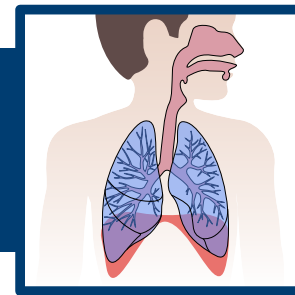


Student Background

PULMO PARK

LESSON 3: RESPIRATORY EXPLORATORY – DIVING DEEPER

Activity 3D: Confusion About Diffusion



TEXAS BIOMEDICAL
RESEARCH INSTITUTE
HEALTH STARTS WITH SCIENCE

Confusion About Diffusion

Two terms which are frequently used interchangeably are *osmosis* and *diffusion*. Although both terms relate to equalizing concentration, they are not the same. When conducting this experiment, consider the following definitions for each term:

Osmosis: the movement of **solvent** particles across a semipermeable membrane from a dilute solution into a concentrated solution. The solvent moves to dilute the concentrated solution and equalize concentrations on both sides of the membrane.

Diffusion: the **movement of particles** from an area of higher concentration to lower concentration. The overall effect is to equalize concentration throughout the medium.

Think about how these terms are similar and different. Both processes take place within the body. When discussing osmosis, it involves the movement of solvent particles. Water is commonly referred to as the “universal solvent” as it breaks apart many materials. Water even breaks apart or erodes rock! The majestic Grand Canyon in Arizona was formed by river water eroding the rocks in the river bed and along the shore. At one mile deep, water continues to erode the river bed, causing the Grand Canyon to get deeper.

Internally, our bodies are designed to function best under specific conditions referred to as **homeostasis** (home-oh-STAY-sus). Homeostasis is a relatively stable type of equilibrium which is attained through osmosis and diffusion. However, equilibrium can be disrupted by many factors including environmental conditions or illness. As a result, solvents (osmosis) and molecules (diffusion) continually move to counter-act conditions which upset equilibrium. In order to maintain optimal conditions inside our body, osmotic and diffusion processes are nearly continuous, resulting in **dynamic equilibrium**. Maintaining equilibrium is a balancing act which requires constant movement of solvents (osmosis) and molecules (diffusion).

Osmosis involves a solution which consists of a solvent and solute(s): the solvent dissolves the solute(s). In a glass of sugar water, the solvent is water (does the dissolving) and the solute is the sugar (what is dissolved). Other terms often associated with osmosis are semi-permeable membrane and three types of solutions: *isotonic*, *hypotonic*, and *hypertonic*. A semi-permeable membrane acts as a filter, allowing some molecules, ions, and particulates to pass through while others are too big to pass through the membrane.

The terms hypertonic, hypotonic and isotonic compare concentrations of solute on either side of a semi-permeable membrane. Hypertonic solutions have a higher concentration of solute while a hypotonic solution has a lower concentration of solute. An isotonic solution has equal concentrations of the solute on either side of the semi-permeable membrane.

MIDDLE & HIGH SCHOOL LEVEL