

"The cells"

- cell is the basic, living, structural & functional unit of body
- Principal parts of cells are :- plasma Membrane
 - cytoplasm
 - Nucleus
- Plasma Membrane surrounds & contains cytoplasm of cell.
- Membrane composed of lipid bilayer in which proteins float.
- Membrane proteins function as ion channels, transporters of specific substances, receptors of specific ligands, enzymes.
- Membrane is selectively permeable to certain substances
- Transportation be passive (movement of substance down its concentration gradient using its own kinetic energy) or active (cellular energy drives a substances against concentration gradient).
- Passive processes are simple diffusion through lipid bilayer or through ion and water channels.
- Endocytosis, infolding of plasma membrane forms a vesicle around the substances & detaches from it.
- Exocytosis vesicles containing cellular secretⁿ or excretion merge with the plasma mem.
- cytoplasm consists of cytosol & organelles
- cytosol (water + solutes + suspended particles) is medium in which many of cell's metabolic reaction occur.
- organelles are specialized structures with characteristic shape & each has functions
- Ribosomes (rRNA + ribosomal proteins) free ~~fr~~ in cytosol or attached to

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rough ER & perform protein synthesis.

- Endoplasmic reticulum or ER membranous network of flattened sacs or tubules. may be rough or smooth
- Smooth ER (SER) : synthesis fatty acids & steroids, detoxify drugs, and other harmful substances, stores & releases Ca^{2+} ions that trigger contraction in muscle cells.
- Rough ER (RER) : synthesis glycoproteins & phospholipids for internal or external transport.
- Golgi complex (stack of 3-20 flattened cisternae) has an entry cis face, medial cisternae & exit (trans) face.
- It modifies, sorts, packages, & transports proteins received from RER.
- It forms secretory vesicles, membrane vesicles & transport vesicles
- Lysosomes & membrane enclosed vesicles containing digestive enzymes.
- Mitochondria consists of smooth outer membrane, inner membrane infolded into cristae & a fluid filled cavity called matrix.
- These are power houses of cell produces most of cell's ATP
- cilia & flagella are formed by basal bodies. cilia move fluid along cell membrane, flagella move the entire cell.
- Nucleus consists of double membrane nuclear envelope, nuclear pores for regulating movement of substances to or from cytoplasm

The Blood

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- The cardio-vascular system consists of blood, heart & blood vessels
- Blood is connective tissues composed of blood plasma & formed elements
- Functions of blood include transportation of various substance, regulation of physiological conditions & protection.
- Physical characteristics include viscosity than water, pH = 7.35 - 7.45, temp = 38°C
Blood vol = 4-6 L.
- Blood constitutes 8% of body wt.
- Blood have 2 components: Blood plasma 55%
elements 45%.
- Blood plasma consists of 91.5% water & 8.5% solute
- Formed elements in blood include RBC, WBC, platelets
- Hemopoiesis is formed of blood cells from hemopoietic stem cells in red bone marrow
- RBCs are biconcave discs, contains hb, lack nuclei
- Hematocrit value of percentage of total blood volume occupied by RBCs
- ESR (erythrocyte sedimentation rate) is rate at which the erythrocytes settle down to form a

- sedimentation when allowed to stand in test tube.
- WBC are nucleated cells, combat inflammation & infection
 - WBC are 2 types :
 - granulocytes (neutrophils, eosinophils, basophils)
 - agranulocytes (lymphocytes & monocytes)
 - Neutrophils & macrophages combat infection through phagocytosis
 - Eosinophils combat the effects of histamine in allergic rxns & phagocytize antigen-antibody
 - Platelets are disc shaped cell fragments
 - Platelets stop bleeding.
 - ABO & Rh blood groups are genetically determined & based on antigen-antibody responses.
 - In ABO blood grp, the presence or absence of A & B antigens on the surface of RBCs determines blood type