

The Sodium Potassium Pump (Na^+/K^+ ATPase)

An Example of Active Transport using a Carrier Protein

Let's work the pump

Use the ATP models and the Sodium Potassium pump pieces.

- Place the sodium potassium pump in the membrane.
- Open toward the inside of the cell to start.
- Have sodium model pieces inside the cell, and potassium pieces outside the cell.
- Use the script:
 1. Cytoplasmic sodium ions (Na^+) bind because they have a high affinity (“liking for”) for the carrier protein in this form.
 2. Na^+ binding stimulates the hydrolysis of ATP leaving a phosphate group attached to the carrier protein.
 3. Phosphorylation causes a shape change, opening the carrier to the outside. Now there is a lower Na^+ (sodium ion) affinity and a high K^+ (potassium ion) affinity.
 4. The K^+ binding causes the phosphate group to be released.
 5. Phosphate release causes shape to return to original form. Now there is a low K^+ affinity causing them to be released into the cytoplasm. The process begins again.

