

# Lecture 5

Wednesday, July 14, 2021

00:12

## Structure and Function of the Neuromuscular System (cont.)

- DICR (depolarization-induced calcium release)
- CICR (calcium-induced calcium release)
- Excitation-contraction coupling:
  - o Transverse tubules typically dive into sarcolemma at the junctions of the A and I bands
  - o Depolarization causes the DHIP to change conformation
  - o Ca is released from the SR (DICR), which results in CICR
  - o Inactivation of contraction occurs when Ca is pumped back into the SR (requires a bunch of ATP)
- Reflex arcs:
  - o SNS control skeletal muscles, this is where voluntary control of your movements comes from *and* where reflex arcs come from
  - o *Motor control*: impulses are carried to skeletal muscles from your ventral roots
  - o *Sensory input*: impulses are carried from skeletal muscle to dorsal roots
  - o **Reflex arc**: a circuit that doesn't have to go all the way to the brain; it only goes as far as the spine
- Reflex arcs are for "self-preservation"; need to react faster than able to send messages up spine and back down
- 5 components:
  - 1) Receptor
  - 2) Afferent nerve
  - 3) Integrator
  - 4) Efferent nerve
  - 5) Effector
- Muscle sensors:
  - o Sense tension
  - o " length
  - o " rate of change of length
- Muscle spindles are a type of sensory receptor in skeletal muscle

- Intrafusal fibers embedded in extrafusal (regular) fibers
  - Don't have the same neural input (gamma rather than alpha)
- Static stretching before = bad
- Static stretching AFTER = good (at least better)
- Golgi tendon - a proprioceptor sensory organ that receives info from the tendon (senses tension)
  - When lifting weights, this organ is the sense organ that tells how much tension the muscle is exerting