Human biology
Cells: The Basic Units of Life

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Reference

- Text book of human biology by John Kenneth Inglis 3rd Ed (1985)

Cells: The Basic Units of Life

❖All organisms are composed of one (e.g. bacteria) or more cells (e.g. human body contains about a trillion cells).

❖**Cells** are the basic structural and functional unit of life.

❖ The study of cells is called **cytology**.

Cell theory

Cell theory consists of three principles:

- ✓ All living things are made up of cells.
- ✓ Cells are the structural and functional unit of an organism.
- ✓ All cells come from pre-existing cells through cell division.

Types of cells

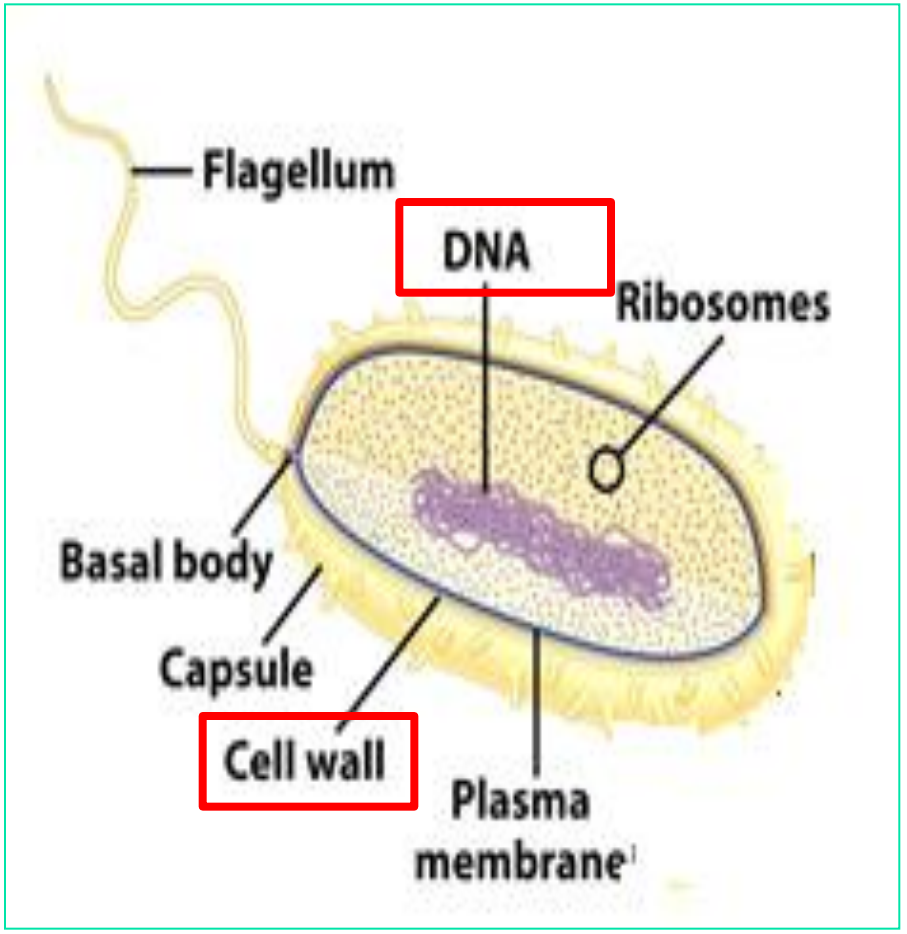
- All living cells can be divided into two groups:

