

Cell Structure and Function Notes

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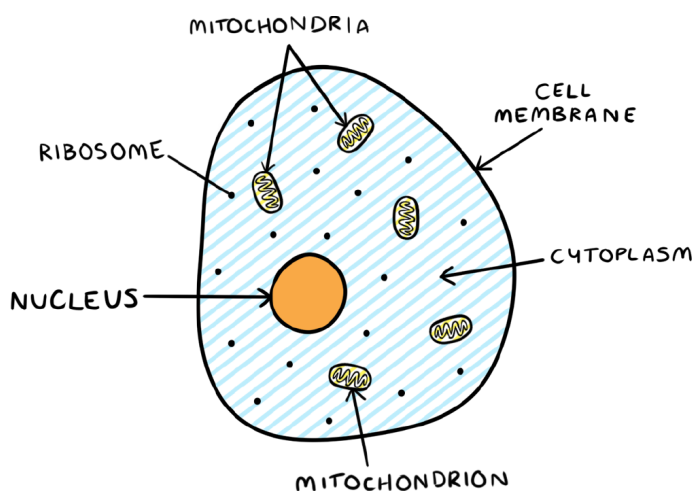


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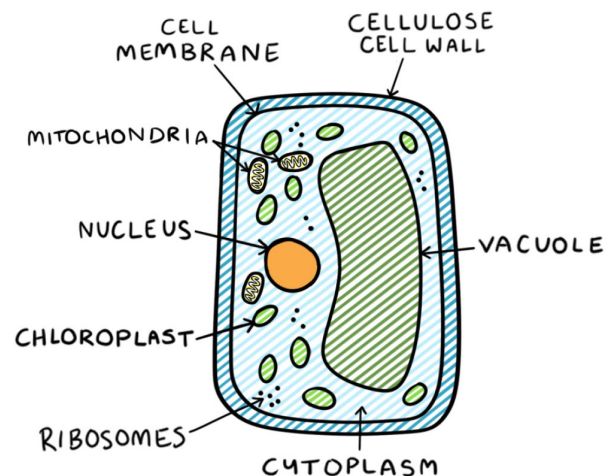
All organisms are made up of cells. The cell is the simplest unit (one part) that can live. Cells can be either **Eukaryotic** or **Prokaryotic**.

A eukaryotic cell: a cell which contains a nucleus and organelles, for example muscle cells in animals or palisade mesophyll cells in plants. Organelles are little organs inside cells, like chloroplast and mitochondria.

A prokaryotic cell: a cell which does not contain a nucleus or membrane bound organelles for example any bacterial cell. Membrane bound organelles are organelles that have their own membrane like mitochondria and chloroplasts.



An Animal Cell



A Plant Cell

Structure	Function
Nucleus	Contains the cell's DNA, which controls the cell's activities.
Cell membrane	Is <u>partially permeable</u> to substances and so it controls the <u>movement of substances in and out of the cell</u> .
Cytoplasm	A <u>jelly-like material</u> that contains dissolved nutrients and salts and structures called organelles. It is <u>where many of the metabolic chemical reactions take place</u> .
Ribosome	The site of <u>protein synthesis</u> , where proteins are made.
Mitochondria	Is the <u>organelle which is the site of aerobic respiration</u> . One is a Mitochondrion.
Cellulose cell wall	<u>Provides structure and support</u> to the cell. Only plant cells have walls that are made from <u>cellulose</u> .
Vacuole	Stores cell sap and water within the cell. It is involved in keeping the cell turgid (firm).
Chloroplast	An organelle that contains the <u>green pigment, chlorophyll</u> , which absorbs light energy for photosynthesis. <u>Chloroplasts are the site of photosynthesis</u> .

Comparing Cell Sizes: Orders of Magnitude

Cells are incredibly small, so we don't measure them in centimetres or millimetres. Instead, we use a much smaller unit called micrometres (μm). (Quick math reminder: 1 millimetre = 1000 micrometres!)

