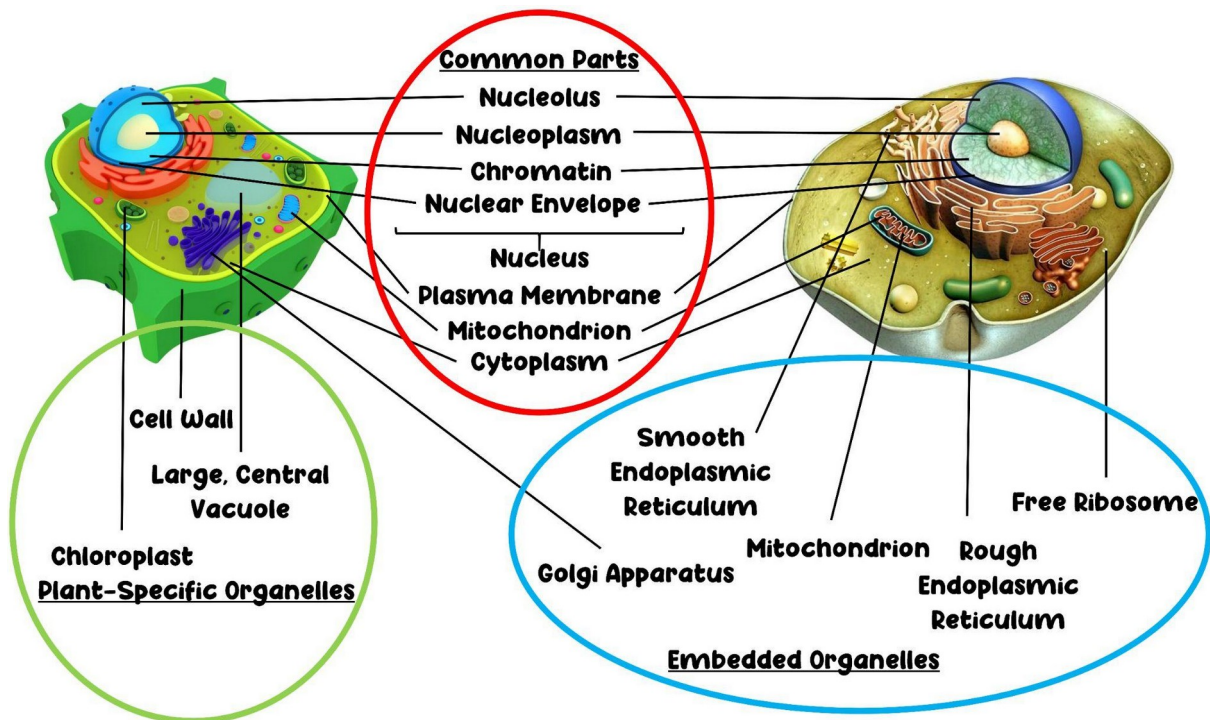


CELLS



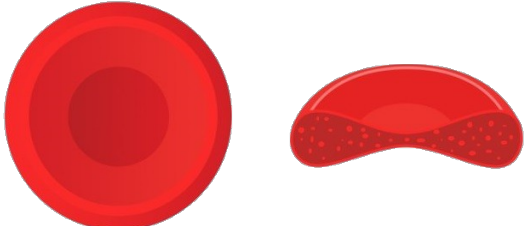
Organelle	Appearance / Functions	
Common Parts		
Nucleus	Controls cell activities such as cell growth and the repair of worn-out parts	
	Essential for cell division (cells without the nucleus, e.g. red blood cells of mammals, are unable to divide)	
	Nucleolus	Plays a part in the making of proteins in the cell
	Nucleoplasm	Smaller round denser protoplasm within the nucleus, surrounded by nuclear envelope
	Chromatin	Mass of long thread-like structures found within the nucleus
		Made up of proteins and deoxyribonucleic acid