1. Prokaryotic cells
2. Eukaryotic cells

Prokaryotic cells

They have:-

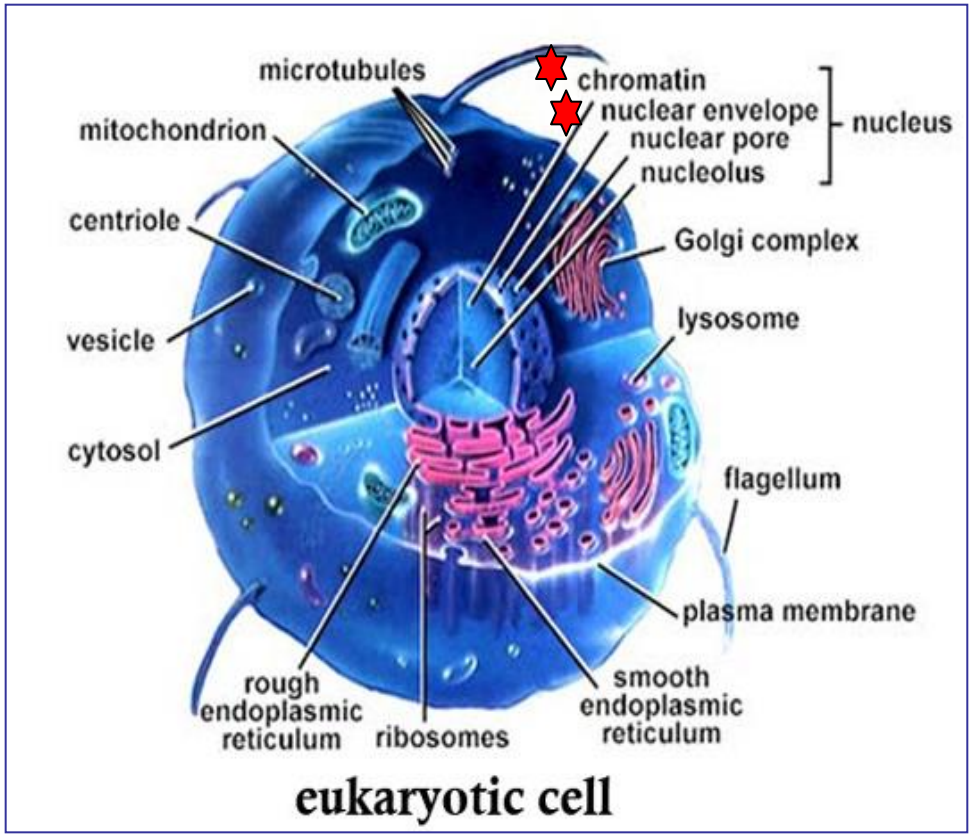
- ✓ The hereditary material in the form of a single long strand of DNA
- ✓ No separate nucleus
- ✓ Fewer organelles in the cytoplasm
- ✓ A cell wall like plant e.g. bacteria.



