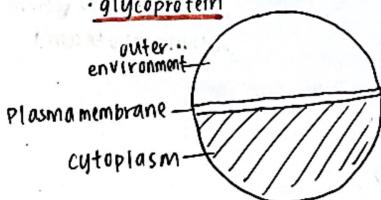


Mitochondrion (Plural: Mitochondria)

- rod-shaped / spherical
- consists of 2 layers of membrane
 - smooth outer membrane
 - folded inner membrane
- contains enzymes that play a role in cellular respiration
- Function: → generates energy thru the glucose oxidation process during cellular respiration
→ energy released in the form of ATP molecules (adenosine triphosphate) to be used by the cell
- Centriole
 - small cylindrical components that exist in pairs in animal cells
 - Made up of complex arrangement of microtubules
- Function: forms spindle fibre during cell division in animal cells

Golgi apparatus

- consists of a stack of parallel flattened sacs that are coated by a single cell membrane
- New membrane is added at one end of the Golgi apparatus + vesicles bud off from the other end
- Function: → processes, modifies, packs + transports chemicals:
 - protein
 - carbohydrates
 - glycoprotein



Lysosome

- small spherical sac enclosed in a single membrane
- contains hydrolytic enzymes
- Function:
 - hydrolyses complex organic molecules such as: protein, nucleic acid, lipid
 - breaks down bacteria + components of damaged cells



Ribosome

- small, compact + spherical granules
- consists of protein + ribonucleic acid (RNA)
- Ribosomes are present on the surface of endoplasmic reticulum / exist freely in the cytoplasm
- Function: → site for protein synthesis

nucleus (Plural: nuclei)

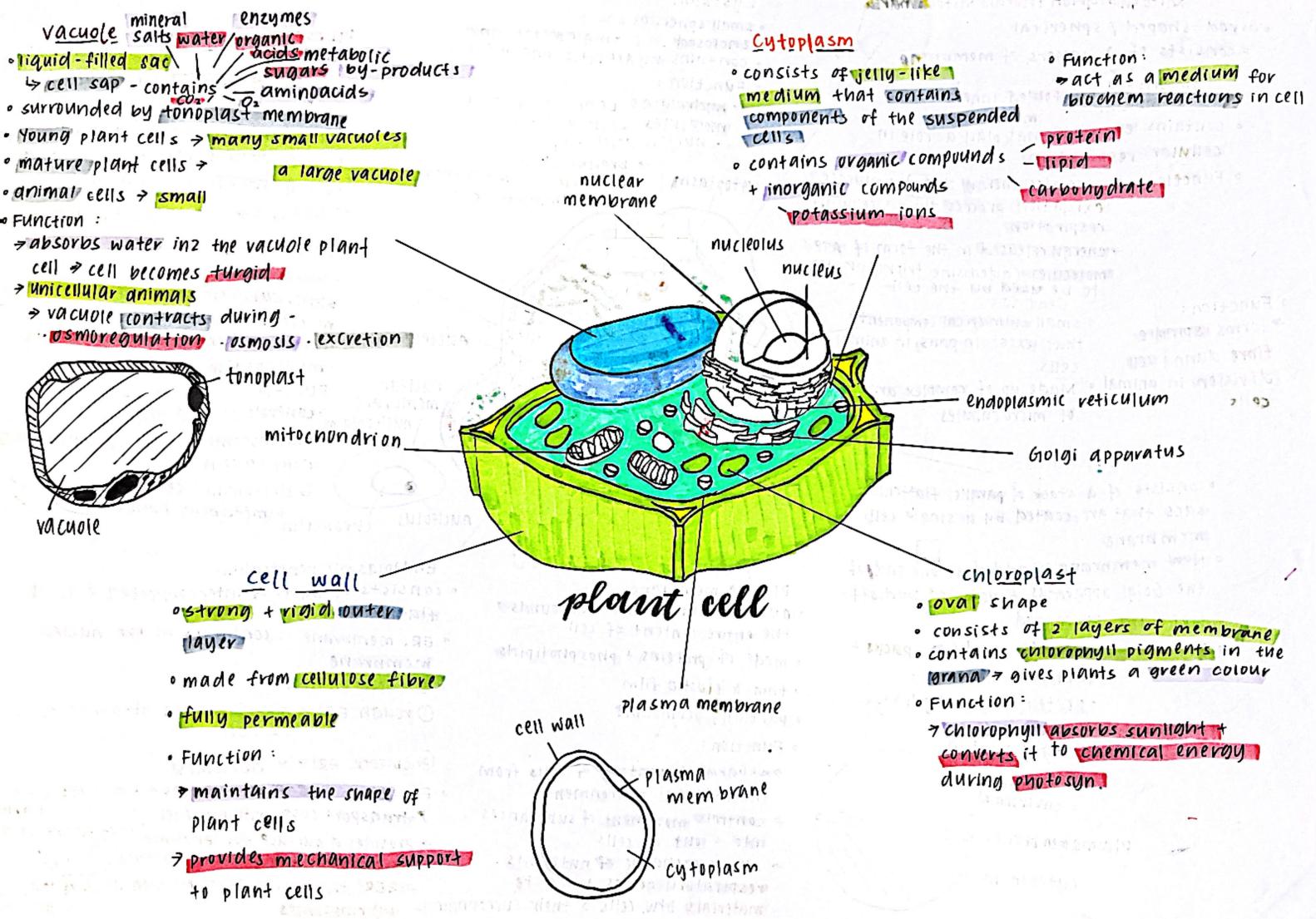
- Largest component in the cell
- spherical, compressed + enclosed in nuclear membrane w/ many pores
- contains chromosomes, nucleolus + nucleoplasm
- Function:
 - controls all cell activities
 - chromosomes contain deoxyribonucleic acid (DNA)
 - determines cell characteristics + metabolic functions

