

Biological Motors Procedure

Goal: Visitors will learn about the transport of materials inside the cell.

Materials:

- 4-6 home siding sheets
- 3-4 pairs of socks with CD cases attached

Procedure:

- Connect the siding pieces by hooking the long, notched end of one piece of siding into the underside of the long, plain end. Place the siding on the floor.
- Have the participant put on the socks with the CD's on the ends. Do not have them pull the sock all the way up. The CD needs to be hanging down several inches.

During the demonstration:

1. Talk to the visitors about biological motors in the body (see FAQ sheet and reference for more information). These motors help to move important items inside of our cells. The biological motors move along tracks (like the siding you have on the floor) until they reach the place they need to go. Express to them, that in this activity, they are the motors responsible for transporting important items within the cell. Without these motors we could not survive.
2. The motors and tracks are both made of proteins. Specific motors will only move on a certain type of track. One type of motor track system is kinesin and microtubules. The kinesin protein is the motor and the microtubules are the tracks. The microtubules are made a protein called tubulin.
3. Have the visitors run their hands or feet across the siding tiles. They can easily slide their hands or feet in one direction, but in the other direction the ridges impede movement. In this way the track dictates the movement of the motor.
4. Ask the participants to guess which was the motor will be able to move on the track. Then have them test their hypothesis using the motor socks.
5. The picture on the CD is an actual depiction on a kinesin molecule cut in half (one side for each foot). The molecule is very complex.

Explanation:

While most of us did not know we have motors in our bodies, they certainly play an important role. They are vital to our cells dividing and help keep the cells in good working order by moving things inside of our cells. The tracks dictate the movement of the motors, not the other way around. Without the high specialization of the tracks, the motors would move uncontrolled in every direction and proteins would not be sent to the correct receptors.

One example is when our cells divide in a process called mitosis they need to have a copy of everything that was in the original cell that divided. The tracks start at the center of the cell and move out in two opposite directions and carry the same cargo to each of the new cells. The motors will carry things such as DNA after replication to the new cells that are produced during the process of mitosis.

Scientists can attach the kinesin motors to a piece of glass so they can not move. The feet of the kinesin are sticking up in the air. A microtubule is placed on the motors. The feet of the kinesin push the microtubules along. It works just like a person who is body surfing!!! Scientists hope to attach cargo to the microtubules and use these motors to move very small cargo.