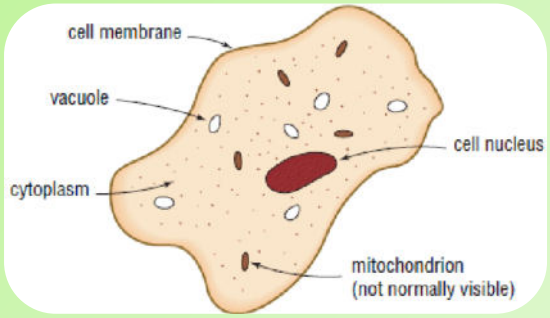
Cells

Specification Link:
Plant & Animal Pathogens: 4.1.1

Introduction

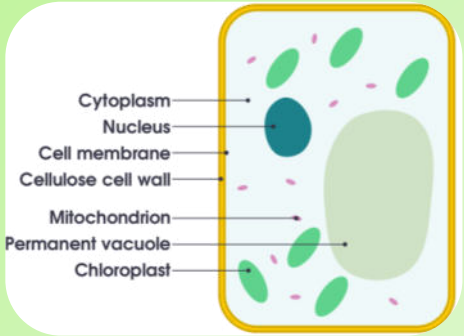
Cells are the basic building blocks of all animals and plants. Inside cells are various structures that are specialised to carry out a particular function. Cells contain structures called organelles that carry out different jobs inside the cell

Animal Cell



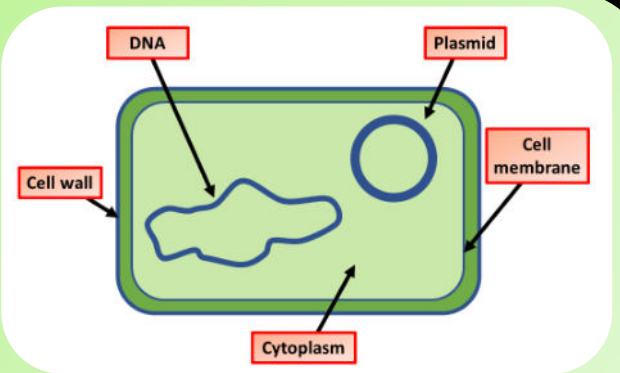
Cells carry out all the processes of the body including producing and storing energy, making proteins, replicating the DNA, and transportation of molecules through the body.

Plant Cell



Plant cells are the building block of plant life, and carry out all of the functions necessary for survival. Photosynthesis, the making of food from light energy, carbon dioxide, and water, occurs in the chloroplasts of the cell

Bacteria Cell



Bacteria are prokaryotes, lacking a nuclei and organelles, and with chromosomes composed of a single closed DNA circle. They come in many shapes and sizes

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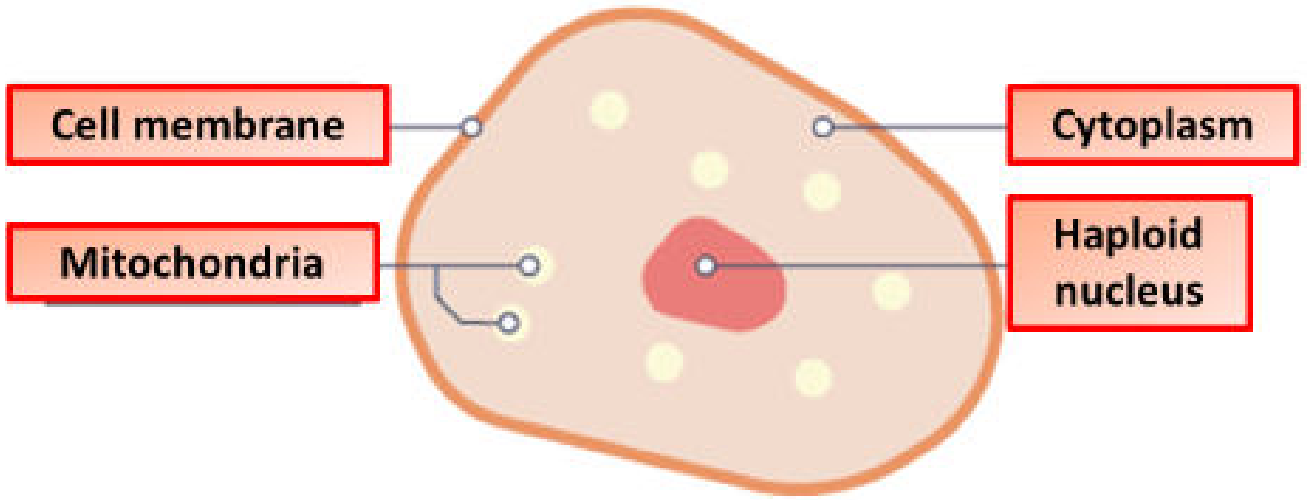

Organelles found in plant and animal cells

Cell membrane – this surrounds the cell and allows nutrients to enter and waste to leave it.