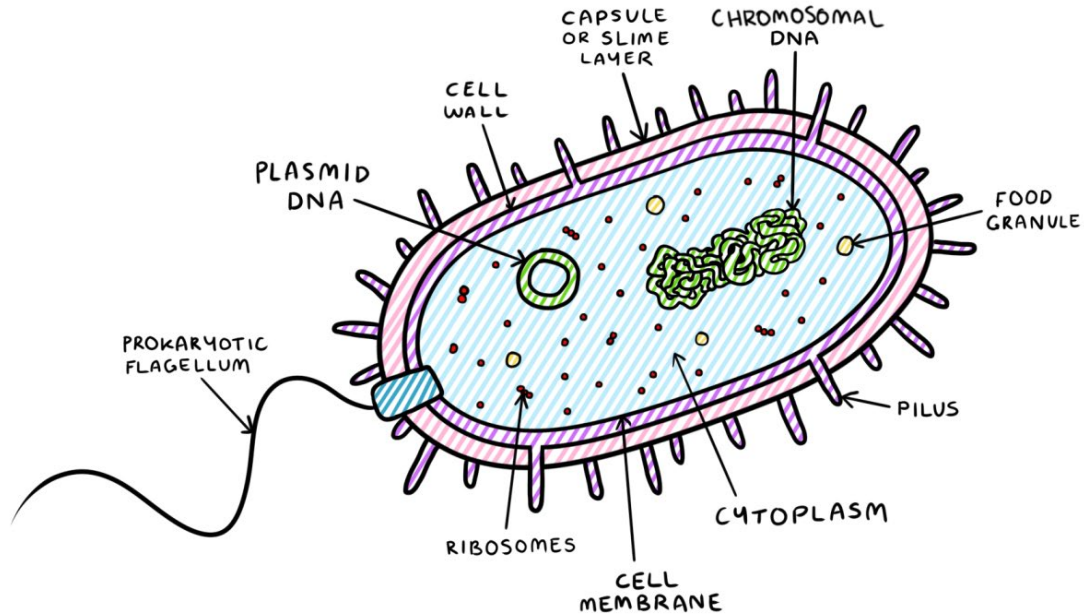
When we compare the actual sizes of different cells, we can see a massive difference:

Eukaryotic cells are typically 10 to 100 μm in size.

Prokaryotic cells are much smaller, typically just 1 to 10 μm in size.

Exam note: Because Eukaryotic cells are roughly 10 to 100 times larger than Prokaryotic cells, examiners love you to state that Eukaryotic cells are **1 to 2 orders of magnitude larger** than Prokaryotic cells 😊.

A Bacterial Cell



Structure	Function
Bacterial DNA	The DNA of bacterial cells is found loose in the cytoplasm. It is called chromosomal DNA and is not contained within a nucleus.
Cell membrane	Is <u>partially permeable</u> to substances and so it controls the movement of substances in and out of the cell.
Cell wall	<u>Provides structure and support to the cell.</u> Only bacterial cells have walls that are made from <u>peptidoglycan</u> .
Plasmid	Bacteria also have small, closed-circles of DNA called plasmids present in their cytoplasm. Unlike the chromosomal DNA, plasmid DNA can move from one bacterium to another giving genetic variation. This is how bacteria can share genes for traits like antibiotic resistance.
Pilus	These help the bacteria attach to surfaces, tissues or other bacteria.
Cytoplasm	Jelly-like material that contains dissolved nutrients, salts, and ribosomes. It is where many of the metabolic chemical reactions take place. <u>It lacks membrane-bound organelles.</u>
Flagellum	Bacteria can have one or more flagella. These can rotate or move in a whip-like motion to move the bacterium.
Ribosome	<u>The site of protein synthesis</u> , where proteins are made.
Capsule	This gives the bacteria some protection against phagocytes (a type of white blood cell).