

# **WJEC Biology A-level**

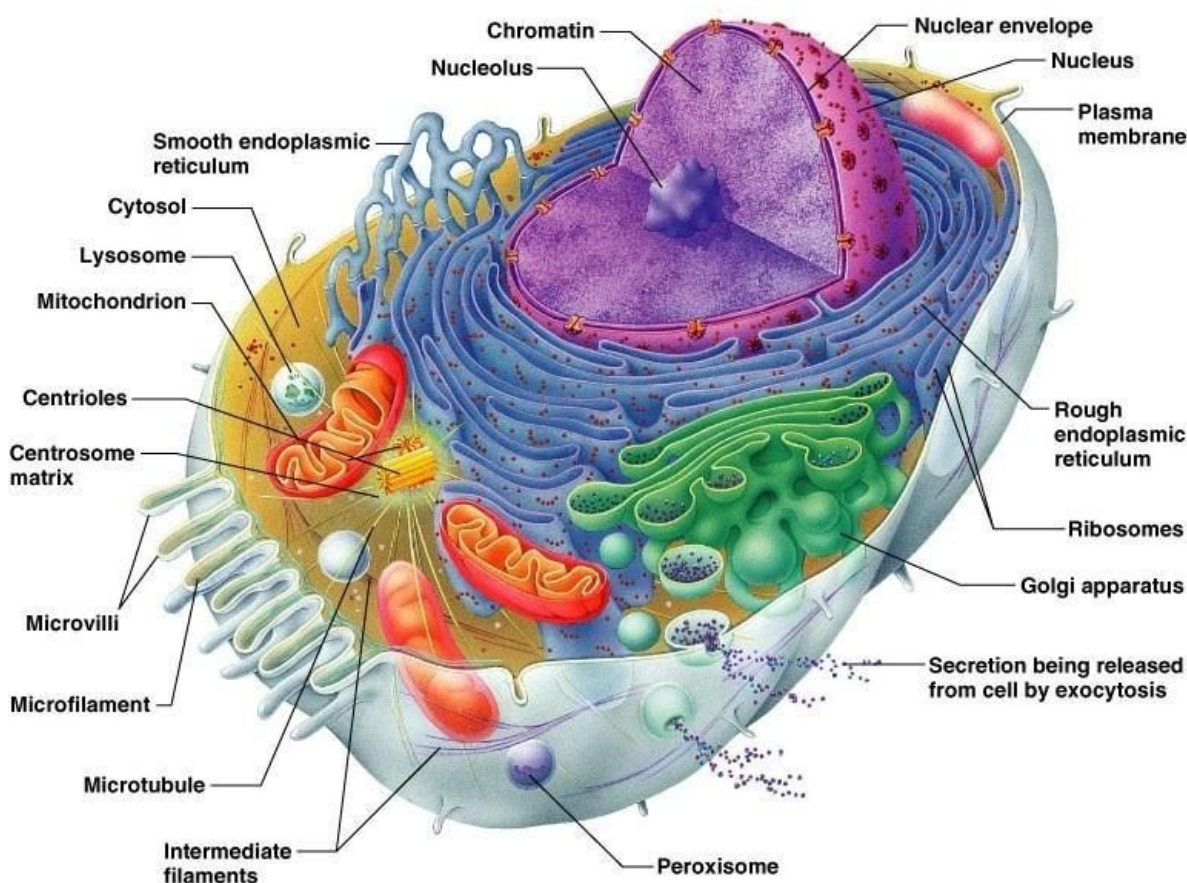
## **Topic 1.2: Cell structure and organisation**

### 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:



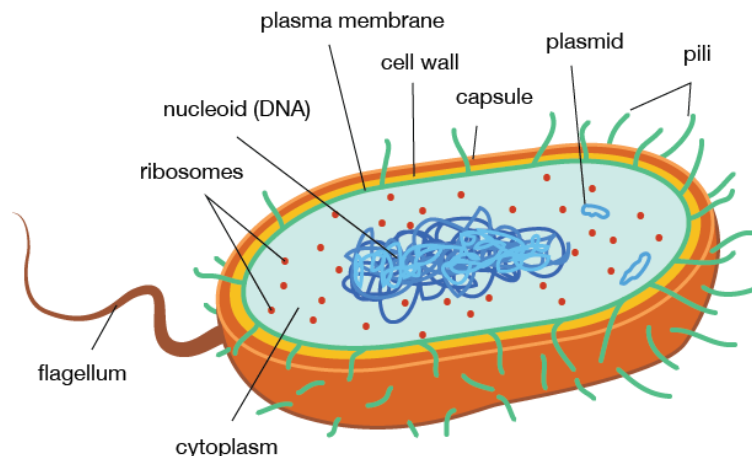
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- **Nucleus** surrounded by a **double membrane called the envelope** containing **pores** which enable molecules to enter and leave the nucleus, the nucleus also contains **chromatin** and a **nucleolus** which is the site of ribosome production.
- **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**.