Nucleus – this controls what happens in the cell. It contains DNA, the genetic information that cells need to grow and reproduce.

Cytoplasm – this is a jelly-like substance in which chemical reactions happen.

Mitochondria – these are the powerhouse of the cell. They are structures where respiration takes place.

Ribosome– this organelle uses mRNA from genes to produce protein

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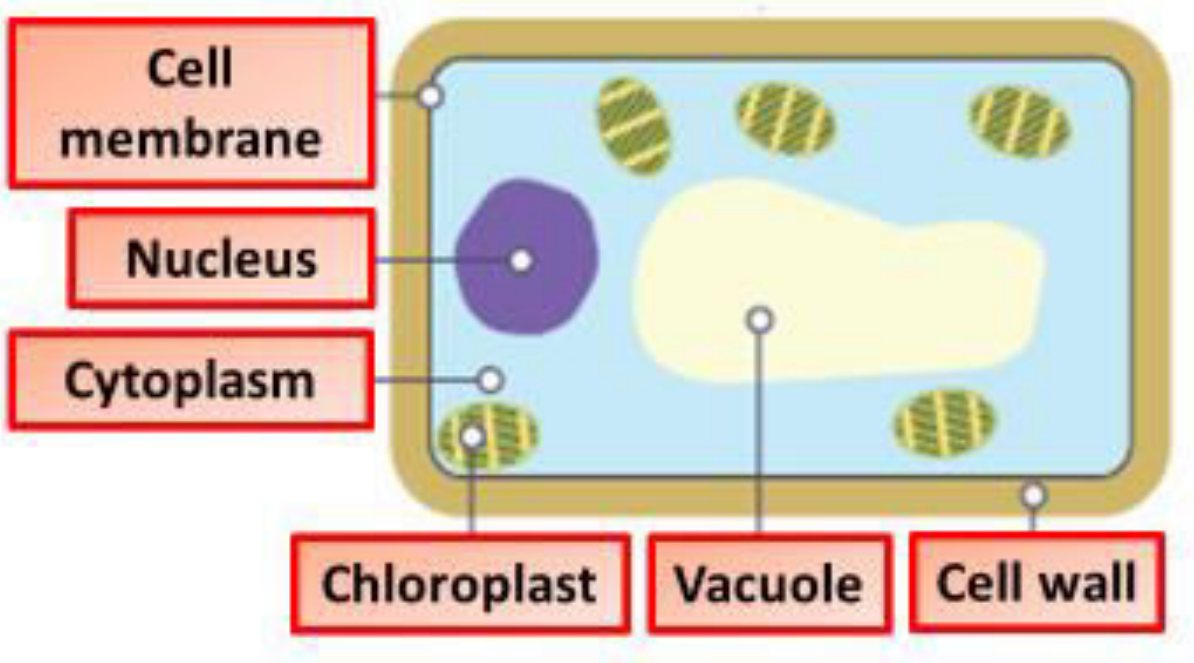

Organelles found only in plant cells

Cell wall - this is an outer structure that surrounds the cell and gives it support.

Vacuole - this is a space within the cytoplasm of plant cells that contains sap.

Chloroplasts - these contain chlorophyll and are the site of photosynthesis.