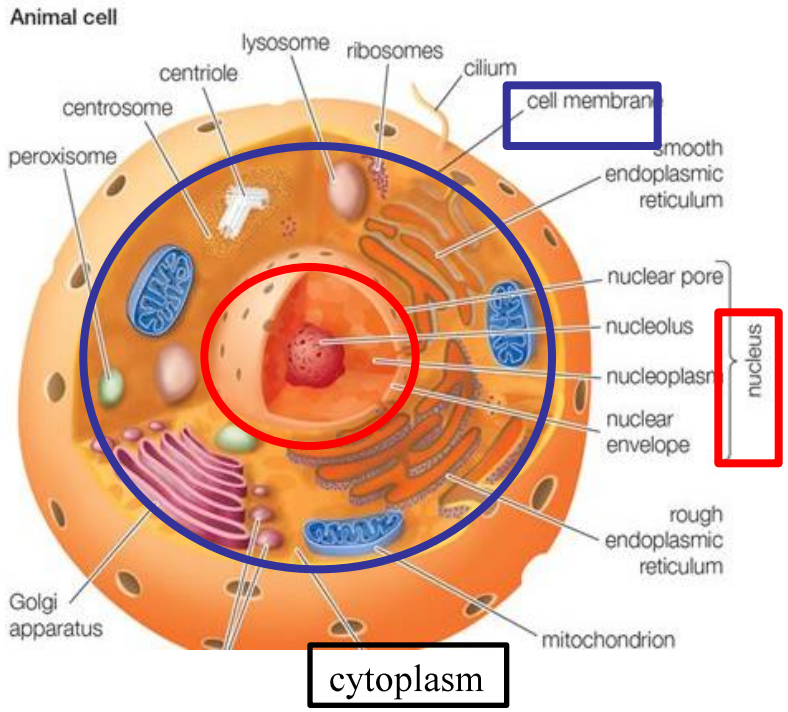
Eukaryotic cells

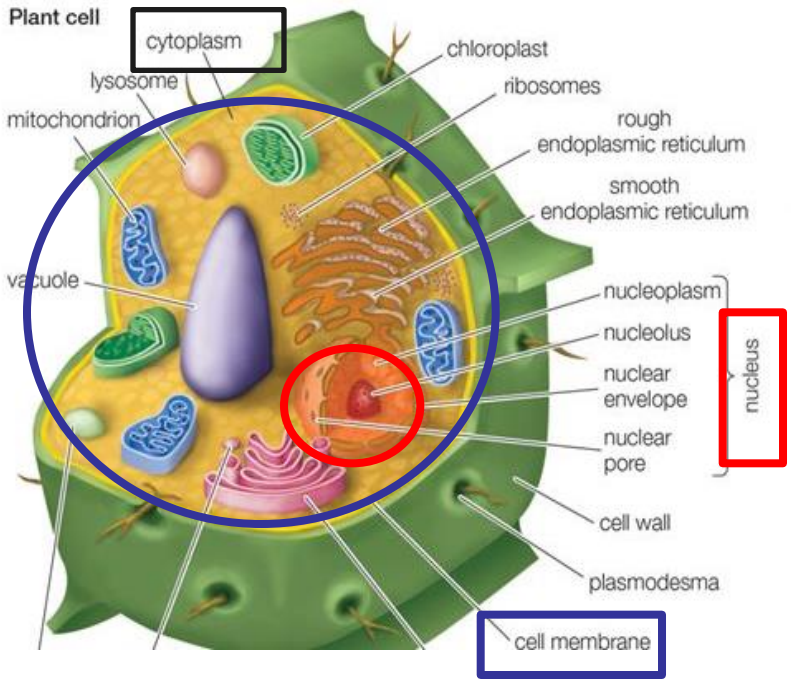
They have:-

- ✓ The hereditary material in the form of **chromosomes**
- ✓ A nucleus surrounded by a **nuclear membrane**
- ✓ Many organelles in the cytoplasm e.g. animals, plants and fungi.



Plants and animals



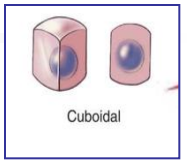


	Animal cells	Plant cells
1-	Cell wall is absent	Cell wall is present
2-	One or more small vacuoles	One large central vacuole
3-	Animal cells do not have chloroplast	Plant cells have chloroplast

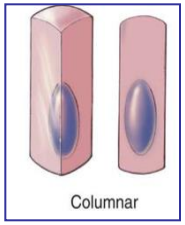
Cell shapes

- Cells come in different forms because they have different function:-

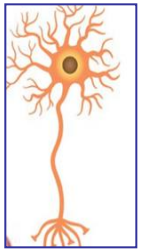
Cube like cell, cubical cells which is seen in cuboidal epithelium



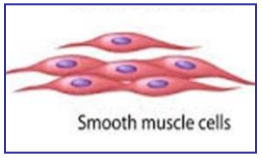
Long column like the goblet cell



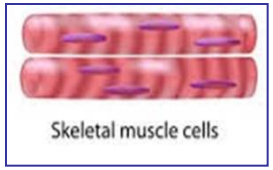
Nerve cells have long projections that help them carry electrical messages to other cells



Spindle shape in smooth muscle cells



Rectangular shape in skeletal muscle which is multinucleated



What is the size of a cell?

