

muscle physiology lecture 9

excitation-contraction coupling

sarcolemma has invaginations called transverse tubules (t-tubules)

electrical message depolarizes membranes of t-tubules

electrical message eventually reaches dihydropyridine receptor

motor action begins @ primary motor cortex, ends @ dihydropyridine receptor

dihydropyridine receptors linked to ryanodine receptors linked to sarcoplasmic reticulum

"change shape \rightarrow opening up ryanodine receptors \rightarrow releases calcium

\uparrow "depolarization-induced calcium release"

not all ryanodine are connected to dihydropyridine receptors, need calcium induced calcium release (little signal triggers a larger signal) \leftarrow ex. of positive feedback loop.

transverse tubules tend to go into the sarcolemma @ junctions of A&I bands

when the muscle is done with contraction, "sarcoplasmic reticulum calcium-ATPases" pump

the calcium back into the reticula. this stops the signal.

reflex arcs

extrafusal fibers - voluntary control

intrafusal fibers - activated by gamma motor nerves (involuntary)

voluntary control & reflex arcs come from somatic nervous system

motor control: impulses carried to skeletal muscles from ventral roots

sensory input: impulses carried from skeletal muscle to dorsal roots

reflex arc does not go to brain, only goes as far as the spine.

if you recoil from something that hurt you, that means your body reacts and moves before your brain is conscious of the pain.

the five components

- receptor
- afferent nerve
- integrator
- efferent nerve
- effector

muscle sensors can sense tension, length, and rate of length change

muscle spindles - sensory receptor in skeletal muscle.