ENGL 301
Definition Assignment
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Introduction

The objective of this assignment is to provide an audience of "non-technical readers" with three types of definitions (parenthetical, sentence, and expanded) of a term used within my area of study. It is important to be considerate of the audience and situation in which they are being presented with this new information.

I choose to define *active transport* for students taking an introductory biochemistry class on biological membranes and transport.

Parenthetical definition:
Ion pumps are responsible for *active transport* (movement requiring energy) of ions across the cellular membrane.

Sentence definition:
Active transport is energy-requiring movement of a solute across a membrane against a concentration gradient.

Expanded definition:

Active Transport

What is Active Transport?
Active transport is energy-requiring movement of a solute (molecule dissolved in a solution) across a membrane against a concentration gradient.

Why is it important?
All living cells must retrieve from its environment the raw materials for biosynthesis and for energy production, and must release to its surroundings the by-products of metabolism. The movement of these solutes across the cellular membrane are either by passive or active transport. Regulation of the cell's environment through active and passive transport is vital for the cell's survival.

What is the difference between passive and active transport?

- Passive transport: movement of a solute down its concentration gradient facilitated by simple diffusion and does not require an input of energy.
- Active transport: movement of a solute across a membrane in the direction of increasing concentration, which requires energy.

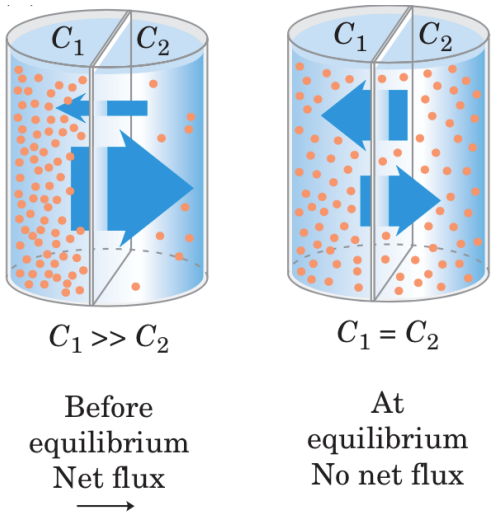

Figure 1. Movement of solutes across a permeable membrane by simple diffusion. There is net movement of the solute toward the side of lower solute concentration until equilibrium is achieved. This is an example of passive transport as no energy input is required for this movement of solute.
Source: Nelson, David, and Michael Cox. *Lehninger: Principles of Biochemistry*, 2008. 390.

Solutes tend to move from regions of high solute concentration to regions of low solute concentration by simple diffusion.

Passive transport is the movement of solute in the direction of simple diffusion. In other words, passive transport is used when solute is to move from a region of high concentration to a region of low concentration, because no input of energy is required for this movement.

Conversely, active transport goes against the tendency of solute moving from high to low concentration. Active transport of a solute requires energy to move a solute against simple diffusion, from a region of low concentration to a region of high concentration.

What types of active transport are there?
Two types of active transport:

- Primary active transport: the chemical energy released by adenosine triphosphate (ATP) hydrolysis drives solute movement against a concentration gradient.
- Secondary active transport: a gradient of ion X has been established by primary active transport and the movement of X down its concentration gradient now provides the energy to drive co-transport of a second solute against its concentration gradient.

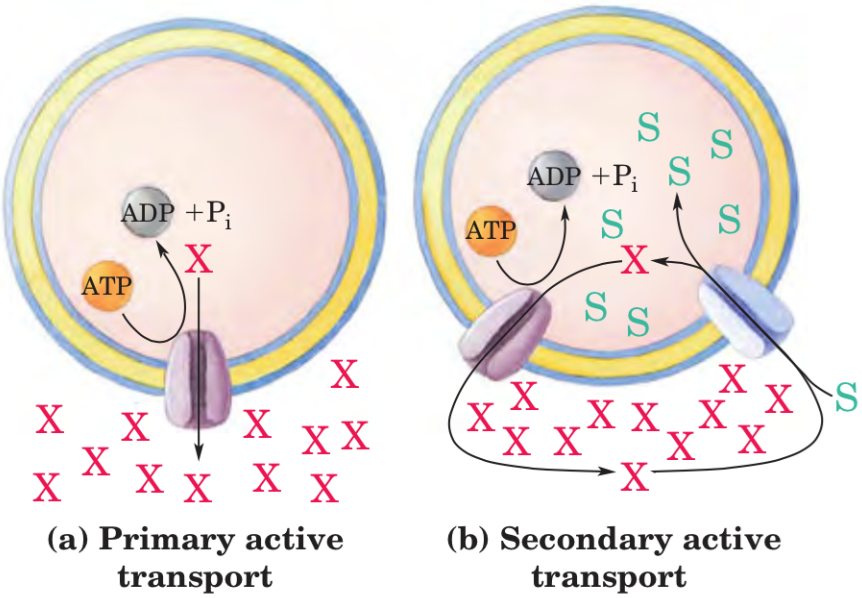

Figure 2. Two types of active transport. Primary active transport uses chemical energy and secondary active transport uses energy stored in a concentration gradient of another ion/solute to move a ion/solute against its concentration gradient.
Source: Nelson, David, and Michael Cox. *Lehninger: Principles of Biochemistry*, 2008. 395.

Summary:

- Active transport is important for the cell to regulate its environment.
- Active transport differs from passive transport in that it requires energy to move a solute across a membrane against simple diffusion and its concentration gradient.
- There are two types of active transport: primary active transport and secondary active transport.

Works Cited:

Nelson, David, and Michael Cox. *Lehninger: Principles of Biochemistry*. 5th ed. New York: Freeman, 2008. 389-96. Print.

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