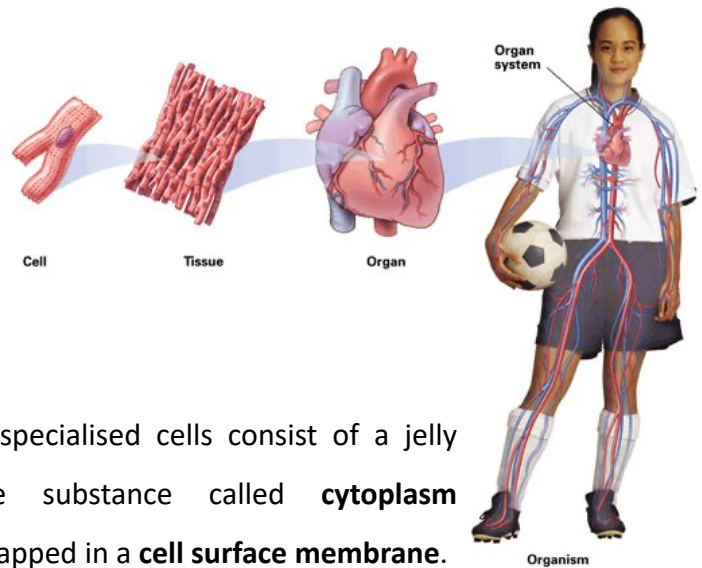


# Revision sheet - IGCSE Human Biology

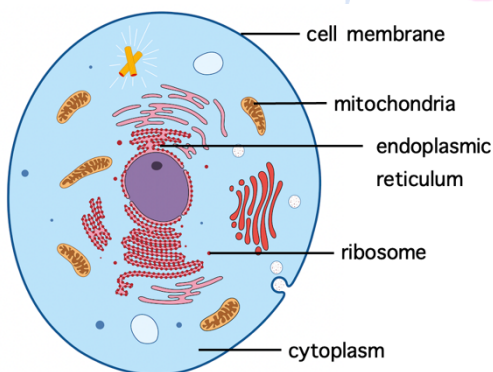
## Lesson 1: Unspecialised cells

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



Animal 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**.

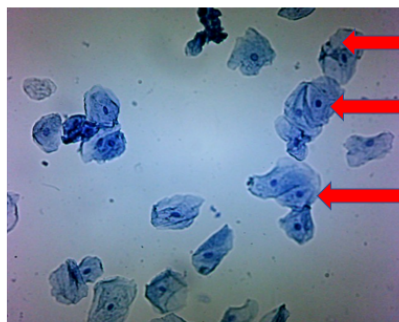
Many other structures called organelles exist inside the cell. Each has a specific function

More structures exist, but we don't learn these until A level biology.

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.
- Samples need to be prepared for a microscope. For the cheek cells bottom left we would swab the cheek, spread the sample thinly on a microscope slide (we don't want too many overlapping cells). Stain it to visualise the cells. Add a coverslip to protect them and the microscope. Then place the slide on the microscope to view.

## LIGHT MICROSCOPE IMAGES

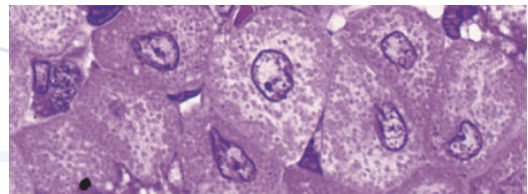


cytoplasm

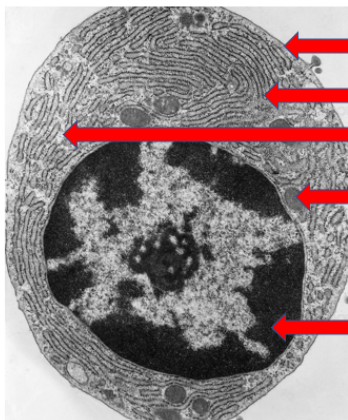
nucleus

cell surface membrane

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



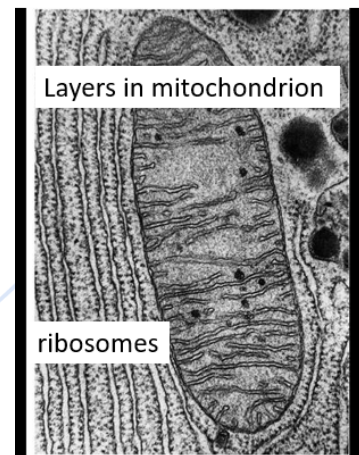
cell surface membrane

endoplasmic reticulum

cytoplasm

mitochondria

nucleus



Layers in mitochondrion

ribosomes

Much more detail can be seen using an electron microscope, for example we can see ribosomes on the endoplasmic reticulum and layers inside mitochondria. The scanning electron microscope is another type of electron microscope. It sees tiny structures in 3D. Google some pictures of SEM images if you have time.

## CALCULATING MAGNIFICATION

$$\text{Magnification} = \frac{\text{size of image}}{\text{size of real object}}$$

To find how much something is magnified fill in this equation. To rearrange it and find the actual size of the object or the size of the image you see use the pyramid right. Place your finger over the thing you want to find. If what is left are on top of each other divide. If next to each other multiply.

