

Muscles



**ASSIGN
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Muscle Depending on whether the movement is voluntary or involuntary, communication is either going to stem from the spinal chord for a reflex involved muscle contraction or it will stem from the brain as a voluntary muscle contraction. The dendrites of the motor neuron will receive the electrochemical signal from other cells and pass it along the axon through depolarization and re-polarization along the action potential gradient. This then reaches the motor plate, which is a collection of muscle fibers.

Acetylcholine, a neurotransmitter, causes the resting potential to change resulting in the sarcoplasmic reticulum to release calcium II ions. Then, these ions cause the movement of troponin and tropomyosin that causes movement in the filaments. When the muscle needs to relax, an enzyme called acetylcholinesterase breaks down the existing acetylcholine that is in the synapse which terminates contraction. The sarcoplasmic reticulum ceases production of calcium II ions and immediately begins reuptake of the pre-existing ions. The muscle is then returned to its original shape via movement of muscle fibers. (2)Both systems are vital to our structure and our movement. The skeletal system is the support frame for our entire body. In some cases it encases vital organs (ie skull is to brain as rib cage is to intestines). However, the musculature in our body allows for vital functions to be carried out such as heart rate for blood pressure, movement of food for digestion as well as serving an important motor function as well. Muscles are attached to almost every part of the skeletal system. Without the skeletal system, our bodies would collapse under the weight of the muscles and without the musculature, we would not be able to carry out vital functions in our bodies as well as have locomotion. (3)The extensor carpi radialis was what allowed Ann to reach for the box on top of the refrigerator. This

happens through muscle passively lengthening. This is because it was not being stimulated to contract. The antagonist to this muscle is the Flexor carpi radialis muscle. The muscles that allowed her to stand on her tip-toes were the calf muscles and extensor muscles which are undergoing an isometric contraction because the muscle is being activated by having to hold up all the weight, but it is not being allowed to lengthen or shorten. The antagonist for the calf muscles (gastrocnemius) is the tibialis anterior and the for the extensor muscles (extensor hallucis longus) is the flexor hallucis longus. (4)He is testing a class II lever in that these types of lever systems can produce a great force. The toe serves as the fulcrum. The heel then absorbs the force applied by the gastrocnemius and soleus when they work. The advantage to this is that we can produce a huge rush of force which allows us to run, lift, etc. The disadvantage is all the strain is put in the middle of the lever which can result in tissue damage and muscle tear to the gastrocnemius or soleus if they are overstrained. References Costanzo, L. (2009). Physiology: cases and problems. Baltimore, MD: Wolters Kluwer. Sandler, D. (2005). Sports power. Champaign, IL: Human Kinetics . Types of contractions. (2006). Unpublished manuscript, Muscle Physiology, University of California, San Diego, CA. Retrieved from <http://muscle.ucsd.edu/musintro/contractions.shtml>