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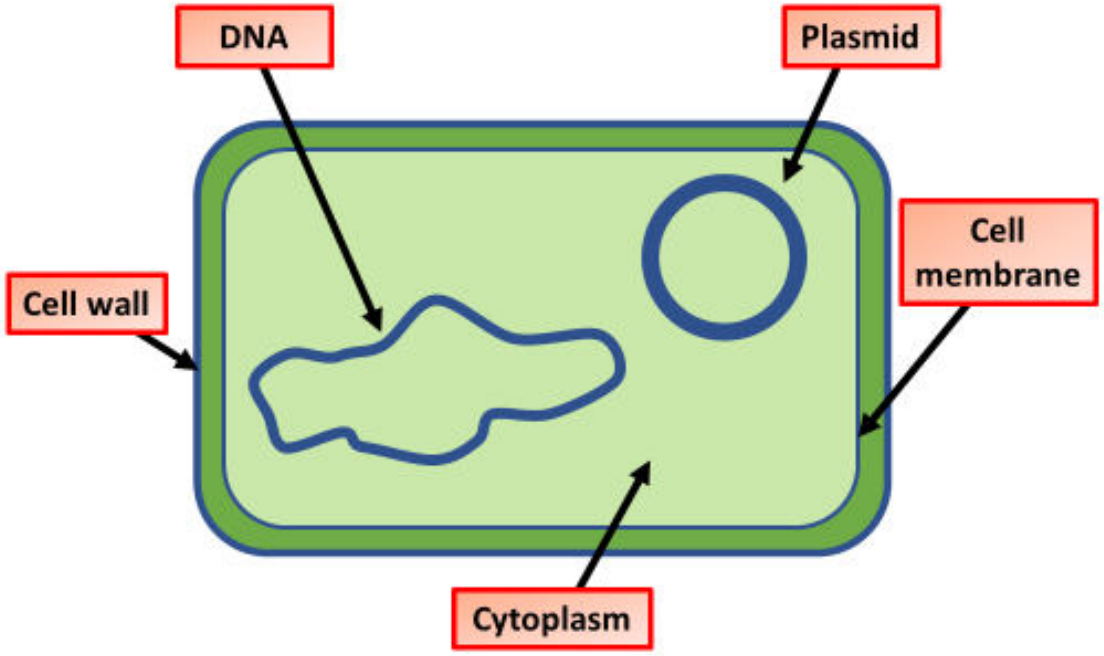

Prokaryotic Cells

Prokaryotes are unicellular organisms that lack organelles or other internal membrane-bound structures. Therefore, they do not have a nucleus, but, instead, generally have a single chromosome: a piece of circular, double-stranded DNA located in an area of the cell called the nucleoid.

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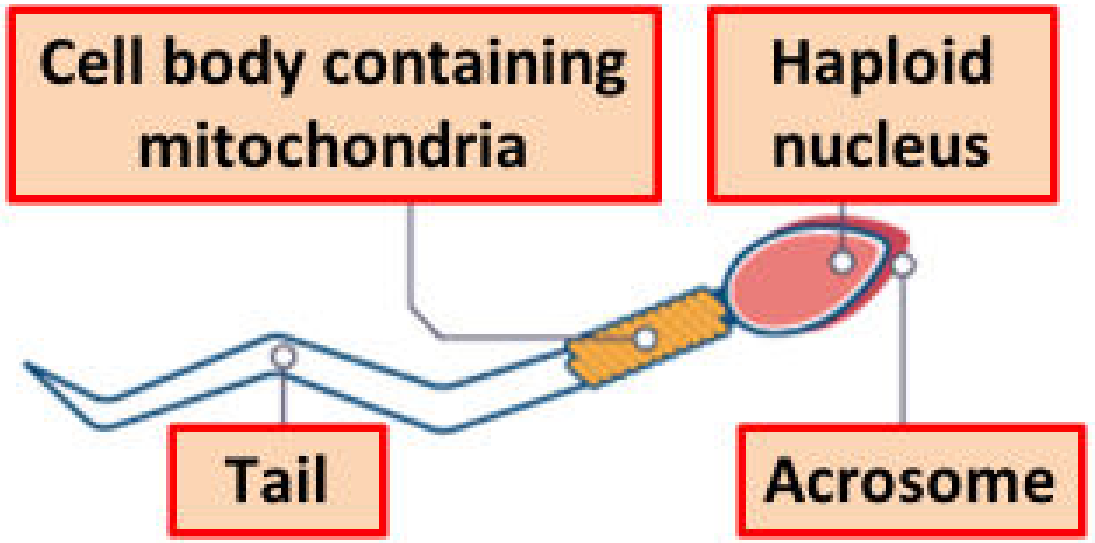
Specialised cells

Specialised cells are cells that have developed certain characteristics to perform a particular function



Sperm cell

The head of the sperm contains the genetic material for fertilisation. The acrosome in the head contains enzymes so that the sperm can penetrate an egg. The middle piece is packed with mitochondria to release energy needed to swim and fertilise the egg. The tail enables the sperm to swim.

