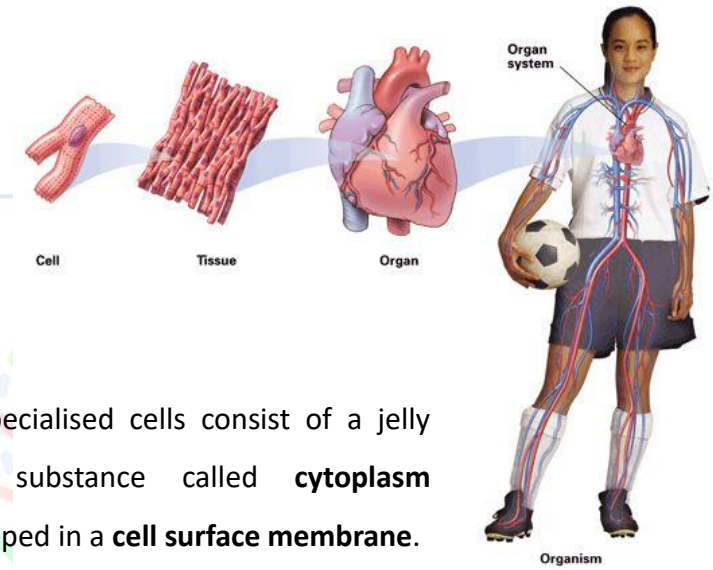
Revision sheet - IGCSE Biology

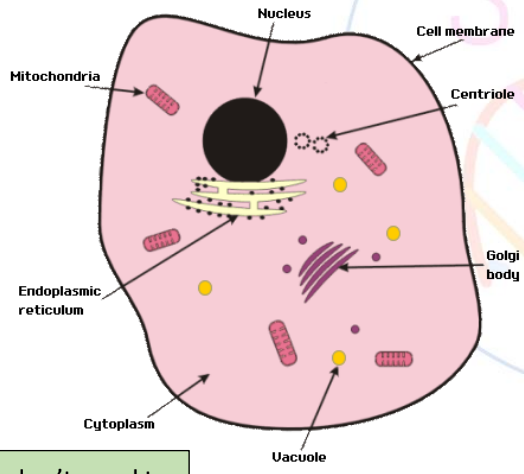
Lesson 1: Unspecialised cells

Make sure you can sketch a cell for the exam.

- Cells are the building blocks of a human.
- A **tissue** is a group of similar cells working together to perform a function.
- A collection of different tissues working together to perform a function is an **organ**.
- Multiple organs working together is a **system**. For example, the reproductive system, cardiovascular system and digestive system.
- All unspecialised cells have a similar structure (they look the same).
- Unspecialised means they don't perform a specific job.



STRUCTURE OF AN UNSPECIALISED CELL



- Unspecialised cells consist of a jelly like substance called **cytoplasm** wrapped in a **cell surface membrane**.
- The membrane is **partially permeable** as only small substances can pass through. It is **selectively permeable** because some larger substances can pass but only through special gates called **carrier proteins**.
- Many other structures called organelles exist inside the cell. Each has a specific function.

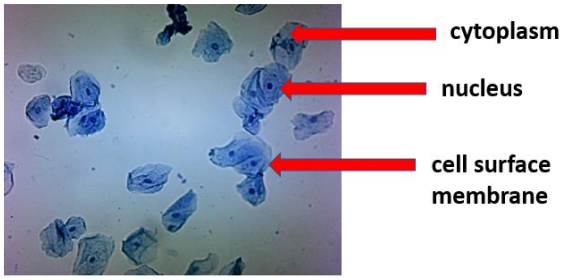
You don't need to know recognise the golgi body or centrioles.

The ER is not required for your syllabus, but it could give you a head start in level 8/9 questions.

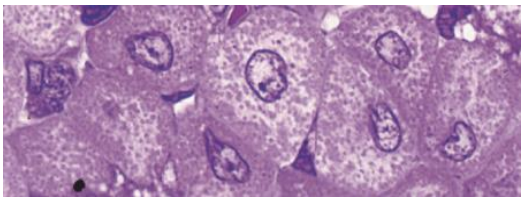
PART OF CELL	FUNCTION
NUCLEUS	Contains genetic material, which controls the activities of the cell.
MITOCHONDRIA	Releases the energy stored in glucose by respiration.
RIBOSOMES	The site of protein synthesis.
ENDOPLASMIC RETICULUM (ER)	A network of membranes. In some places covered in ribosomes. Spaces between the membranes allow for transport of proteins and other materials around the cell.
CELL MEMBRANE	Selectively and partially permeable. It controls the movement of substances in to and out of the cell.
CYTOPLASM	Where chemical reactions happen. Jelly like substance that makes up most of the cell.

- As cells are very small, we use microscopes to see them. Light microscopes have x 400 magnification. This means they can make something look 400 times bigger than it is.
- Transmission electron microscopes magnify up to 50,000 times, so more detail can be seen.