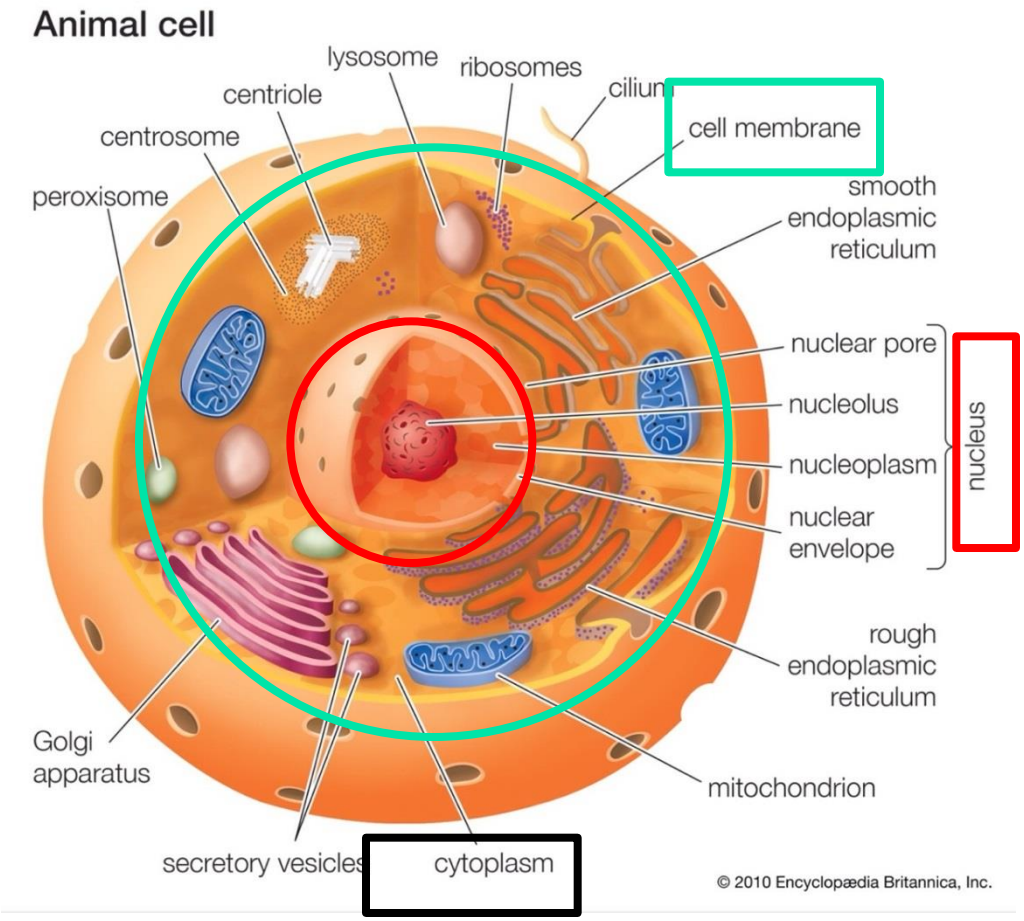
- Some large cells e.g. an egg such as frogspawn can be seen with the unaided eye but most cells are much smaller and so we need a microscope to be able to examine them.

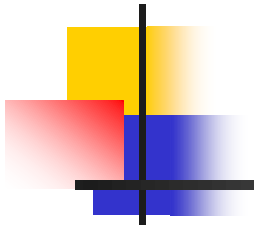
- Light microscopes can resolve structures that are 200 nm
- Electron microscopes can resolve structures that are 0.2 nm

Cells structures

- A cell consists of three main parts
  - ✓ Nucleus
  - ✓ Cell membrane
  - ✓ Cytoplasm
- Within the cytoplasm are many parts that do different functions these parts are called organelles (small organs)

Typical animal cells





Thank you