Movement of water through a plant

Water is the principal component of living cells, accounting for around 70% of the cytoplasm, and plays many important roles. Water is a solvent, and most of the nutrients in order chemicals in cells are dissolved in it. Many viral processes in cells, including respiration and photosynthesis, either produce water or need water in order to occur. Water also transports dissolved substances (solutes), such as nutrients and waste products, throughout the bodies of living things.

Osmosis, as we have seen, is the process by which water and solutes move into and out of cells. Plants absorb water and nutrients from the soil through their roots and move them to all the other parts where they are used in photosynthesis and other processes. This movement is driven by transportation, which is the evaporation of water from the stomata in a plant´s leaves and stems. As water evaporates from the leaves and stems, more water is drawn into them, via the roots, by osmosis; the roots then absorb more water from the soil by the same process. Water is transported throughout plants by the vascular system, which consists of microscopic tubes, collectively called xylem, that stretch from The Roots all the way up to the leaves. About 90% of the water absorbed by the roots is lost to transportation.

In plant cells, water also provides structural support by pressing the cell membrane firmly against the cell wall. When a plant has access to sufficient water, the plant is turgid and stands up straight. When there isn't enough water, the plant cells lose their structure and the plant wilts. If a plant is placed in a solution with a low concentration of water, such as a strong sugar solution, then water will move out of itself and into the sugar solution, which will also cause the plant to wilt.

1. What is the primary role of water in living cells?

A) Providing genetic information
B) Acting as a solvent for nutrients and chemicals
C) Supplying energy for cellular processes
D) Forming cell walls

2. Approximately what percentage of the cytoplasm of living cells is made up of water?

A) 30%
B) 50%
C) 70%
D) 90%

3. Which cellular processes either require water or produce water, according to the text?

A) Digestion and excretion
B) Respiration and photosynthesis
C) Growth and reproduction
D) Diffusion and transpiration

4. How do plants absorb water and nutrients from the soil?

A) Through diffusion in the leaves
B) Through active transport in the stems
C) Through osmosis in the roots
D) Through evaporation from the xylem

5. What process drives the upward movement of water in plants?

A) Diffusion through cell membranes
B) Transportation caused by evaporation from leaves
C) Active pumping by xylem cells
D) Water pressure from the soil

6. What structure is primarily responsible for transporting water throughout a plant?

A) Phloem
B) Stomata
C) Xylem
D) Cell wall

7. What happens to most of the water absorbed by plant roots?

A) It is stored in the leaves
B) It is used in photosynthesis
C) It is lost through transportation
D) It remains in the roots

8. How does water provide structural support to plant cells?

A) By strengthening the cell wall
B) By increasing photosynthesis
C) By pressing the cell membrane against the cell wall
D) By transporting nutrients

9. What condition causes a plant to wilt?

A) Excess water in the soil
B) High nutrient concentration inside cells
C) Loss of water from plant cells
D) Increased transpiration rate

10. Why does placing a plant in a strong sugar solution cause it to wilt?

A) Sugar damages the xylem
B) Water moves out of the plant cells by osmosis
C) Photosynthesis stops completely
D) The roots stop absorbing nutrients