YAKEEN NEET 2.0

2026

Cell - The Unit of Life

Botany | Lecture - 08

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Topics to be covered

1. PLASTID (part 02)
2. Cell membrane & TRANSPORT
3.
4.

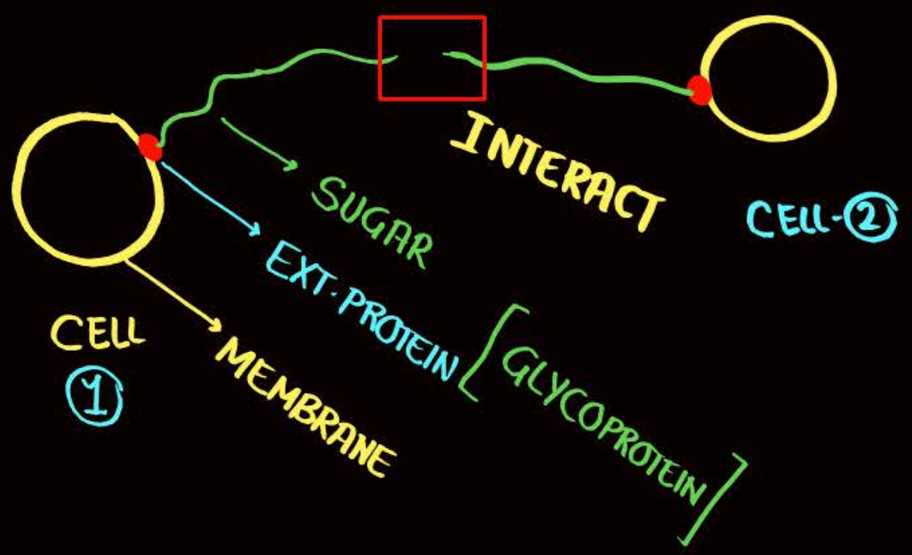
★ RATIO OF PROTEIN & LIPID: VARY IN DIFFERENT MEMBRANE

↓

DISTRIBUTION : ASYMETRICAL

★ CELL MEMBRANE: DYNAMIC (QUICK REPAIR) [EXTRA]

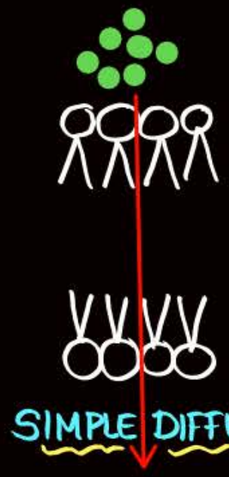
★ ROLE OF EXTERNAL PROTEIN (EXTRA]

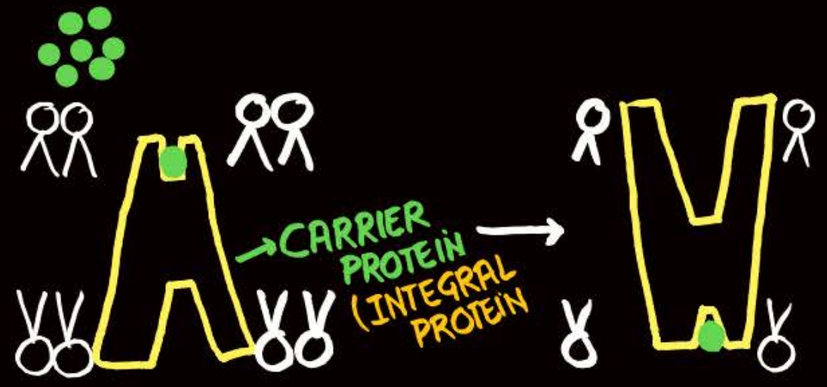


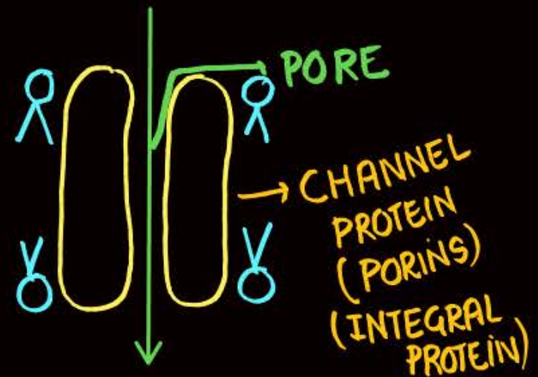
★ CELL TO CELL RECOGNITION [EXT. PROTEIN

★ RECEPTOR.