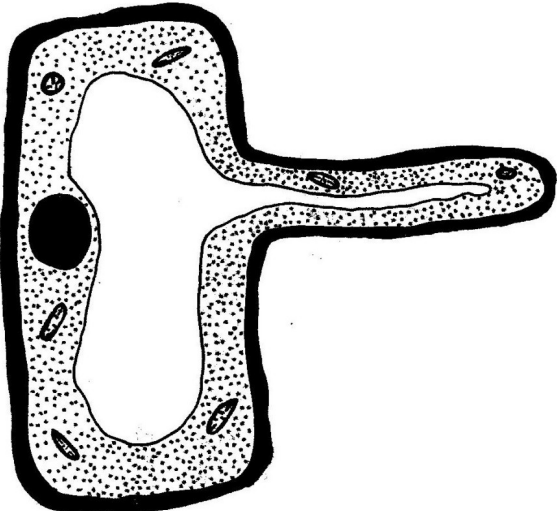
		DNA stores hereditary information and carries instructions that a cell needs for carrying out its activities
		Chromatin thread condenses into chromosomes when the cell is actively dividing
		Appear as thick rod-shaped structures under the light microscope
	Nuclear Envelope	Separates the contents of the nucleus from the rest of the cytoplasm
Plasma Membrane	Surrounds the cytoplasm of the cell	
	Made up of lipids and proteins	
	Controls the substances entering or leaving the cell by allowing only small substances to pass through but not the large ones	
Mitochondrion	Performs aerobic respiration in which glucose is oxidised to release energy	
	Sausage-shaped and double membrane appearance	
Cytoplasm	Where most cell activities occur	
	Contains special membrane-bound structures called organelles	
Plant-Specific Organelles		
Vacuole	Fluid-filled space enclosed by a membrane, storing substances within the cell	
	Large, Central (Plants)	Contain water and food substances
		Exists temporarily

	Small, Many (Animals)	Contains a liquid called cell sap which contains dissolved substances such as sugars, mineral salts and amino acids
		Enclosed by a partially permeable membrane called the tonoplast
Cell Wall	Made of cellulose and fully permeable	
	Protects the cells from injuries and gives the plant cell a fixed shape	
Chloroplast	Contain chlorophyll which absorbs light energy to carry out photosynthesis	
Embedded Organelles		
Smooth Endoplasmic Reticulum	Does not have ribosomes attached to its membrane and is more tubular than RER	
	Synthesises substances such as fats and steroids	
	Converts harmful substances into harmless substances, a process known as detoxification	
Rough Endoplasmic Reticulum	Appears rough when viewed under the electron microscope because small particles called ribosomes are attached to its outer surface	
	Its surface is continuous with the nuclear envelope	
Golgi Apparatus	Consists of flattened spaces surrounded by a membrane	
	Packages the substances in vesicles for secretion out of the cell	
	Stores, packages and chemically modifies substances made by the endoplasmic reticulum	
Ribosome	Small round structures needed to synthesise proteins in the cell	
	Attached	Attached to the RER

	Ribosome	Make proteins that are usually transported out of the cell
	Free Ribosome	Lie freely in the cytoplasm
		Make proteins that are used within the cytoplasm of the cell

SPECIALISED CELLS

Cell Structure	Adaption
	Contains haemoglobin which binds to oxygen and transports it from the lungs to all parts of the body

	• No nucleus to allow for more space to store more haemoglobin for more transport of oxygen • Circular, biconcave shape to increase the surface area to volume ratio for a faster transport of oxygen
	• No cross walls and protoplasm to enable water and mineral salts to move easily through the lumen without resistance • Lignin is deposited on xylem vessels to strengthen the xylem walls, preventing the xylem from collapsing
	• Long and narrow root hair to increase the surface area to volume ratio so that water and mineral salts can be absorbed at a faster rate • Large number of mitochondria that provides more energy for a higher rate of active transport of dissolved mineral salts

CLASSES OF NUTRIENTS

Factors	Carbohydrates	Fats	Proteins
Similarities			
Process to Form Large Molecules	Condensation Reaction		
Process To Break Down Large Molecules	Hydrolysis		
Differences			
Type of Elements	Carbon Hydrogen		Carbon Hydrogen

	Oxygen		Oxygen Nitrogen
Chemical Formulae	$C_nH_{2m}O_m$	-	-
Food Test	Benedict's Test	Ethanol Emulsion Test	Biuret Test
Simplest Molecules	Glucose Galactose Fructose	Glycerol Fatty Acids	Amino Acids