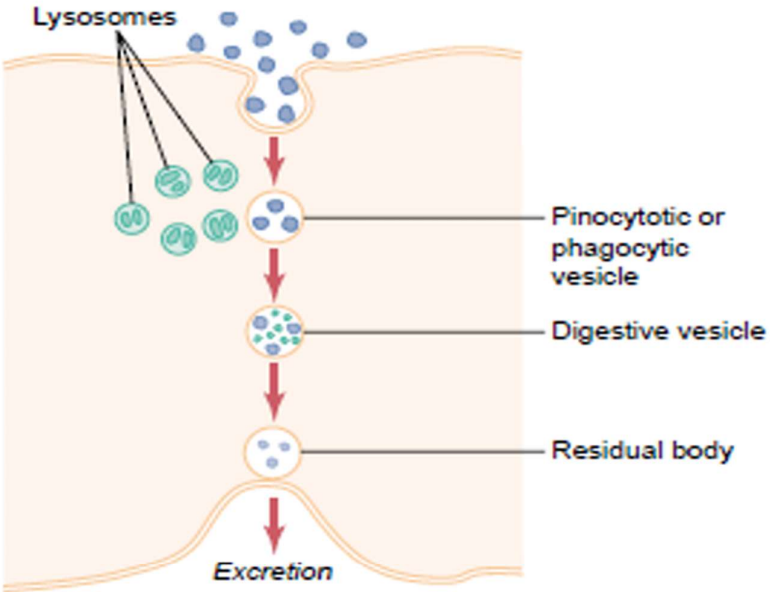


Digestion of substances in pinocytotic or phagocytic vesicles by enzymes derived from lysosomes

Two types:

Phagocytosis (cell eating)	Pinocytosis (cell drinking)
Engulfment of solid particles	Engulfment of droplets
1. The engulfed material surrounded by cytoplasmic extension celled pseudopodia.	1. Smaller invagination of the cell membrane surround extracellular fluid
2. When particles become completely surrounded.	2. Them form pinocytic vesicle
3. The plasma membrane fuses and the membrane surrounding engulfed particles forms a vesicle The vesicle called (phagosome - endocytosis vesicle)	3. Pinocytic vesicle usually fusses with lysosome

4. When phagosome enters the cytoplasm	4. Lysosome digested its component
5. Phagosome fuses with lysosome	
6. Phagosome contents are subjected to enzymatic digestion	

Exocytosis: (active vesicular transport) Exocytosis is the release of substance from cells, (i.e. opposite endocytosis). Proteins synthesized with in the cell are usually packed into secretory vesicles& secreted by exocytosis.

Notice that exocytosis requires calcium, energy,& certain proteins

Def: bulk movement of substances from inside to outside

1. Cytoplasmic vesicle fuses with plasma membrane

2. Release their contents outside the cell

Functions of the cell coat (glycocalyx):

1. Mechanical and chemical protection of the cell membrane

2. Aids in induction of immunological (antigen body) response

3. Site for binding of hormones

4. Share in the formation of intracellular adhesion

5. Contributes to forming a basement membrane

6. Cell recognition

Other functions of the cell membranes

1. Transmission of nerve impulses in the muscle and nerve

2. Myelin sheath formation by (Schwann cell around peripheral nerves)

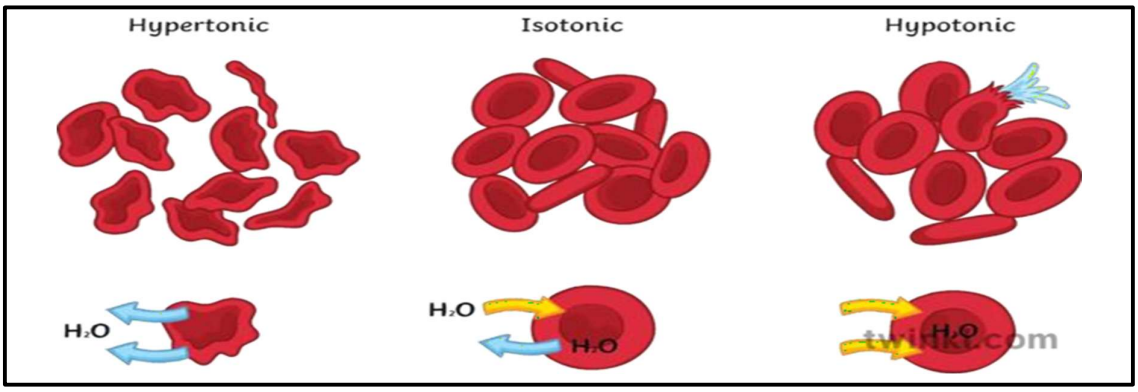
3. Share in formation of (microvilli - cilia - flagella - cell junction)

Osmosis is the net movement of water across a semipermeable membrane, from an area of higher concentration to an area of lower concentration. Water tends to flow from the area that has **less solute** (and therefore more water) to the area with more solute (and therefore less water). Normally, body fluids are **isotonic to cells** which means the same concentration of non-diffusible solutes and water on both sides of the plasma membrane. Therefore, cells maintain their normal size and shape. **Intravenous solutions** given in medical situations are usually isotonic (Figure 4).

hypotonic. A hypotonic solution has a lower concentration of solute and higher concentration of water than the cells. If red blood cells are placed in a hypotonic solution, water enters the cells. They swell to bursting. Lysis is used to refer to the process of bursting cells. Bursting of red blood cells is termed hemolysis.

