

The Cell in Its Environment

- A. All cells are surrounded by a cell membrane that separates the cell from its outside environment.
- B. The cell membrane is selectively permeable: a property of cell membranes that allows some substances to pass through, while others cannot.
- C. Cells must let in needed materials, such as oxygen & food molecules. In contrast, waste materials must move out of cells.
- D. All substances must pass through the cell membrane.

- I. Diffusion: the process by which molecules move from an area of higher concentration to an area of lower concentration.
 - a. concentration: the amount of a substance in a given volume.
 - b. Molecules are always moving & bumping into each other. The more molecules there are in an area, the more collisions there are.
 - c. Collisions cause molecules to push away from one another and spread out. Eventually, they will spread evenly throughout an area.
2. Osmosis: the diffusion of water molecules through a selectively permeable membrane.
 - a. Because cells cannot function properly without adequate water, many cellular processes depend on osmosis.
 - b. Water molecules move by diffusion.
 - c. Too much salt in water causes cells to shrink.
 - d. Too much water causes cells to swell.

3. For a cell, moving materials through the cell membrane by osmosis & diffusion is like pedaling downhill passive transport: the movement of materials through a cell membrane without using the cell's energy.
4. When a cell needs to take in a substance in a higher concentration inside the cell than outside the cell, it has to move in the opposite direction than they naturally move by diffusion. They can do this but it takes energy.
active transport: the movement of materials through a cell membrane using energy.
 - a. Transport Proteins: proteins in a cell membrane that "pick up" molecules and carry them into or out of the cell, using energy.
 - b. Engulfing: the cell membrane surrounds & engulfs, or encloses, a particle, wrapping around it & forming a vacuole within the cell. The cell must use energy in this process.

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