DISCOVERIES

Robert Hooke discovered cells in 1665. Leeuwenhoek discovered free living cells in pond water in 1674. Robert Brown discovered nucleus in 1831. Purkinje termed 'protoplasm' in 1839. Schleiden [1838] and Schwann [1839] proposed the cell theory. Virchow expanded the cell theory in 1855. discovery of electron microscope in 1940.

TERMS

flexibility of the plasma membrane enables the cell to engulf food and other materials from its environment. this process is called **endocytosis**. ex. amoeba

when a living plant cell loses water through osmosis, there is a shrinkage or contraction of contents of the cell away from the cell wall. this is called **plasmolysis**.

DIFFUSION /\ OSMOSIS

movement of substances from high concentration to low concentration until they are spread out	movement of water molecules from high concentration to low concentration through a semi-permeable membrane
occurs in any medium	occurs only in liquids
semi-permeable membrane not reqd	semi-permeable membrane reqd
can be carried out by dead cells	only living cells carry out osmosis

role of diffusion: gaseous exchange b/w cells & cells and its external environment.

ex. of osmosis: absorption of water by plant roots, unicellular freshwater organisms gain water through osmosis.

ony living cells perform osmosis but dead cell

TYPES OF SOLUTIONS

HYPOTONIC	HYPERTONIC	ISOTONIC
has higher concentration of water in the medium than in the cell. if we place a cell in it, it gains water and swells up due to endosmosis	has higher concentration of water in the cell than in the medium. if we place a cell in hypertonic solution, the cell loses water and shrinks due to exosmosis	has concentration of water same in and outside the cell. if we place a cell in an it, there will be no net movement of water across cell membrane and the cell remains the same size

acc to their chemical composition, diff regions of cells color differently. iodine, safranin & methylene blue solutions.

CELL WALL

outermost covering of plant cells. made up of cellulose and is rigid and non-living.

provides protection, shape and structural strength to and freely allows materials to move in and out.

permit plant, fungi & bacteria cells to withstand very dilute external media w/o bursting.

PLASMA MEMBRANE/\CELL WALL

outermost covering of animal cells	outermost covering of plant cells
made up of lipids and proteins	made up of cellulose
flexible and living	rigid and non-living
selectively permeable membrane	freely permeable membrane
seperates inner contents of the cell from its external environment, provides protection and shape to cells and allows entry and exit of materials in and out of cells	provides protection, shape and structural strength and freely allows materials to move in and out

NUCLEUS

nuclear membrane: double layered covering. separates inner contents of the cell from cytoplasm.
nuclear pores: minute openings in nuclear membrane, allows transfer of material b/w nucleus & cytoplasm.
nucleoplasm: jelly-like substance containing nucleolus and chromosomes.
nucleolus: small dark spherical structure composed of RNA and proteins.
chromosome: a thread-like structure in nucleus known as chromatin reticulum. during cell division, it organizes to form a rod-like structure called chromosome. it has DNA [functional unit: genes, help in transfer of characteristics from parents to offspring] and proteins. controls all activities of the cell, helps in cellular reproduction/cell division & transfer of characteristics from parents to offspring.

PROKARYOTIC CELL Λ EUKARYOTIC CELL

size 1-10nm	size 5-100nm
nuclear region is an undefined nucleus w/o nuclear membrane, containing only nucleic acids [nucleoid]	nuclear region is well defined and nucleus is surrounded by nuclear membrane
single chromosome	more than one chromosome
membrane bound cell organelles absent	membrane bound cell organelles present
ex. blue green algae, bacteria	ex. plant cell, animal cell

unicellular organisms: amoeba, chlamydomonas, paramoecium & bacteria.
multicellular organisms: some fungi [mushroom], plants & animals.
chlorophyll in photosynthetic prokaryotic bacteria is associated w/ membranous vesicles but not w/ plastids as in eukaryotic cells.

RER Λ SER

ribosomes attached to surface	ribosomes absent
helps in synthesis of proteins	helps in synthesis of lipids and fats
seen near nucleus	seen near plasma membrane

ER is a large network of membrane bound tubes and vesicles. it is made up of lipids and proteins.
it serves as channels for transport of materials b/w regions of cytoplasm or nucleus and cytoplasm. acts as a cytoplasmic framework for various activities of cell. in liver cells of vertebrates, SER detoxifies poisons and gases.

MEMBRANE BIOGENESIS

process of building up of new cell membrane using lipids and proteins synthesized by SER AND RER.

GOLGI APPARATUS

membrane bound, vesicles are arranged parallel to each other in stacks [cisterns]. often has connections w/ ER. Camillo Golgi.
helps in storage, modification, packaging and dispatching off products in vesicles. complex sugars may be made from simple sugars. involved in formation of lysosomes.

LYSOSOMES

membrane bound sacks filled with digestive enzymes made by RER.
waste disposal system of cell. aka 'suicide bags'.
helps keep cell clean by digesting any foreign material and worn out cell organelles

MITOCHONDRIA

oval shaped organelle having own DNA and ribosomes. surrounded by a double layered membrane. outer membrane porous. inner membrane deeply folded inwards for larger surface area for ATP generating chemical reactions. inner folding is called cristae.
aka powerhouse of cell as it releases energy reqd for various activities of cell [ATP aka energy currency of cell].

PLASTIDS

CHROMOPLASTS	LEUCOP-LASTS	CHLORO-PLASTS
colored except green	colorl-ess/white-	green coloured
gives color to petals and fruits pollination and dispersal of roots and seeds	help in photos-ynthesis	store starch, oil and protein granules

membrane bound organelle having own DNA and ribosomes. chloroplast contains many membrane layers embedded in the stroma.

VACUOLES

storage sacks for liquid/solid content. small in animal & big [50-90%] in plant cells.
[plant cells] vacuoles are full of sap, provide turgidity and rigidity to cell. store amino acids, sugars, organic acid, & some proteins.
[unicellular organisms] food vacuoles help in intake & digestion of food and specialized vacuoles expel excess water and wastes from cell.

ANIMAL CELL Λ PLANT CELL

outermost covering: plasma membrane	outermost covering: cell wall
plastids absent	plastids present
vacuoles absent/small	large vacuoles present
prominent & highly complex golgi apparatus near nucleus	golgi apparatus is in the form of sub-units

MITOSIS Λ MIOSIS

occurs in body [somatic] cells	occurs in reproductive cells
1 nuclear division	2 nuclear divisons
chromosome number remains same	chromosome number reduces to half
2 identical daughter cells produced	4 non-identical daughter cells produced
helps in growth & repair of tissues in organisms	helps in maintaining chromosome number same every generation

process by **cell division**. mitosis: involved in growth & repair of body. miosis: forms gametes.

By **Ayesha Talib**
cheatography.com/ayesha-talib/

Not published yet.
Last updated 28th January, 2023.