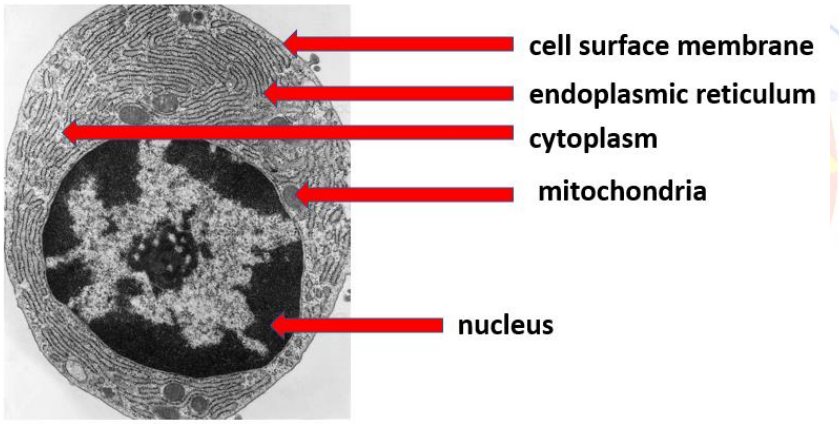
LIGHT MICROSCOPE IMAGES

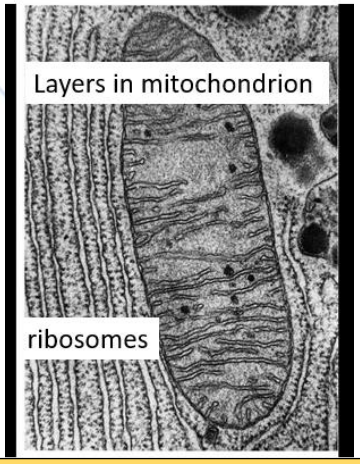


You can see mitochondria with a light microscope but not with any detail (see below). There are more in areas that need lots of energy like near the cell membrane.



TRANSMISSION ELECTRON MICROSCOPE IMAGES





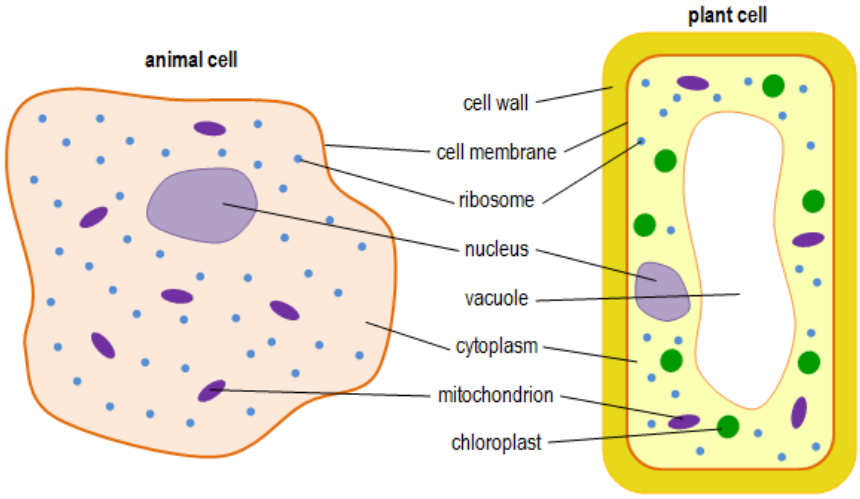
Much more detail can be see using an electron microscope, for example we can see ribosomes on the endoplasmic reticulum and layers inside the mitochondria. The scanning electron microscope is another type of electron microscope. It sees tiny structures in 3D. You don't need to know about it for your IGCSE but looking at the pictures is very interesting if you have time.

PLANT CELLS

- Plant cells have three more organelles than animal cells; chloroplasts, a vacuole and a cell wall.
- **Chloroplasts** contain **chlorophyll**, which absorbs light energy for **photosynthesis**.
- The **cell wall** strengthens the cell. It is made of a tough material called **cellulose**.
- The **permanent vacuole** is filled with cell **sap** to help keep the cell **turgid**.

sap = mainly food and some waste products.

Some animal cells have a vacuole, but it's so rare that your exam doesn't want you to know (shhh…our secret). We say plants have a permanent vacuole because they always have one. Vacuoles are super easy to spot in a diagram because they're the biggest organelle. Some take up 90% of the cell! This keep the cell turgid (full), so the plant won't wilt.



- To be thought of as 'living' an organism must carry out these 8 things:

1. Require nutrition i.e. eat (animals eat food, but plants make it from the sun).
2. Respire i.e. turn that food in to energy the body can use.
3. Excrete i.e. poo, wee and sweat.
4. Respond to stimuli i.e. react to pain, touch etc.
5. Move (plants move too. They just aren't as busy as us).
6. Control internal conditions. For example, maintain a constant body temperature.
7. Reproduce i.e. make offspring (science word for babies).
8. Grow and develop i.e. increase in size and complexity from birth.