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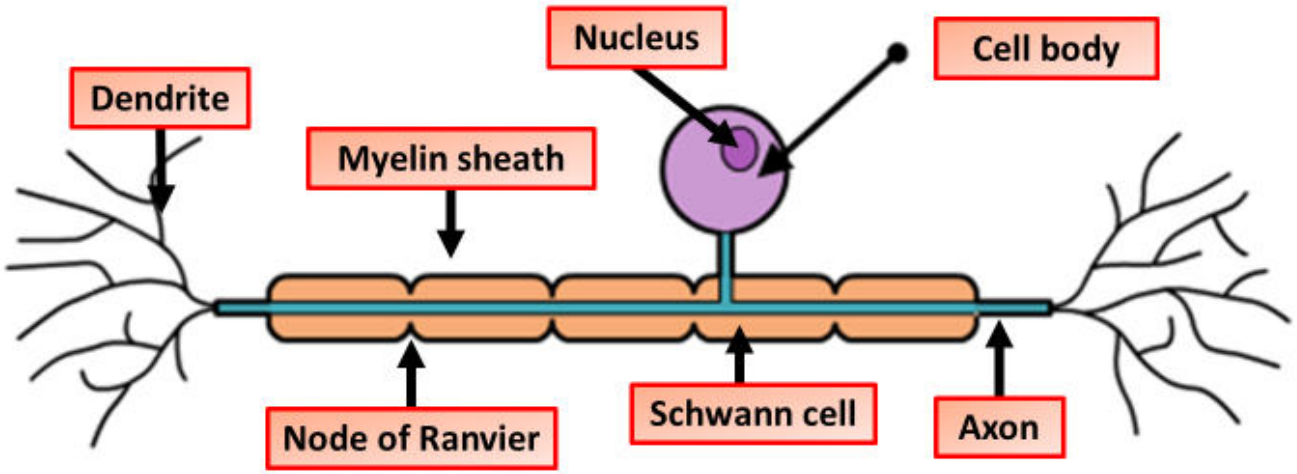

Nerve cell

The nerve cell is extended, so that nerves can run to and from different parts of the body to the central nervous system. The cell has extensions and branches, so that it can communicate with other nerve cells, muscles and glands. The nerve cell is covered with a fatty sheath, which insulates the nerve cell and speeds up the nerve impulse.

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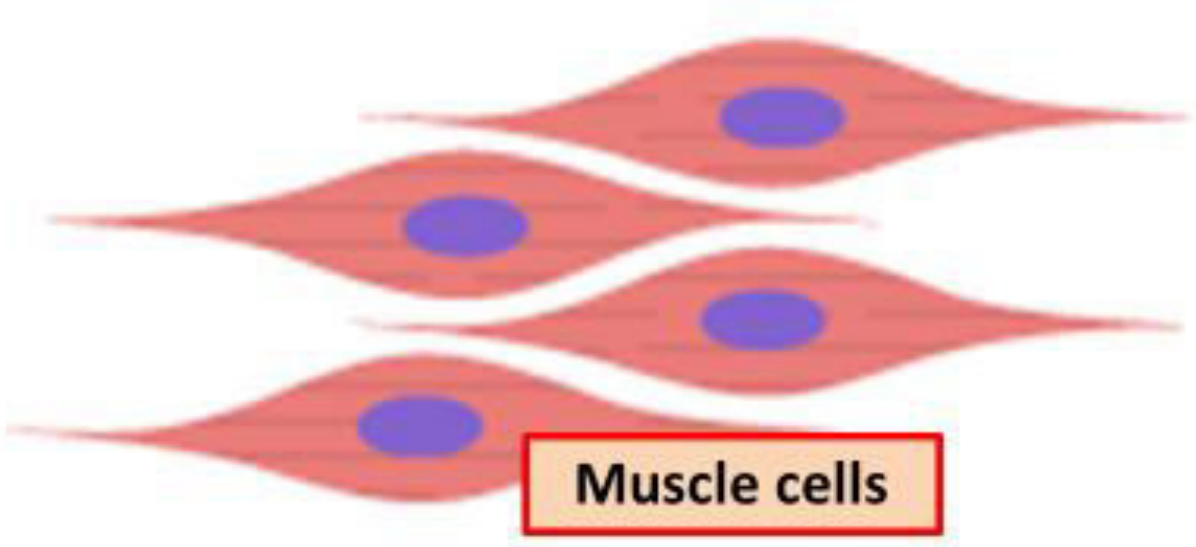

Muscle cell

Muscle cells contain filaments of protein that slide over each other to cause muscle contraction. The arrangement of these filaments causes the banded appearance of heart muscle and skeletal muscle. They contain many well-developed mitochondria to provide the energy for muscle contraction. In skeletal muscle, the cells merge so that the muscle fibres contract in unison.