Plasma membrane

- (outer) membrane that surrounds the entire content of cell
- made of proteins + phospholipids
- thin & elastic film
- partially permeable
- Function:
 - separates content of cells from the external environment
 - controls movement of substances into + out of cell
 - allows exchange of nutrients, respiratory gases + waste materials btw cells & their surroundings

Endoplasmic reticulum

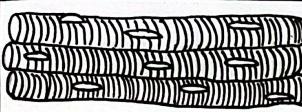
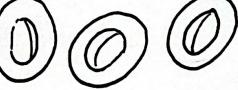
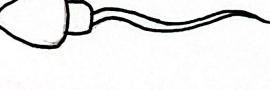
- consists of syst. of interconnected folded flattened sacs
- ER membrane is continuous w/ the nuclear membrane
- 2 types of ER:
 - ① rough ER → has ribosomes attached to the surface
 - ② smooth ER → x ribosomes
- Function:
 - SER synthesises + transports glycerol + transport cyst. within the cell (+ lipids, + carries out the detox. of drugs + metabolic products)
 - provides a surface for enzyme attachment + biochem. reactions
 - RER transports proteins synthesised by ribosomes

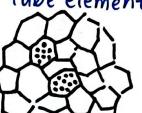


Living processes of unicellular organisms

Movement	Amoeba sp.	Paramecium sp.	<ul style="list-style-type: none"> grow by synthesising new cytoplasm
	<ul style="list-style-type: none"> constantly changes its shape when it encounters obstacles moves by extending out its pseudopodium (false feet) then, this is followed by the flow of cytoplasm into the extended pseudopodium 	<ul style="list-style-type: none"> Moves using rhythmic cilia beats 	
Nutrition	<ul style="list-style-type: none"> moves towards food by extending its pseudopodium to trap food particles by food phagocytosis <p>The food vacuole combined w/ lysosome + food particles are hydrolysed by the enzyme lysozyme</p> <p>Nutrients are absorbed into cytoplasm</p> <p>Undigested food is discharged thru the anus.</p>	<p>The presence of cilium beat helps transfer food particles into the oral groove.</p> <p>The food vacuole combined w/ lysosome + food particles are hydrolysed by the enzyme lysozyme</p> <p>Nutrients are absorbed into cytoplasm</p> <p>Undigested food is discharged thru the anus.</p>	<ul style="list-style-type: none"> respond to stimuli such as chemicals, touch / bright light by moving away from the stimuli
Respiration			<ul style="list-style-type: none"> exchange of O₂ and CO₂ gases occur thru the plasma membrane by simple diffusion on the surface of the cell
Excretory			<ul style="list-style-type: none"> waste such as CO₂ + ammonia are removed by diffusion water will diffuse by osmosis + fill the contractile vacuole as organisms live in freshwater environment. when the vacuole expands to its max. size, contraction occurs + water is excreted from time to time This process is called osmoregulation
Reproduction			<ul style="list-style-type: none"> when the conditions are suitable + there is plenty of food <ul style="list-style-type: none"> ↳ binary fission thru mitosis ↳ asexual reproduction when the environmental conditions are not suitable such as: <ul style="list-style-type: none"> • dry conditions • low temperature • food storage ↳ forms spores that will only germinate when the environment improves.
			<ul style="list-style-type: none"> when the conditions are suitable + there is plenty of food <ul style="list-style-type: none"> ↳ binary fission thru mitosis ↳ asexual reproduction when environmental conditions are not suitable <ul style="list-style-type: none"> ↳ conjugation ↳ sexual reproduction

