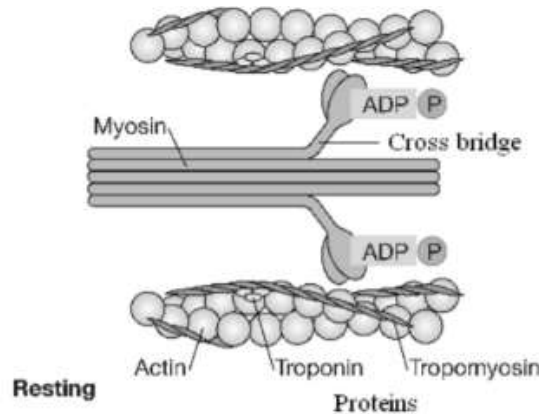
The Sliding Filament Theory explains how the muscle contracts at the microscopic level. One analogy for this is rowing a row boat. Where the:

- Boat = myosin (thick filament)
- Oar/paddle = myosin arm
- Water = actin (thin filament)
- Life ring = calcium



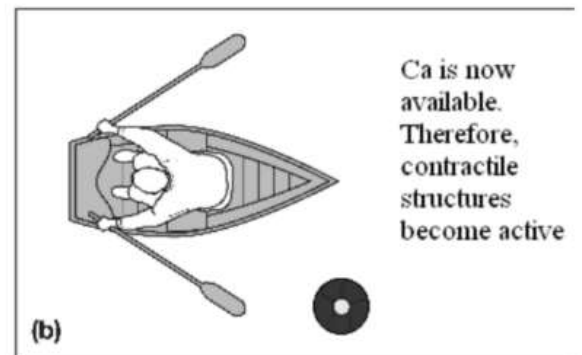
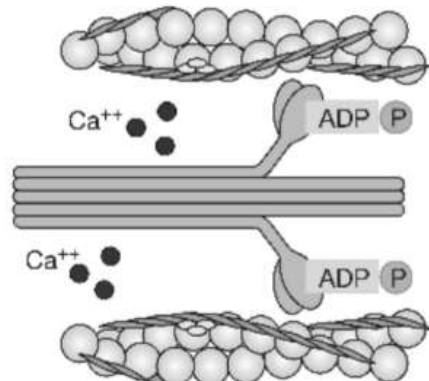
Resting Muscle

1. _____ binds to myosin arm
2. ATP _____ into ADP + P, reading to be activation



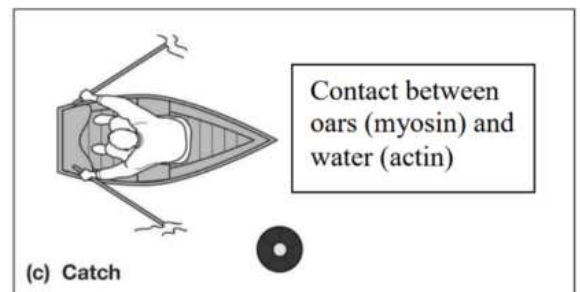
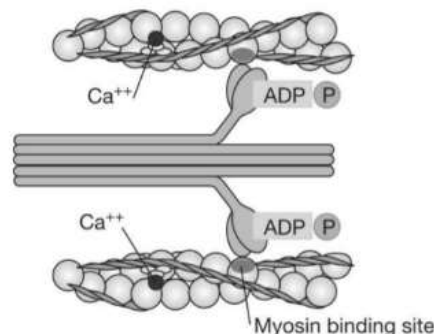
Step 1. Action Potential

1. A nerve _____ releases _____ into the synaptic cleft opening the _____ channels.
2. _____ gets sent to sarcoplasmic reticulum, which releases _____



