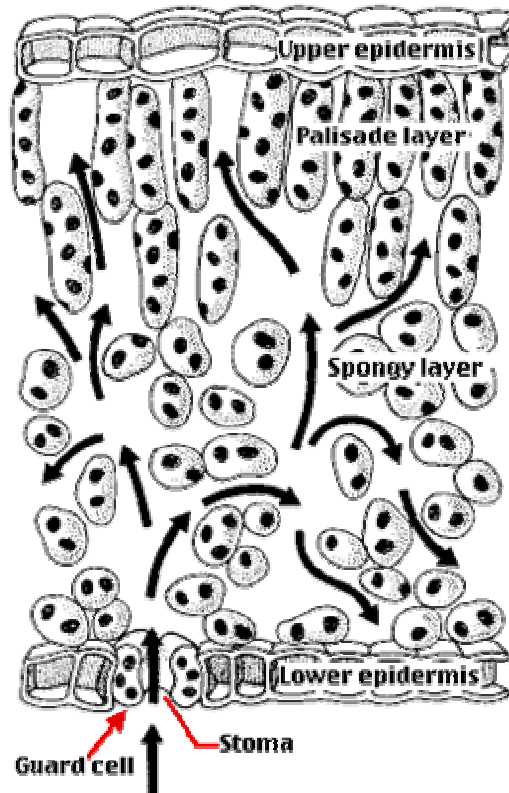


How do Plants respire?

Both plants and animals respire, but plants respire at a considerably lower rate than animals. Although in photosynthesis large amounts of gas is exchanged, leaves are adapted to control this situation. All cells in a plant respire, as it is necessary to break down glucose in order to release energy and therefore carbon dioxide.

Leaves

In leaves, gas exchange (and loss of water vapour in transpiration) occurs through pores called the stomata, or if a singular pore, a stoma. They are light sensitive and usually open in the morning when light hits them, and close in the night. Otherwise, what opens and closes the stomata depends on whether the guard cells of the leaves are turgid or flaccid. There are two guard cells to each stoma, and when they are turgid, they bulge out and force the inner walls into a crescent shape, opening the stoma. What actually makes them turgid is the increase in osmotic pressure (which is “the pressure exerted by the flow of water through a semi permeable membrane separating two solutions with different concentrations of solute”), which is caused by an uptake of potassium ions, which is caused by protons (H^+) being pumped out of the cell, making it negative, therefore attractive potassium ions, increasing the pressure. However, when they become flaccid, the inner walls of the guard cells (which are thick and elastic) go back to their original shape, forcing the stoma to close. This is triggered by a hormone called abscisic acid (ABA), when there is not enough soil water to keep up with transpiration.



The density of the stomata varies depending on the temperature, humidity, light intensity and concentration of carbon dioxide in the air. The latter can be supported with the evidence that plants grown in an artificial atmosphere with more carbon dioxide than usual have less stomata than would usually be present.

Bark

It is possible for the bark on trees to respire through breaks in the surface called lenticels. Each lenticel allows gases (especially oxygen) to diffuse to the living cells of the bark through a “pathway”. Without sufficient oxygen, cells of bark can die. They can be longitudinal or transverse and have a blister-like appearance and they usually form where a stoma once was.

Roots

Although roots do need to respire because they need energy to absorb nutrients from the soil, out of leaves, bark and roots, roots respire the least, as they do not require the energy for such things as photosynthesis. The roots get oxygen from the air that surrounds them.