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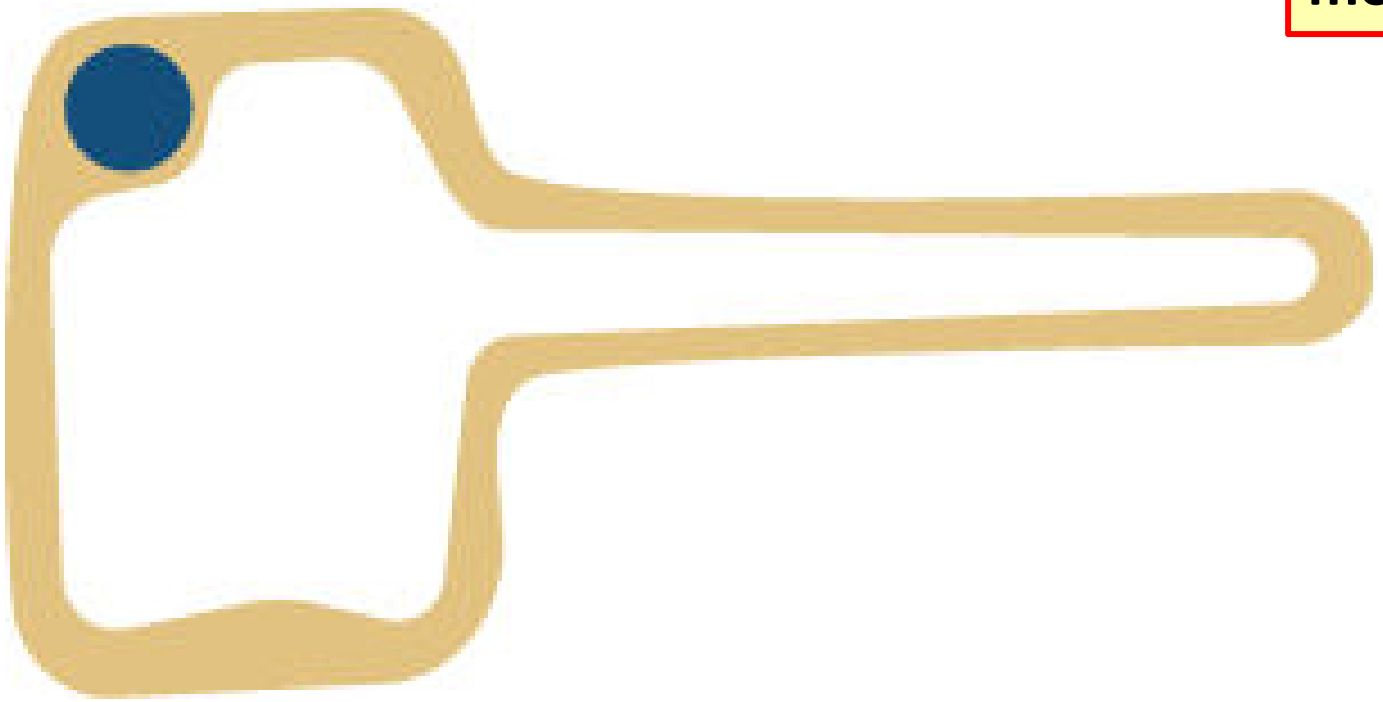
Root hair cell

The root hair cell has a large surface area to provide contact with soil water. It has thin walls so as not to restrict the movement of water.



