Internet Assignment: Cytoskeleton

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class:\_\_\_\_\_\_\_\_

Go to the website below and watch the animation answering questions as you go

<http://www.wiley.com/college/pratt/0471393878/student/animations/actin_myosin/actin_myosin.swf>

* Upon completion of this exercise you should be able to
  + Describe the physical properties and dynamics of an actin based cytoskeletal fiber called a microfilament
  + Understand that motor proteins can partner with cytoskeletal fibers in order to do work in a cell
  + Be able to describe how actin and myosin work together to drive muscle contraction
  + Be able to describe the mechanism of the actin myosin reaction cycle
* Before starting define the following
  + Dynamic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Conformation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What does the cytoskeleton provide the cell with
2. How is the cytoskeleton different from the skeletal system in your body
3. What is the role of motor proteins?
4. In this animation, what is the **motor protein** and the **cytoskeletal protein** that will be focused on?
   1. Motor protein: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Cytoskeleton: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What does the cytoskeleton refer to, and what are the 3 major components of this
6. What is used to make microfilaments? Microtubules?
   1. Microfilaments 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Microtubules 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*For the next few questions you have to click on the magnifying glass for each cytoskeletal component*

1. What 2 things can actin bind
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What are the 2 subunits that make up the hetertubulin dimer
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. One example of an Intermediate filaments are made up of
4. What does the + end of actin bind? The minus end?
   1. + 🡪 \_\_\_\_\_\_\_\_\_\_\_
   2. - 🡪 \_\_\_\_\_\_\_\_\_\_\_\_
5. What molecule has to enter to hydrolyze ATP to ADP
6. Which end has faster polymerization
7. Upon release of inorganic phosphate what happens
8. Which cytoskeletal filaments have polarity, and which don’t

|  |  |
| --- | --- |
| Polarity | No Polarity |
|  |  |

1. Why are microfilaments considered to be dynamic structures?
2. The actin is represented by the orange bars inside the cell. When you move the virus away from the cell, which part of the cell follows, the side with more actin polymerization or the side with less polymerization
3. What is “treadmilling”
4. List and describe the function of 3 proteins that regulate cytoskeletal dynamics
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
5. What partnership allows cytoskeletal proteins to generate tensile force
6. What does myosin activity depend on
7. The animation claims that myosin movement is driven by ATP-dependant conformational changes. In your own words, what does this mean?
8. As myosin moves along actin, in converts the chemical energy from ATP into what?