Living processes in multicellular organisms

Human	
Type of cell	Specialisation
	<ul style="list-style-type: none"> arranged as multinucleate striated fibres contract + relax to generate movt.
	<ul style="list-style-type: none"> can change shape functions in destroying pathogens
	<ul style="list-style-type: none"> nucleus shaped as a biconcave disc functions to optimise transportation of O₂
	<ul style="list-style-type: none"> long and thin in shape functions in sending nerve impulses
	<ul style="list-style-type: none"> thin + flat cells coats the surface of organs such as the digestive tract
	<ul style="list-style-type: none"> has a long tail <ul style="list-style-type: none"> enable it to swim towards the ovum in the Fallopian tube the head <ul style="list-style-type: none"> carries a set of chromosomes from male

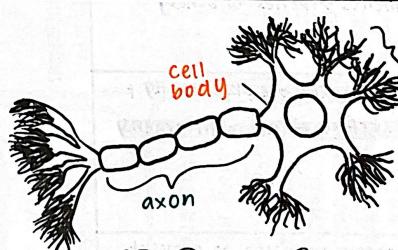
Plants	
Type of cell	Specialisation
 	<ul style="list-style-type: none"> long cylindrical tubes arranged from end to end transports organic materials from leaves to storage organs such as fruits
 	<ul style="list-style-type: none"> consists of long cylindrical cells, arranged vertically + close to each other <ul style="list-style-type: none"> allows max. absorption of sunlight for photosyn. contains high chlorophyll density
	<ul style="list-style-type: none"> cells are loosely arranged w/ a lot of air space btwn <ul style="list-style-type: none"> allows exchange of gas from the inside of the leaves to the palisade mesophyll cell
	<ul style="list-style-type: none"> modified lower epidermal cells w/ thicker cell wall on the inner side controls the opening + closing of stoma <ul style="list-style-type: none"> allows the exchange of O₂ + CO₂
 	<ul style="list-style-type: none"> has a long projection which adds surface area for the absorption of water + mineral salts.
	<ul style="list-style-type: none"> long, continuous hollow tube functions in transporting water + mineral salts from roots to the other parts of the plant

epithelial tissue

Diagram	Functions
	<ul style="list-style-type: none"> covers the surface of the mouth + oesophagus protect against infections + injuries
	<ul style="list-style-type: none"> covers the surface of lungs, body cavities + blood vessels allow gaseous exchange in alveoli and blood capillaries
	<ul style="list-style-type: none"> covers the surface of the trachea + bronchus consist of cilia, has elongated cells to secrete mucus + traps dust
	<ul style="list-style-type: none"> lines tubules, glands + Fallopian ducts modified to form sweat glands, sebaceous glands
	<ul style="list-style-type: none"> covers the small intestine absorbs nutrients after digestion has goblet cells to secrete mucus

muscle tissue

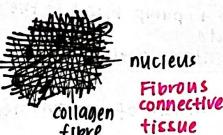
Diagram	Description
	<ul style="list-style-type: none"> found in oesophagus, liver, stomach, blood vessels contract slowly enable involuntary activities such as: → peristalsis along the digestive tract
	<ul style="list-style-type: none"> attached to bones involved in control movement contract + relax to generate moment in bones + limbs
	<ul style="list-style-type: none"> found in contractile wall of the heart builds walls of the heart contract + pump blood to the whole body → involuntary action