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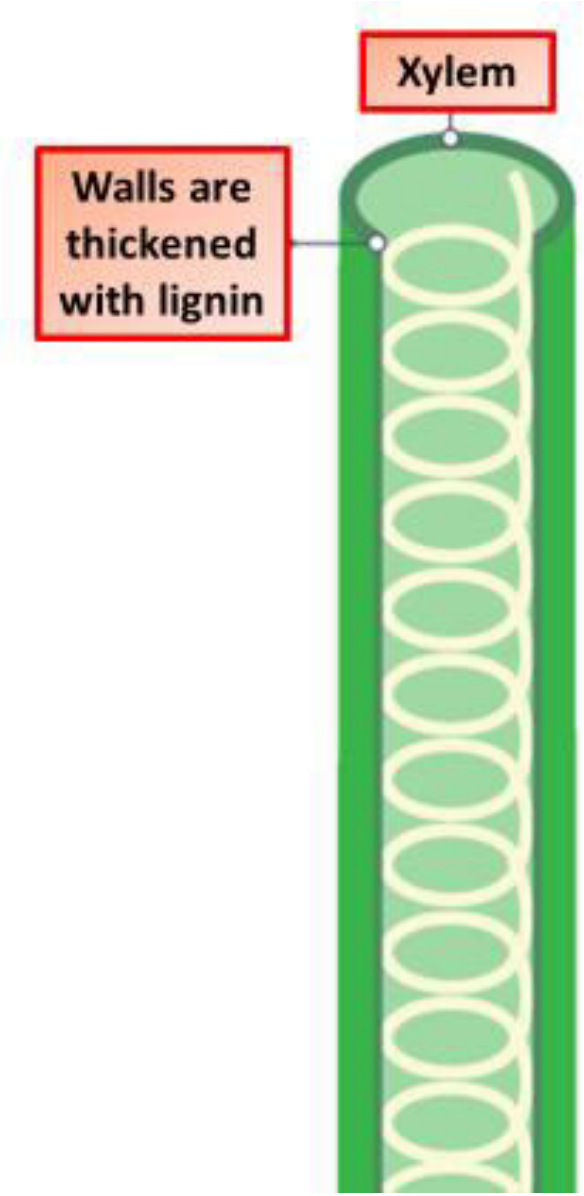
Xylem cell

There are no top and bottom walls between xylem vessels, so there is a continuous column of water running through them. Their walls become thickened and woody. They therefore support the plant.



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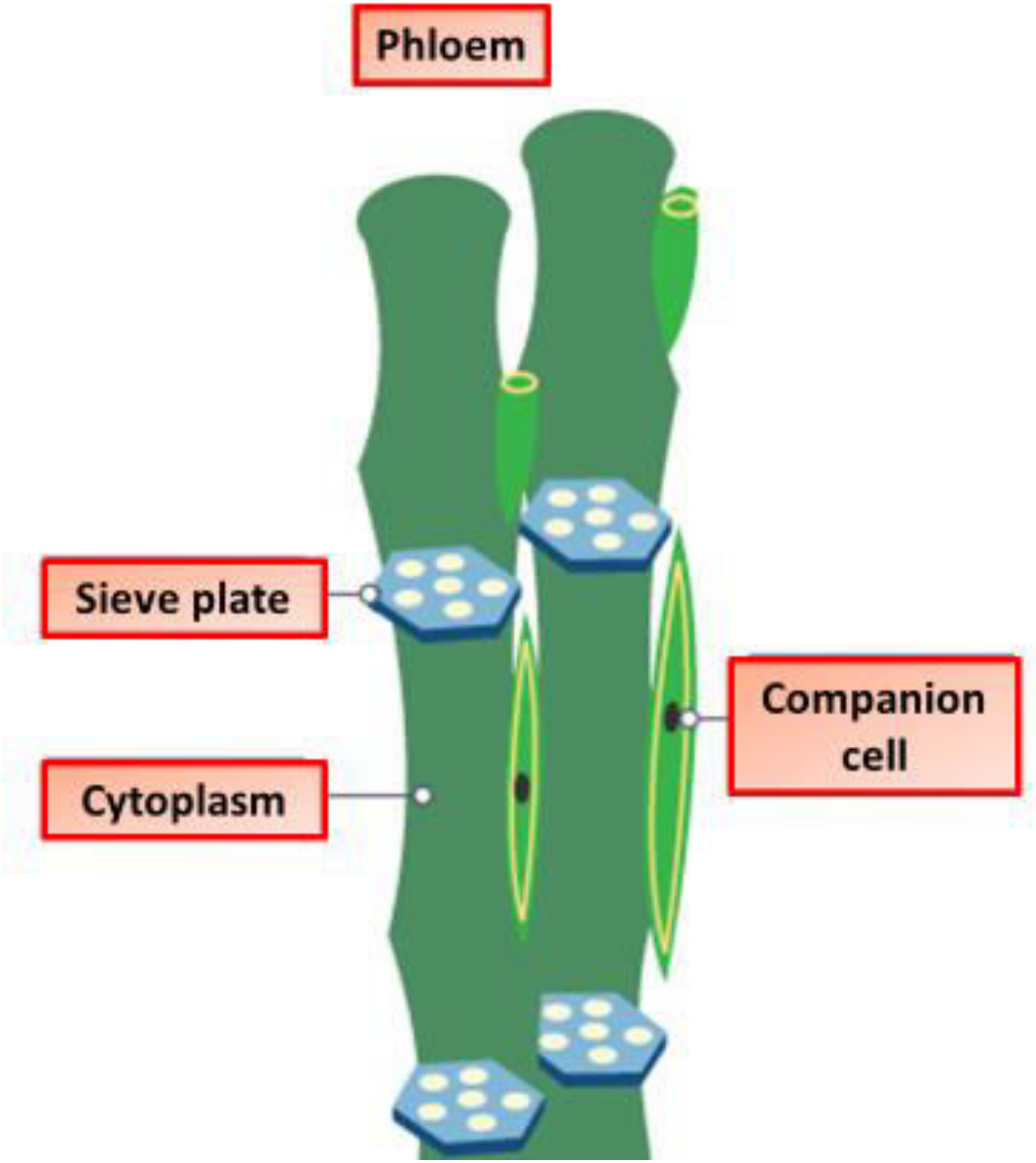
Phloem cell

