

Organisms

2. Cells

CONCEPT 1

CELLS AND HIERARCHY

NOTES

Living organisms have certain life processes in common. There are seven things they need to do to count as being alive. This can be remembered using MRS GREN:

Movement: all living things move (even plants!).

Respiration: getting energy from food.

Sensitivity: detecting changes in the surroundings.

Growth: all living things grow.

Reproduction: making more living things of the same type.

Excretion: getting rid of waste.

Nutrition: taking in and using food.

Organisation of complex organisms

Multicellular organisms are organised into increasingly complex parts. Groups of similar body cells working together are called **tissues**- such as muscle and bone. These different tissues work together to make up an **organ** that has a specific function. For example, the heart is an organ which pumps blood to the cells. These organs work together to make **organ systems**, such as the circulatory system.

What are cells?

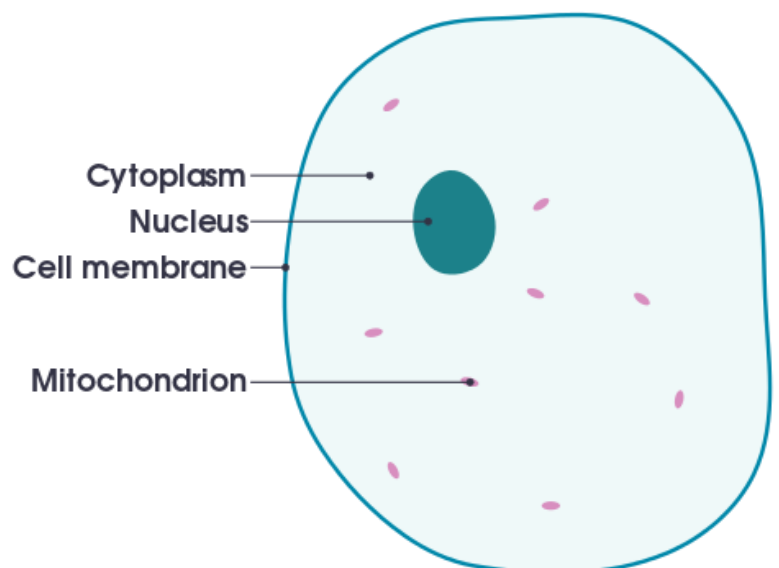
Cells are the basic building blocks of all living organisms. Most cells are so small they cannot be seen except under a microscope. Cells have different components which each perform its own function within the cell.

What are the common structures found in animal and plant cells?

All plant cells and animal cells have three main structures: the **nucleus**, the **cytoplasm** and the **cell membrane**.

Apart from red blood cells, all cells contain a nucleus. The nucleus controls what happens in the cell. It contains DNA, which is the genetic information that cells need to grow and reproduce.

The cytoplasm is the jelly-like substance where all chemical reactions happen. Within the cytoplasm are smaller structures called organelles, which make new materials to keep the cell and organism alive. In particular, there are special organelles called **mitochondria**. These are the powerhouse of the cell, which carry out respiration- the process where glucose and oxygen are converted into a form of energy that the cell can use.



The cell membrane surrounds the cell and allows water, oxygen, glucose and nutrients to enter into the cell. However, during chemical reactions waste products such as carbon dioxide and urea are also made. The cell membrane allows these substances to leave the cell.

What are the differences between animal and plant cells?

Plant cells have a few extra structures in comparison to animal cells for specific purposes.

The **cell wall** is an extra outer structure made of cellulose that surrounds the plant cell. This protective layer gives the cell both shape and strength.

The **vacuole** is a sac in the cytoplasm that contains sap, which is a mixture of water, sugars, nutrients and salts.

The **chloroplasts** are organelles containing a green pigment called chlorophyll. This pigment absorbs energy from the Sun and helps the plant to make its food (glucose) via photosynthesis.