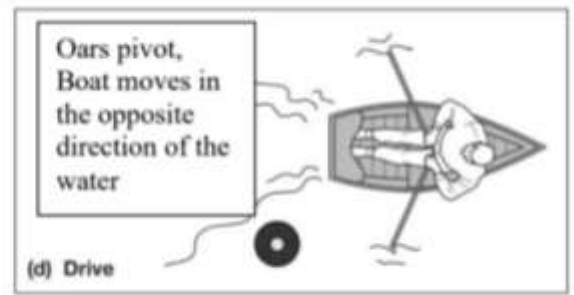
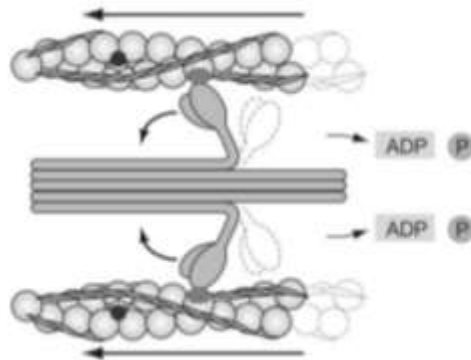
Step 2. Myosin-Actin Binding

1. _____ binds to _____
2. Causes _____ to move out of the way of the _____ binding site
3. _____ and _____ bind together using energy from _____



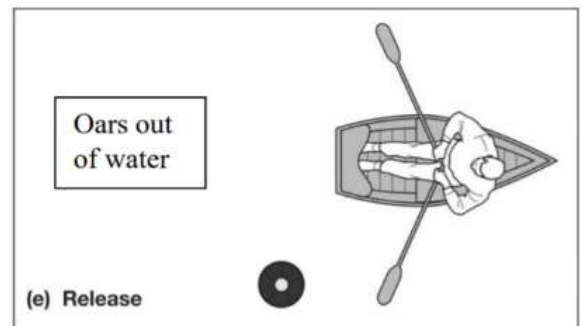
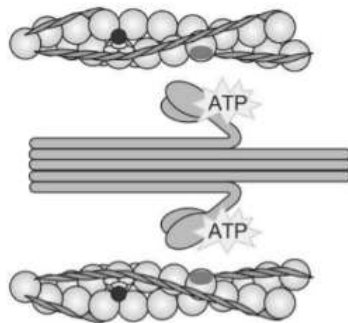
Step 3. Row, row, row your boat (Power Stroke)

1. _____ arm pivots so _____ and _____ slide past each other, shortening the _____
2. _____ and _____ released



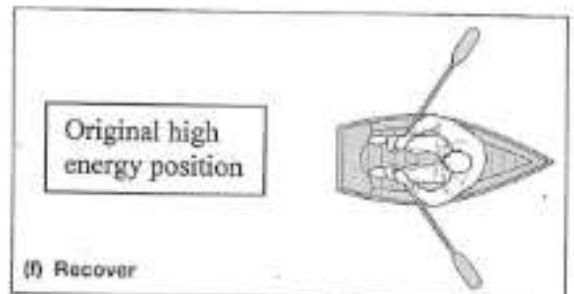
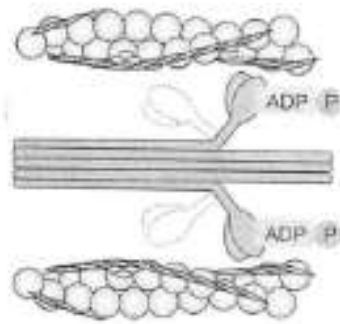
Step 4. Lift (ATP binding and Actin-Myosin release)

1. A different _____ molecule binds to the _____.
2. _____ - _____ complex released.



Step 5. ATP Cleavage (Reset for next row)

1. Return to high _____ state.
2. Cycle will repeat if _____ is available and _____ binding sites are not covered.



Analysis Questions

7. What chemical does enter the muscle fiber, resulting in an action potential through the muscle fiber?

8. The signal goes from being electrical to chemical to electrical to chemical... Where does each change occur? What are the chemicals when it is a chemical signal? Why do these changes need to happen?

9. Can a full muscle contraction occur with one cycle of myosin movement?

10. If a muscle is contracted, what would happen if a new ATP was not available?

11. Why does rigor mortis occur? (Hint: What chemical is no longer available to the body?)

12. Come up with AND explain another analogy for muscle contraction.