Solutions that cause cells to shrink due to loss of water are said to be **hypertonic**. A hypertonic solution has a higher concentration of solute and lower concentration of water than do the cells. If red blood cells are placed in a hypertonic solution, water leaves the cells; they shrink. These changes have occurred due to osmotic pressure which control water movement in our bodies. For example, in the small and large intestines, osmotic pressure allows

us to absorb the water in food and drink. In the kidneys, osmotic pressure



controls water absorption as well.

Nucleus:

The nucleus Contain chromatin (DNA) which condenses to form chromosomes before cell division. The DNA replicates during cell division to carry genetic material from the mother cells to the daughter cells. The nucleus also contains one or more nucleoli rich in ribosomal RNA.

RNA

The chemical structure of RNA is very similar to that of DNA, but differs in three main ways:

1. Unlike double-stranded DNA, RNA is a single-stranded molecule and has a much shorter chain of nucleotides. However, RNA can be double helixes, as in tRNA (transfer RNA).

2. While DNA contains deoxyribose, RNA contains ribose (in deoxyribose there is no hydroxyl group attached to the pentose ring in the 2' position). These hydroxyl groups make RNA less stable than DNA because it is more prone to hydrolysis.

3. The complementary base to adenine in DNA is thymine, whereas in RNA, it is uracil.

Types of RNA :

1.Messenger RNA (mRNA) is the RNA that carries information from DNA to the ribosome, the sites of protein synthesis (translation) in the cell. The coding sequence of the mRNA determines the amino acid sequence in the protein that is produced.

2.Transfer RNA (tRNA) is a small RNA chain of about 80 nucleotides that transfers a specific amino acid to the ribosomes in the rough endoplasmic reticulum for protein synthesis during translation.

3.Ribosomal RNA (rRNA) links amino acids together to form proteins.

2) Mitochondria (power house of the cell)

Def: membranous organelles involved primarily in cell respiration and energy production

Number : variable according to energy requirements of the cells

Liver cell (hepatocyte) active cells contain as many as 1000 mitochondria

Small Lymphocyte inactive cells contain very few

L.M & mitochondria appear as (granules - rod like - thread like)

Mitochondria is stained by (iron haematoxylin - Janus green B) In supravital staining of living cells

When abundant they cause cytoplasmic acidophilic

Mitochondria location:

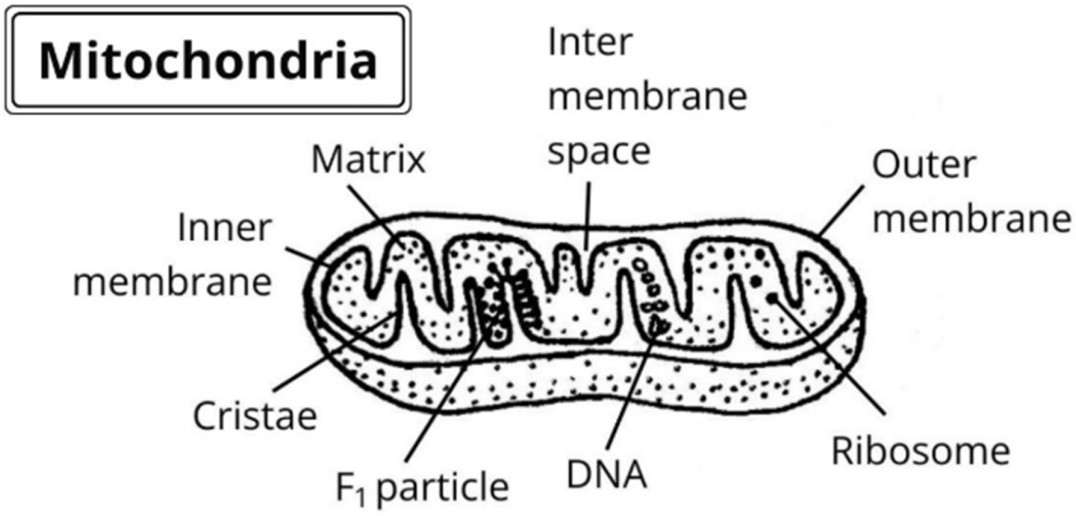
mitochondria are motile organelles and localize at intracellular sites of high energy requirements such as basal region of ion transporting cells

E.M: Mitochondria appear as ovoid - elongated structure

The outer membrane:

*Thrown into folds called cristae

*Cristae projecting into inner cavity that is filled with amorphous substance called (matrix) .



*The number of cristae directly related to energy requirement of the cell

*The inner membrane covered by tiny spherical projection supported by narrow stalks

*Spherical projections called (inner membrane spheres - elementary particles)

*Elementary particles contain F1 enzyme responsible for transport of electrons to phosphorylation of ADP

Mitochondrial matrix :

*Contain electron dense granules called (matrix granules) that are sites for Ca storage

*Contain DNA and RNA (this explain the ability of mitochondria to grow and divide and synthesis some of their proteins) give reason for?

N.B: mitochondria is are semiautonomous organelle (give reason for)? because it

1. can motile
2. divide by binary fusion
3. contain DNA and RNA
4. synthesis of proteins

Mitochondria functions

1. they house the chain of enzymes
2. to catalyze the reactions
3. it provide the cells with most ATP