Steps to Muscle Contraction

- The electrical impulse moves from the spinal cord, down the **axon** of the **motor neuron** to the **axon terminal**. This is caused by **depolarization**, which means that Na^+ came into the cell

- The electrical impulse reaches the **neuromuscular junction**, which causes the **neurotransmitter Acetylcholine** (ACh) to be released from the **vesicles** in the axon terminal. The ACh then moves into the **synaptic cleft**

- ACh binds to a **protein** on the muscle fiber's **sarcolemma** and causes the protein channel to open. **Na^+ rushes into** the muscle fiber

- Increase in Na^+ levels in the muscle fiber generates a **new action potential** that doesn't stop until it travels the length of the cell membrane (sarcolemma)

- Meanwhile, the **sliding filament theory** begins when the action potential causes **Ca^{2+}** to be released from the **sarcoplasmic reticulum** and then it binds to the **T and T system of actin**

- Ca^{2+} causes the proteins of the T and T system to **move**, which **exposes** the myosin binding sites

- Myosin heads can now attach to actin and **pivot** with the use of **ATP** to shorten the **sarcomere** by pulling the Z lines closer together.

- The myosin heads **never completely let go** of the actin, which causes the actin not to lengthen in between pivots.

- To relax the muscle, **ACh** in the synaptic cleft is **broken down** by enzymes as soon as the action potential has passed

- **Ca^{2+}** returns to the **sarcoplasmic reticulum**, which causes the T and T system to go back to their original positions and cover the myosin binding sites.

- Thick and thin filaments are no longer attached, and slide past one another and back to original resting length of the sarcomeres.