Types of Plant Cells

There only a handful of cell types found in plants, and these can easily be distinguished because of their appearance and location. The cells that comprises the bulk of the plant can be classified into parenchyma, collenchyma or sclerenchyma, whose basic difference is their cell wall.

The Parenchyma

One of the most common type of plant cells is the parenchyma, regular thin primary wall. They comprise a great bulk of the plant and are the most common type of cell in a developing plant. They are the least specialized type of plant cell, being undifferentiated, but can be modified to perform a particular function.

Parenchyma are alive at maturity and retains the ability to divide throughout their life. This is especially beneficial not only for growth of young plants but also for repair of injured part of mature plants.

Chlorenchyma, a modified parenchyma, has abundant number of chloroplast for photosynthesis, making these cell a major contributor to the sugar production of plants. Water, gases and light can easily pass through the thin wall of chlorenchyma, making photosynthesis an ease for these cells.

Sugars and water are kept by plants in these cells as they are effective storehouses. This means that fleshy fruits and other parts modified for storage like roots have abundant parenchyma cells.

The function of some parenchyma cells is to die a maturity for the greater good of the plant. The release of pollen from stamens, splitting of fruit to release seeds, formation of cracks or openings along a plant tissue to allow transport, and even the fall of senescent leaves are all thanks to the sacrifice of some parenchyma cells.

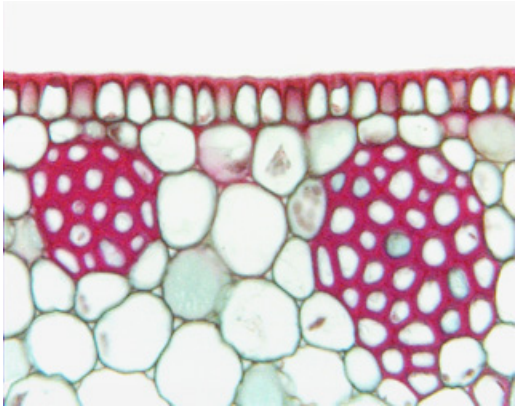
The Collenchyma

The uneven thickenings of the primary wall of collenchyma cells allow it to provide support to the growing plant. The thickenings are usually found along the corners of the cells. This characteristic, the plasticity of the wall, is crucial to the collenchyma's role in plants. These cells provide great support to the growing part of a plant allowing the tip to elongate while resisting the tendency to break. This tells us that collenchyma cells are very strong but flexible.

The strength of the cell is derived from its ability to resist the surrounding cells, primarily the parenchyma. This means that collenchyma alone cannot provide support to the

The Sclerenchyma

parts where supports and strength is needed. The thickened secondary wall provides the strength that the cell has, and can support the region without the help of parenchyma, unlike in the case of collenchyma. This is also the reason why most of these cells are dead at maturity. Their walls can become so thickened with lignin that the protoplast die out.

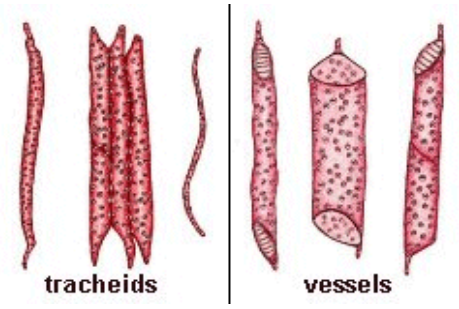


http://www.sbs.utexas.edu/mauseth/weblab/webchap3par/3.1-7.htm

There are two types of sclerenchyma cells – the conducting and the mechanical – classified based on their main function. Mechanical sclerenchyma are the sclereids and the fibers. Sclereids are short, irregularly shaped cells that comprise the tough coats of seeds and provide the stony texture of some fruits like pears and chico. Fibers are long and slender cells that provide support to stems and branches, which makes the part flexible – allowing the part to move or sway with the wind without breaking. Mechanical sclerenchyma are so named because