Dissolved sugars and amino acids can be transported both up and down the stem. Companion cells, adjacent to the sieve tubes provide energy required to transport substances in the phloem.



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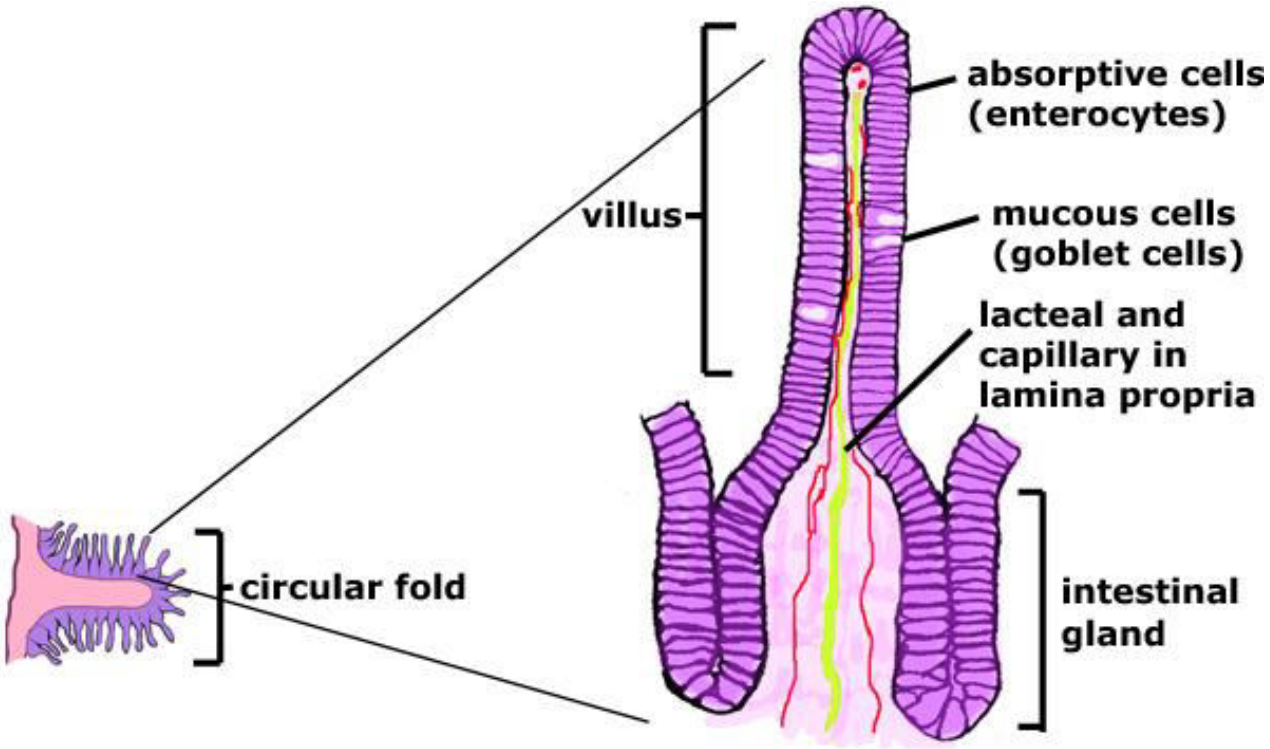

