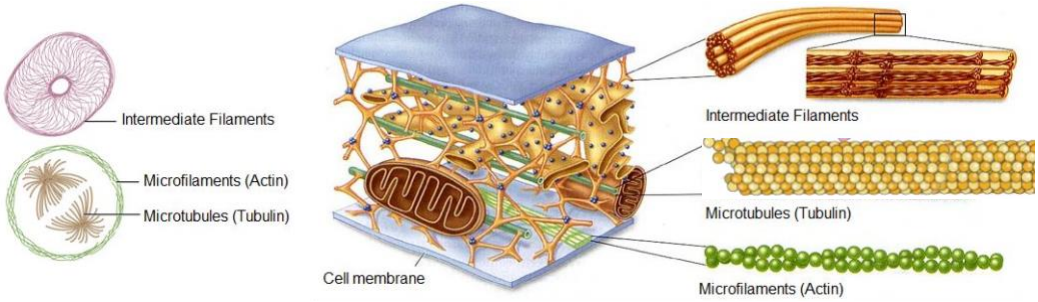
CONCEPT: MOTOR PROTEINS

Motor Proteins Create Movement Using Cytoskeleton

●*Cytoskeleton*: consists of _____-filaments, *intermediate filaments*, & *microtubules*.

●*Functions* include providing *cell-shape,* _____, *transportation, & signaling*.



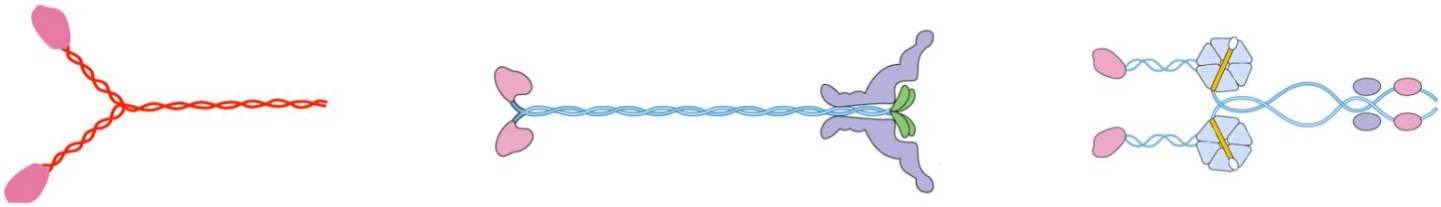
Motor Proteins

●_____ *Proteins*: proteins that use energy (ATP) & the *cytoskeleton* as tracks in order to create molecular movement.

□ Responsible for *muscle* _____, movements of cells, & intracellular movement of molecules/organelles.

□ *Myosin*, *kinesin* & *dynein* are well characterized motor proteins.

_____ _____ _____



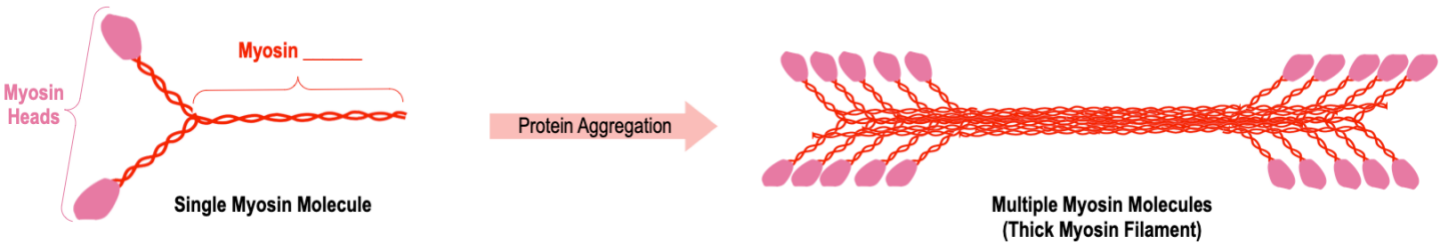
Myosin

●_____: a motor protein that moves along *thin actin microfilaments*.

□ Transports molecular cargo (ex. vesicles) along actin microfilaments & also involved in *muscle contractions*.

□ Many myosin molecules can aggregate to form _____ *filaments*.

EXAMPLE:



CONCEPT: MOTOR PROTEINS

Kinesin Moves Towards ( ) End of Microtubule

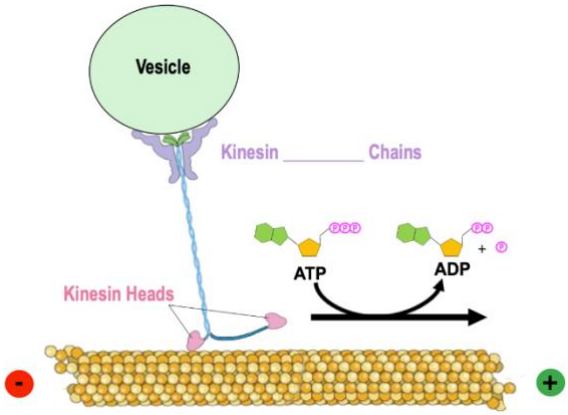
●Microtubule subunits assemble to make a polarized molecule with _____ charged ends.

●_____: a motor protein that moves towards the _____ (+) charged end of microtubules.

□ Transports/pulls molecular cargo (ex. vesicles, chromosomes, etc.) along microtubules.

□ Kinesin's _____ bind to the *microtubule* & its _____ *chains* bind to the molecular cargo.

EXAMPLE: Kinesin's Direction of Movement.



"Kin" = _____ = +

Dynein Moves Towards ( ) End of Microtubule

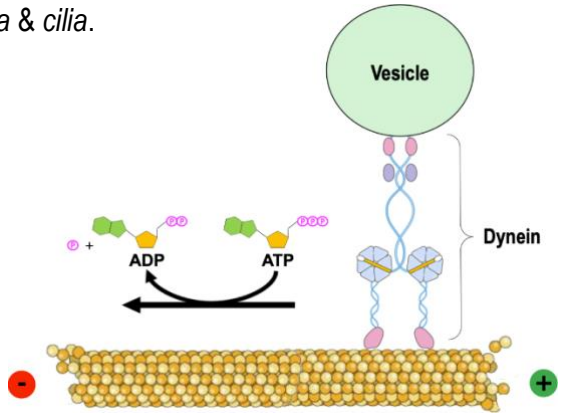
●_____: a motor protein that moves towards the _____ (-) charged end of microtubules.

□ Transports/pulls molecular cargo (ex. vesicles) along microtubules.

□ Responsible for motion of eukaryotic *flagella* & *cilia*.

EXAMPLE: Dynein's Direction of Movement.

"Dynein" sounds like _____ = -



PRACTICE: What are the common features of the motor proteins kinesin and dynein?

a) Both types of motor proteins bind microtubules.

b) Both types of motor proteins bind and hydrolyze ATP.

c) Both types of motor proteins undergo conformational changes when they travel along the microtubule.

d) Both types of motor proteins "step" from one tubulin subunit to another.

e) All of the above are true.

CONCEPT: MOTOR PROTEINS

PRACTICE: Your lab isolates a new type of motor protein, which is some version of either myosin, kinesin, or dynein but it is unclear exactly what type it is. You hypothesize that the motor protein is NOT myosin. Which of the following is a piece of evidence that would support your hypothesis?

a) The protein was isolated by adding then purifying actin microfilaments that it was bound to.
b) The protein was isolated by adding then purifying microtubules that it was bound to.
c) The protein aggregated in solution.
d) The protein did not have a vesicle attached to it when purified.