Conducting sclerenchyma on the other hand allows conduction of water. The tracheary elements – tracheids and vessels – are

therefore the conducting sclerenchyma. Before the cell dies, it reinforces the secondary wall to makeit thicker, characteristic to sclerenchyma. The parts where plasmodesmata are present should be left unthickened and these eventually develop into tiny depression called pits. There are also uneven thickenings alongthe secondary wall resulting to spiral, ring or ladder-like patterns. This allows the cell to somewhat elongate a little as the plant matures, and offers additional support to the plant by providing additional reinforcement. AS the cells matures and die, a cavity is left within the cell, creating a non-living tube where water can be transported through. Tracheids are long, tapered fibers while vessels are shorter, narrowed and less tapered compared to fibers.

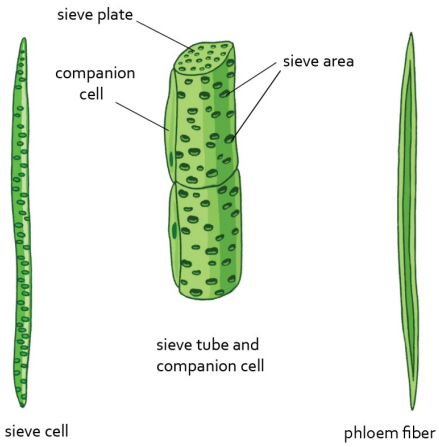


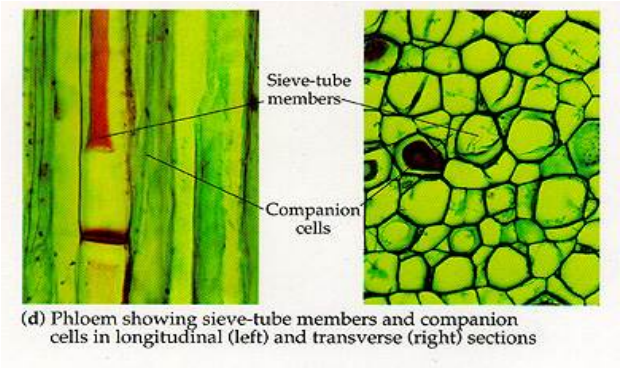
Sieve Tube and Companion Cell

Food is transported throughout the entire plant body within the phloem tissue. This tissue is comprised of sieve elements and companion cells, but only the sieve elements participate in the actual transport of food.

Two types of cells in sieve elements exist – the sieve cell and sieve tube cell. Sieve cells are long, narrow and spindle-shaped while sieve tube cells are smaller and stouter but are stacked to form the sieve tube. These cells must remain alive throughout their life unlike the tracheary elements that are dead at maturity. This means that the protoplast remains intact,

where the companion cell comes in. The main purpose of the companion cell is to nourish the sieve tube cell to keep it alive, but it does not participate in the flow of food products. The companion cell form intimate association with the sieve tube cell though an extensive network of plasmodesmata.

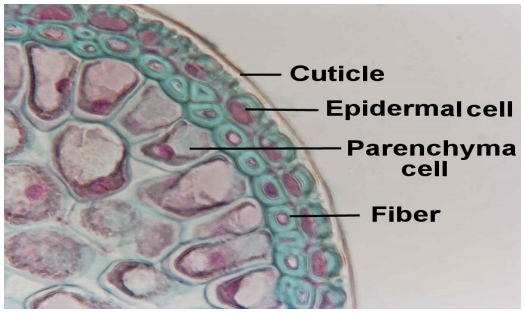




(d) Phloem showing sieve-tube members and companion cells in longitudinal (left) and transverse (right) sections

Epidermal Cells

Plants are unique in that their epidermis is commonly comprised of a single layer of cells. These cells are flat and are described to resemble the pieces of a jigsaw puzzle that makes them pack closely with each other. They provide protection from pathogens and minimizes water loss. They also secrete materials that makes up the waxy cuticle on the surface of the epidermis to reinforce their function further.


Cuticle
Epidermal cell
Parenchyma cell
Fiber