Villi cell

Covering the core of a villus is the surface mucous-membrane layer. This is mainly composed of two cell types: tall, narrow, columnar cells that absorb the substances passed into the blood and lymphatic vessels; and goblet cells, rounded at the end, that secrete mucus into the intestinal cavity.

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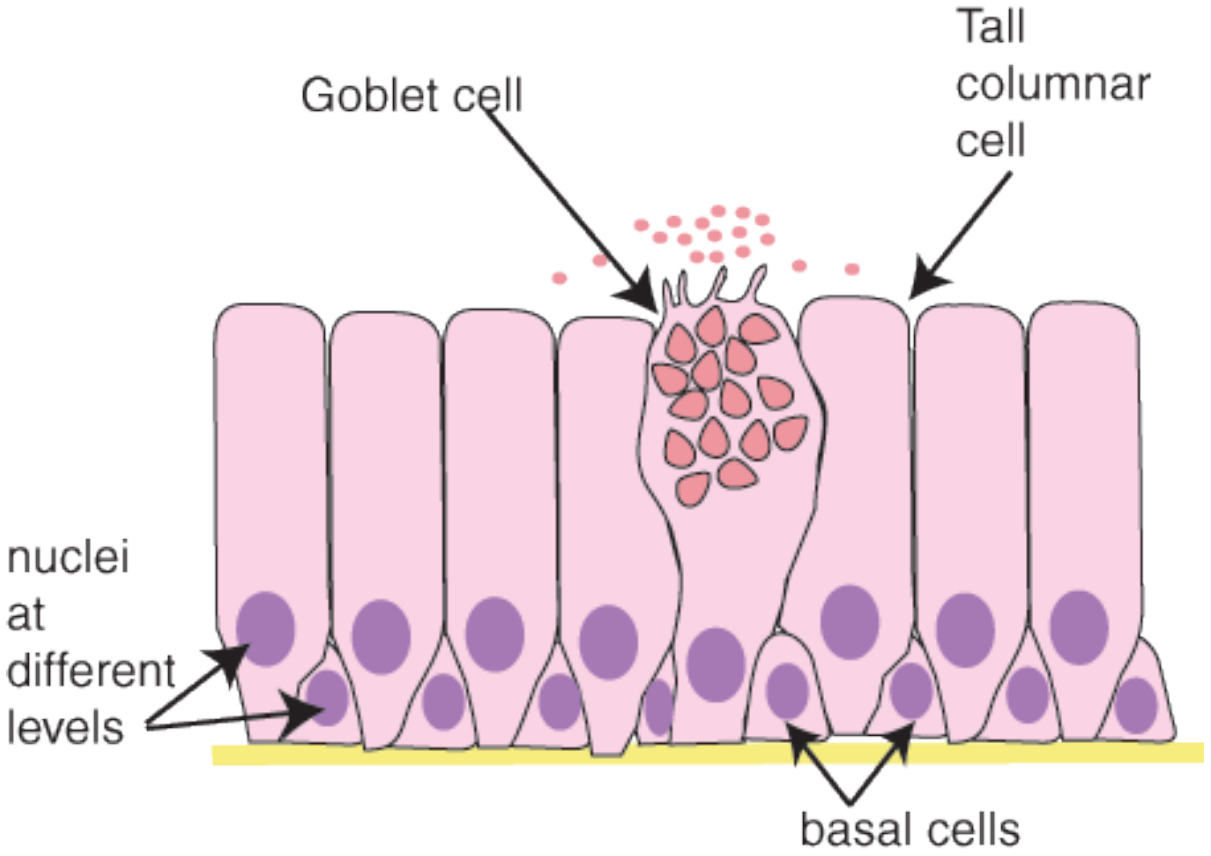

Goblet cell

Goblet cells create the mucus in order to trap pathogens. The production of mucus in your airways is a physical barrier. Goblet cells also produce a range of other molecules around the body. To enable them to do this they have a high number of ribosomes