

Mariya Rupp

Chelsey Tadema

Neuro 430

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Model Outline

The Axonal highway

Purpose: To demonstrate the process of axonal transport from a soma to a terminal and from the terminal back to the soma; to instruct children in the principles of intracellular transportation using microtubules, protein transporters, and vesicles.

Materials: A lot of room, ropes, hollow balls, small objects, candy jar, candy, boards or cardboard, kids, display board, two large tubs.

Procedure: Set up the boards to create a soma and an axon. Place two ropes on the ground, running the length of the axon, parallel to each other. This will simulate the tubules. Using the display board, explain the principles of axonal transport to the children including why are body needs it. Have the kids split into two groups; one in the soma and one at the presynaptic terminal. Kids will be told whether they are kinesin or dynein and start by getting a piece of candy from the candy jar which represents the mitochondria. The kids consume the candy – ATP – for energy and proceed to pick up a vesicle containing neurotransmitters and walk the microtubule to the opposite end. They then release the neurotransmitters from the vesicle into the tubs. The anterograde and retrograde children will be racing each other to add an element of fun to the exercise. When kids complete the race they will be asked by one of us a question pertaining to the process.

Issues: Vesicles will be prestocked with neurotransmitters rather than simulating uptake. The processes (anterograde transport and retrograde transport) are presented as the same (to make the game a fair race) when they are actually different.