

Human Kidney Chapter

Experiment

Basic Level Difficulty Rating:

HK-1: Human Kidney

Overview

The cell membrane forms the barrier that separates the internal environment of the cell from the external environment. The membrane maintains the balance of fluid gained and lost by the cell so that any fluctuations in the osmotic and ionic conditions in the cell are minimized, and reactions can proceed normally.

Animals living in the ocean are exposed to an external environment that has minimal fluctuations in osmotic and ionic conditions. These relatively constant conditions in the external environment, coupled with the similarity of the internal environment to the chemical composition of seawater, makes the maintenance of the internal environment of these animals relatively simple.

Animals living in freshwater are exposed to an environment with low concentrations of ions and a high concentration of water. In this type of environment, cells lose ions and take on water. Animals have developed mechanisms that remove water and retain ions to prevent cells from swelling and bursting.

In the air, humans are exposed to the very harsh environment with a low concentration of water. Without proper levels of water, cells can dehydrate and shrink. In this environment, humans and other terrestrial vertebrates have developed mechanisms that conserve water and remove excess ions. The vertebrate kidney is a good example of an organ that is an important component in a feedback mechanism that regulates the retention or release of water and ions from the body.