Active Transport--Sodium-Potassium

BIO.A.4.1.2 Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport—diffusion, osmosis, facilitated diffusion; and active transport—pumps, endocytosis, exocytosis).

Instructions: Use this animated tutorial to help you understand the purpose of active transport. http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation__how_the_sodium_potassium_pump_works.html

Review the simulation of sodium-potassium (Na+K+) pump. Commonly found in animal cells, this active transport pump uses a carrier protein to move sodium and potassium across the plasma membrane. As the three Na+ ions move outside the cell and two K+ ions move into the cell, the cell membrane becomes charged on both sides; that is to say the outside of the cell membrane becomes positively charged while the inside becomes negatively charged. At top speeds, the pump can transport 450 Na+ ions and 300 K+ ions. The difference in charge is important for the conduction of electrical impulses along nerve cells.

Use picture 1 to answer the following questions:

1. Label the plasma membrane.

2. What molecule is required for active transport to occur?

3. Why is energy needed for Na+ and K+ to move across the membrane?

Picture 1

4. What has happened in picture 2? Why?

Picture 2

5. As the Na+/K+ move across a membrane an electrical gradient will be created. What is meant by this and why is it important?
Endocytosis vs Exocytosis

Use the website linked on the wiki or Chapter 5.2 to explain endocytosis vs exocytosis.

1. What is endocytosis (phagocytosis)?

2. What is exocytosis?

3. How are these examples of active transport across a cell membrane?

4. In animals, if bacteria or a virus is ingested by a cell, what organelle aids in destroying the foreigner? How does it do this?

5. What is the roll of exocytosis in the distribution of proteins?