

WJEC (England) Biology AS-level

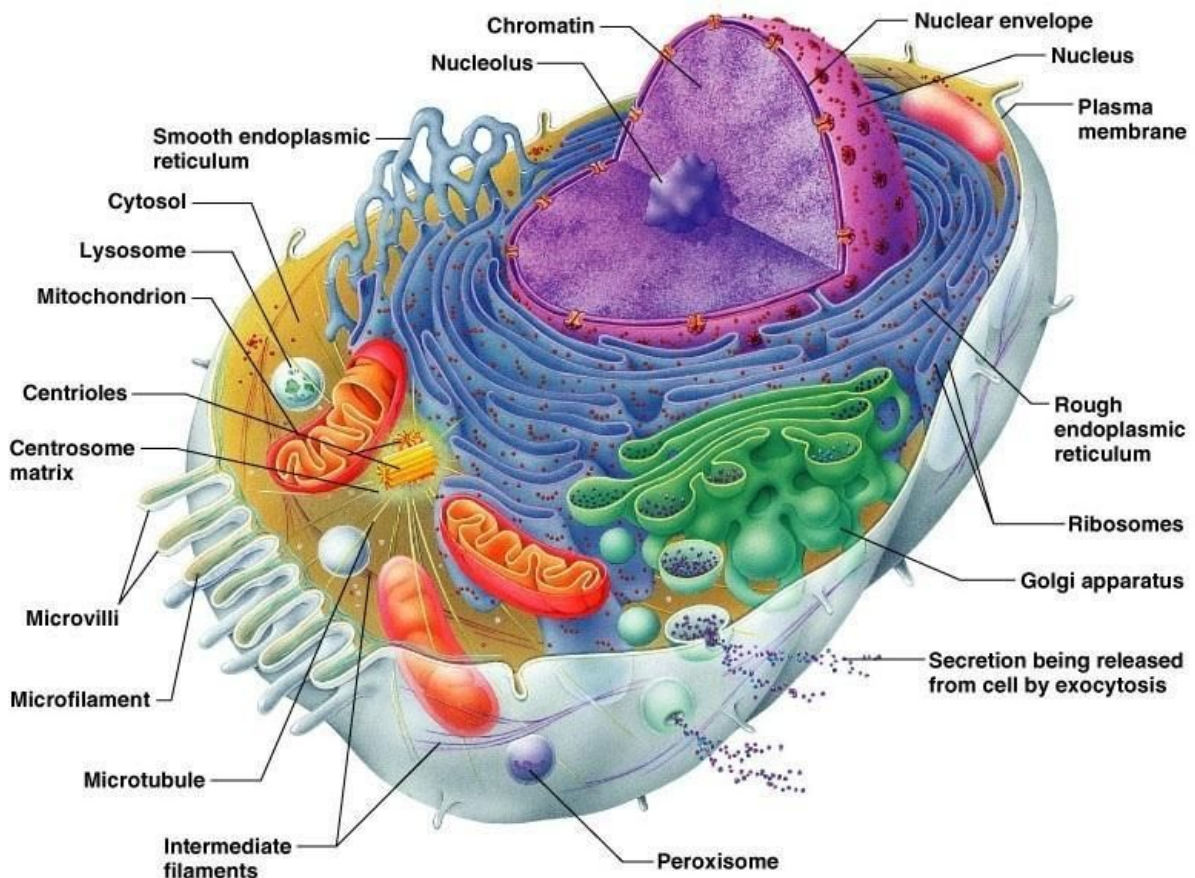
1.2: Cell structure and organisation

Notes

Cell structure

All living organisms are made of cells, there are several different types of cells, some of them sharing some common features. Humans are made up of **eukaryotic cells**. All eukaryotic cells contain a nucleus and membrane bound organelles. A more detailed structure of cells called the **ultrastructure** can be obtained by using a microscope.

Ultrastructure of eukaryotic cells:



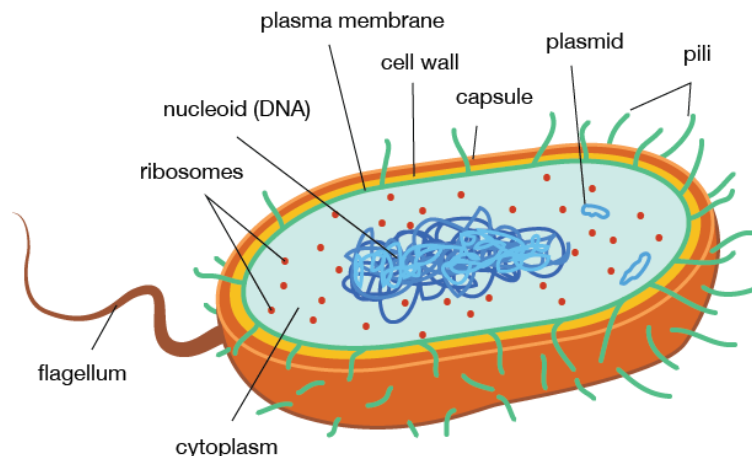
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- **Nucleus** surrounded by a **double membrane called the envelope** containing **pores** which enable molecules to enter and leave the nucleus, the nucleus also contains **chromatin** and a **nucleolus** which is the site of ribosome production.
- **Rough endoplasmic reticulum** which is a **series of flattened sacs** enclosed by a membrane with ribosomes on the surface. RER **folds and processes proteins** made on the ribosomes.
- **Smooth endoplasmic reticulum** is a system of **membrane bound sacs**. SER **produces and processes lipids**.
- **Golgi apparatus** is a series of **fluid filled, flattened & curved sacs** with vesicles surrounding the edges. Golgi apparatus **processes and packages proteins and lipids**. It also **produces lysosomes**.

- **Mitochondria** are usually **oval shaped, bound by a double membrane called the envelope**. The inner membrane is folded to form projections called **cristae** with **matrix** on the inside containing all the enzymes needed for **respiration**.
- **Centrioles** are **hollow cylinders** containing a ring of **microtubules** arranged at right angles to each other. Centrioles are involved in **cell division**.
- **Ribosomes** are **composed of two sub-units** and are **the site of protein production**
- **Lysosome** is a vesicle containing **digestive enzymes** bound by a **single membrane**

Prokaryotic cells such as bacteria contain:

- **Cell wall** – Rigid outer covering made of **peptidoglycan**
- **Capsule** – Protective slimy layer which helps the cell to **retain moisture** and **adhere** to surfaces
- **Plasmid** –Circular piece of DNA
- **Flagellum**- a tail like structure which **rotates to move the cell**
- **Pili**- Hair-like structures which attach to other bacterial cells
- **Ribosomes**- Site of **protein production**
- **Mesosomes**- Infoldings of the inner membrane which **contain enzymes required for respiration**



Viruses are **non-living** structures which consist of **nucleic acid** (either DNA or RNA) enclosed in a protective protein coat called the **capsid**, sometimes covered with a lipid layer called **the envelope**.

Cells of multicellular organisms are organised into **tissues, tissues into organs and organs into systems**.