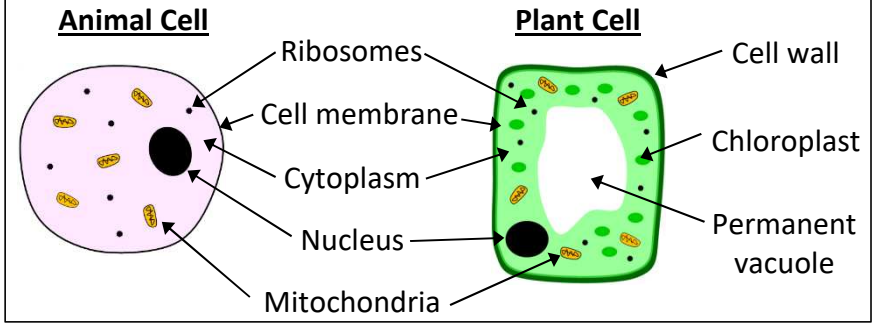
Cells

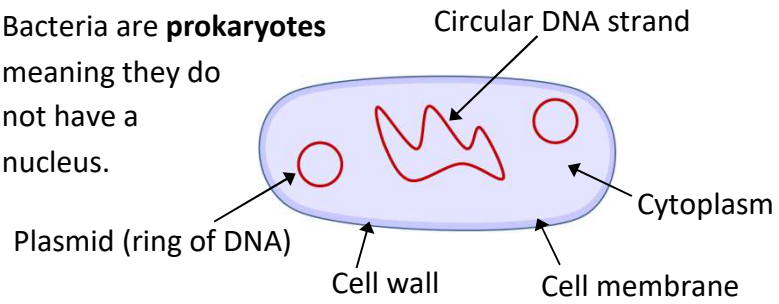


Nucleus - Contains genetic information to control the cell
Cytoplasm – where chemical reactions occur
Cell membrane – controls what goes in and out of the cell
Ribosomes – where proteins are made
Mitochondria – where most of the reactions for aerobic respiration occur

Cell wall – supports and strengthens the cell. Made of cellulose
Permanent vacuole – contains cell sap (sugar and salt solution)
Chloroplasts – contains chlorophyll. Where photosynthesis happens

Bacteria Cell

Bacteria are **prokaryotes** meaning they do not have a nucleus.



Specialised Cells

Sperm cells – has a tail to swim to the egg. Has lots of mitochondria to provide energy to swim. Enzymes in the head digest through the cell membrane of the egg.

Nerve cells – carry electrical signals around the body. Are long cells with branched connections at the end to connect to other nerve cells.

Muscle cells – have to contract quickly. Contain lots of mitochondria to provide energy for each contraction.

Root hair cells – found on the surface of plant roots. Have a large surface area to absorb water and minerals.

Phloem and Xylem – transports substances around plants. Cells are long and joined end to end to form tubes. Xylem cells cells are hollow and phloem cells have few subcellular structures so substances are able to flow through them.

Cell Differentiation

Where a cell changes to become a specialised cell by developing different subcellular structures, allowing them to carry out specific functions. Most animal cells lose the ability to differentiate soon after they specialised. Most plant cells do not lose this ability.

Stem Cells

An **undifferentiated** cell that can **divide** into more undifferentiated cells. These can differentiate into different specialised cells.
In adults they are found in the **bone marrow** – they can only turn into certain types of cell, eg. red blood cells. In an **embryo** they can turn into any cell.
Stem cells may **cure diseases** – embryonic stem cells could replace faulty cells.
Therapeutic cloning involves making an embryo with the same genes as the patient, so wouldn't be **rejected** by their body when used to replace faulty cells. Some people are against it as they think human embryos shouldn't be used as each one is a potential human life. Stem cells from **plants** can be used to grow identical plants with desired features.