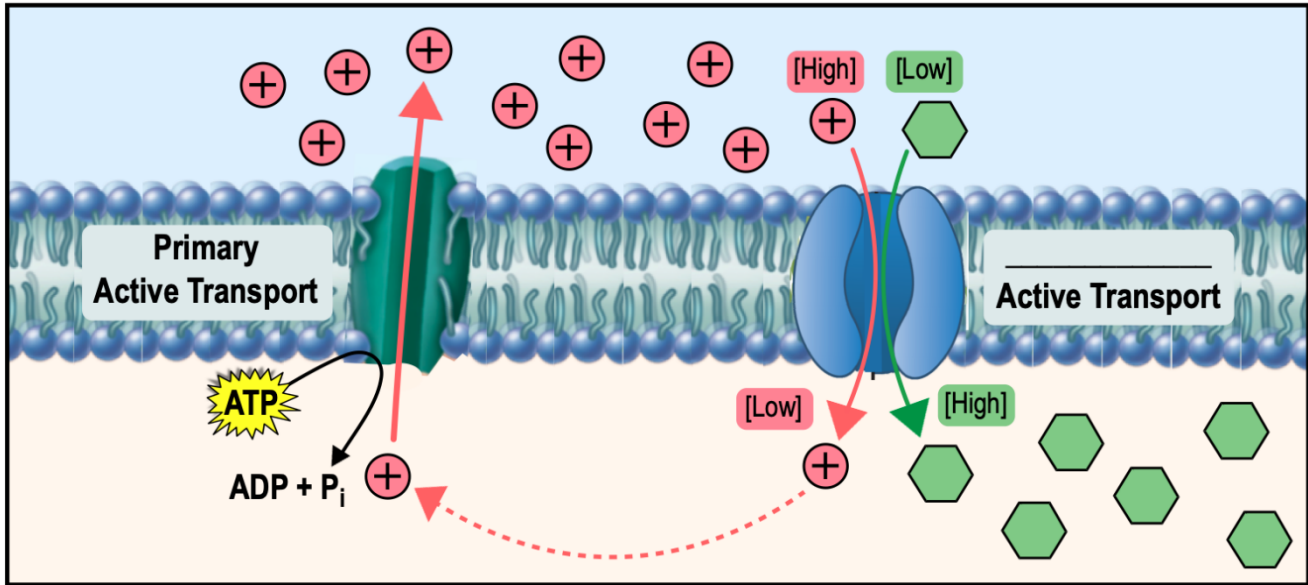<u>**CONCEPT:**</u> <u>SECONDARY ACTIVE MEMBRANE TRANSPORT</u>

●Recall: _____ *Active Transport*: directly driven by an *electrochemical ion gradient*.

    □ HOWEVER, its *indirectly* driven by **p**rimary **a**ctive **t**ransport (since electrochemical gradients are built by PAT).

    □ Co-transports ions _____ their electrochemical gradient & other molecules _____ their gradient.

EXAMPLE: Secondary Active Transport.

EXAMPLE: The sodium–potassium pump is an example of a system that uses primary active transport to set up conditions that can ultimately allow for secondary active transport. All of the following are true except:

    a) The Na^+–K^+ pump is an antiporter fueled by the hydrolysis of ATP.

    b) Secondary active transport of glucose into cells moves glucose against its concentration gradient.

    c) The Na^+–K^+ pump exports Na^+ ions to the outside of the cell, establishing a concentration gradient for Na^+.

    d) K^+ and Na^+ both diffuse into the cell along their concentration gradients to drive the transport of glucose.

    e) Secondary active transport of glucose into cells is indirectly driven by ATP hydrolysis.

PRACTICE: Which of the following is a way in which primary and secondary active transport may work together?

    a) Primary active transport can be used to create a concentration gradient of sodium such that sodium and glucose can move into the cell together via antiport mechanism.

    b) Primary active transport is used to create ATP necessary to drive secondary active transport.

    c) Primary active transport can be used to create a concentration gradient of sodium such that sodium and glucose can move into the cell together via secondary active symport.

    d) Primary and secondary active transport always oppose each other so they never work together.