

GENERAL MUSCULAR SYSTEM LAB

Be able to identify:

Endomysium

Epimysium

Perimysium

Fascicle

Myofilaments

Actin

Myosin

Myofibril

Sarcolemma

Sarcoplasmic Reticulum/ Terminal Cisternae

T-Tubules

Muscle Fiber Arrangements

Parallel/Longitudinal

Unipennate

Bipennate

Multipennate

Convergent

Circular

Slide

Skeletal Muscle

Muscle Fiber

Sarcolemma

Nuclei

A-Band

I-Band

Endomysium

Understand Steps of the Sliding Filament Theory:

Occurs at the junction of a motor neuron to a skeletal muscle fiber: **NeuroMuscular Junction**

Acetylcholine (Ach), a chemical neurotransmitter, is released by the motor neuron and passed to the **sarcolemma**. Ach spreads over the entire sarcolemma. As a result sodium ions (Na⁺) are spread through the cell via **transverse tubules (t-tubules)**. T-tubules spread the action potential throughout the cell and causes the **sarcoplasmic reticulum (SR)** to open calcium channels, initiating muscle contraction.

The released **calcium ions** bind with proteins, **troponin-tropomyosin complex**, on **actin**, which causes the protein complex to 'expose' a myosin-binding site on actin. The **myosin** heads (crossbridges) have an ATP molecule that has a low affinity for actin. As a result, **ATP** is split into **ADP and an inorganic phosphate** (a usable form of energy), and causes the myosin heads crossbridges to 'cock', resulting in a high affinity for actin. The heads bind with the exposed binding site on actin.

The loss of the inorganic phosphate causes the myosin heads to swivel from 90 degrees to 45 degrees, moving the attached actin. The MM brings the **Z lines** together, shortens the **sarcomere**, resulting in a contraction...damn that's cool.

The contracted position remains until the renewed binding of another ATP molecule with the myosin heads. This rebinding causes a dislocation of the actin-myosin complex. If ATP and calcium are remaining in the cell, contractions continue with myosin heads re-cocking and reattaching to actin. A maximum contraction is when myosin filaments butt from z-line to z-line.