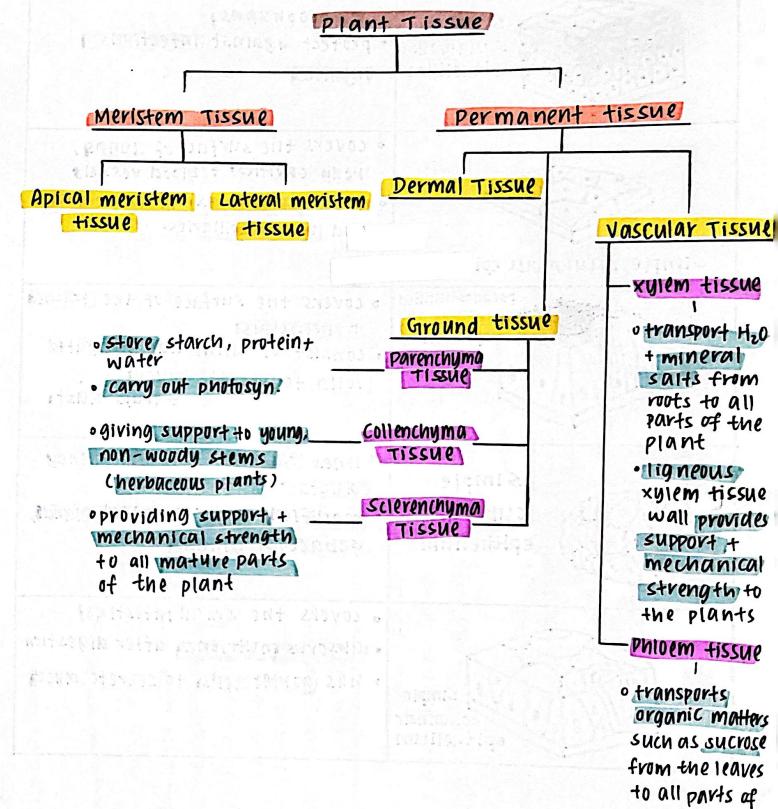
nerve tissue

- made of neuron / nerve cells
- consists of cell body + nerve fibre called dendrite + axon
- detect stimuli + send info in the form of electrical signal (nerve impulses) to the muscles / glands
- regulates + controls body activt.

connective tissue

Diagram	Description
 Blood Tissue	<ul style="list-style-type: none"> Plays a functional role in regulation, transportation + protection.
 Loose connective tissue	<ul style="list-style-type: none"> LINKS the epithelial tissue to the tissue below it. fixes the organs in their positions.
 bone	<ul style="list-style-type: none"> forms the body frame. protects the internal organs.
 collagen fibre nucleus Fibrous connective tissue	<ul style="list-style-type: none"> form tendons + ligaments tendon → connects bones + muscles ligaments → bones to bones
 adipose tissue	<ul style="list-style-type: none"> keep fat under the skin dermis + the surface of all main organs
 cartilage	<ul style="list-style-type: none"> encloses bone tips to prevent the bone from wearing out

tissue organisation in plants



main organ system in the human body

endocrine system

- organs: endocrine gland
↳ secretes hormones
- function: coordinates body activities w/ the nervous system

Blood Circulatory System

- organs: heart, artery, vein + blood capillary
- function: transport nutrients, respiratory gases + waste products

urinary system

- organs: kidney, urethra, ureter, bladder
- function: eliminates waste products such as urea + uric acid from the body

Integumentary system

- organ: skin
- function: protects the body from physical injury, infection + dehydration

nervous system

- organs: brain, spinal cord + peripheral nerves
- function: detects + sends info in the body, as well as coordinates body activities

Digestive system

- organs: mouth, oesophagus, stomach, liver, pancreas, small intestine + large intestine
- function: digests food in a simpler form for easy absorption

Lymphatic system

- organs: spleen, lymph nodes + lymph vessels
- function: maintains balance of bodily fluids + prevents infectious diseases

Muscular system

- organs: skeletal muscles, smooth muscles + cardiac muscles
- function: contracts + relaxes to produce moves in body different parts of the body

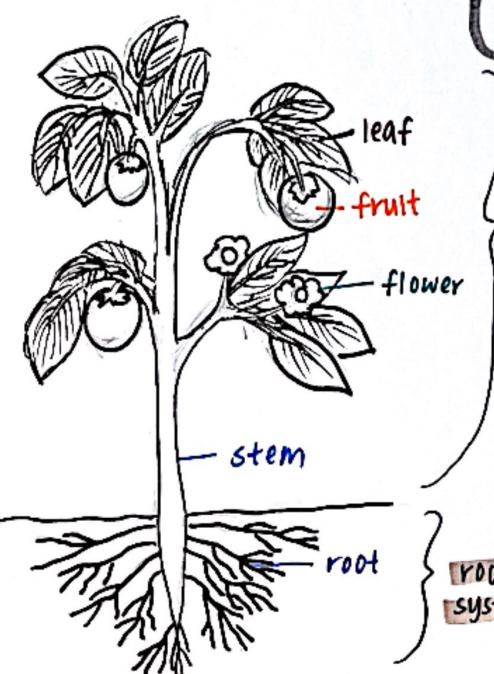
male reproductive system

- organs: testes, prostate gland + penis
- function: produces sperm + male sex hormone

female reproductive system

- organs: ovary, uterus, Fallopian tube, vagina, cervix
- function: produces ovum + female sex hormones

2 main systems in plants



shoot system

stems + twigs → support syst.

→ support the leaves at a vertical position to allow max. absorption of sunlight during photosyn.

root system

→ absorbing water + mineral salts

→ providing support for plants