TRANSPORT







MOVEMENT:	HIGH CONⁿ TO LOW CONⁿ	HIGH TO LOW CONⁿ.
ALONG THE GRADIENT	YES / DOWNHILL	YES / DOWNHILL
ENERGY (ATP)	NO	NO
PASSIVE TRANSPORT	YES	YES
CARRIER PROTEIN	NO	YES.
TYPE OF MOLECULE.	NON-POLAR/ NEUTRAL MOLECULE / LIPID SOLUBLE MOLECUE EASY TO PASS. O_2, CO_2 (EXCHANG OF GASES)	WATER SOLUBLE MOLECULE/ POLAR MOLECULE DIFFICULT TO PASS THROUGH MEMBRANE SO NEED CARRIER PROTEIN CALLED FACILATATED DIFFUSION. eg: GLUCOSE

- WATER CAN PASS THROUGH THIS PORINS PROTEIN (AQUAPORINS)
- MOLECULES / IONS PASS THROUGH PORE

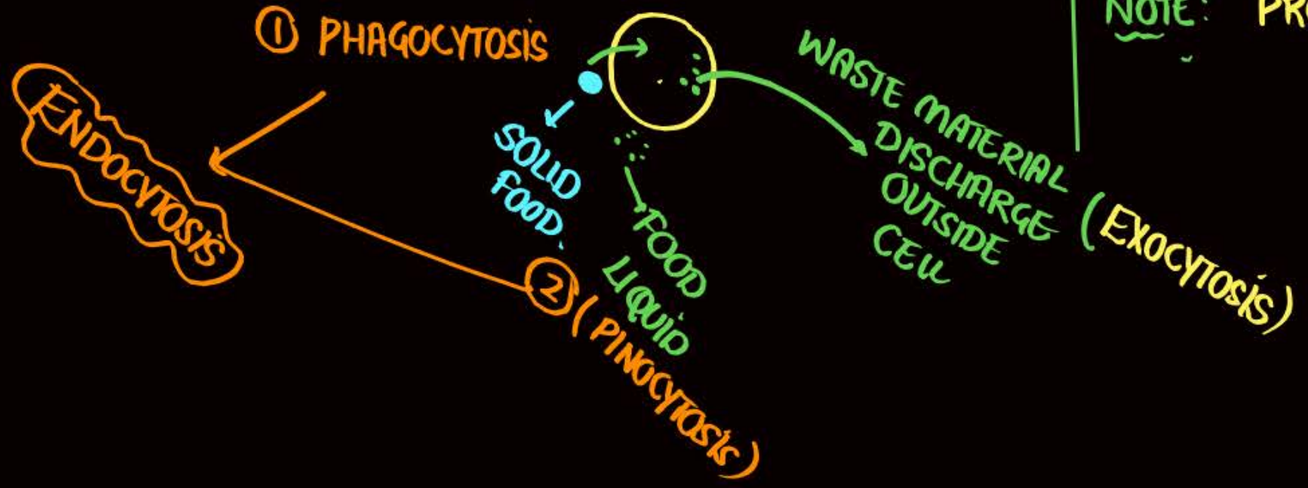
NOTE: CARRIER PROTEIN / PERMEASES

ACTIVE TRANSPORT

* LOW CONⁿ TO HIGH CONⁿ.
* AGAINST THE CONCENTRATION GRADIENT
* UPHILL
* ATP NEED
* CARRIER PROTEIN

eg: FEW IONS
Na^+ K^+ PUMP.

NOTE: MOST OF MOLECULE FOLLOW PASSIVE TRANSPORT.



* OSMOSIS : SPECIAL TYPE OF DIFFUSION OF H_2O (SOLVENT) FROM ITS HIGHER CONⁿ TO LOWER CONⁿ. THROUGH SELECTIVELY PERMEABLE MEMBRANE

FUNCTION

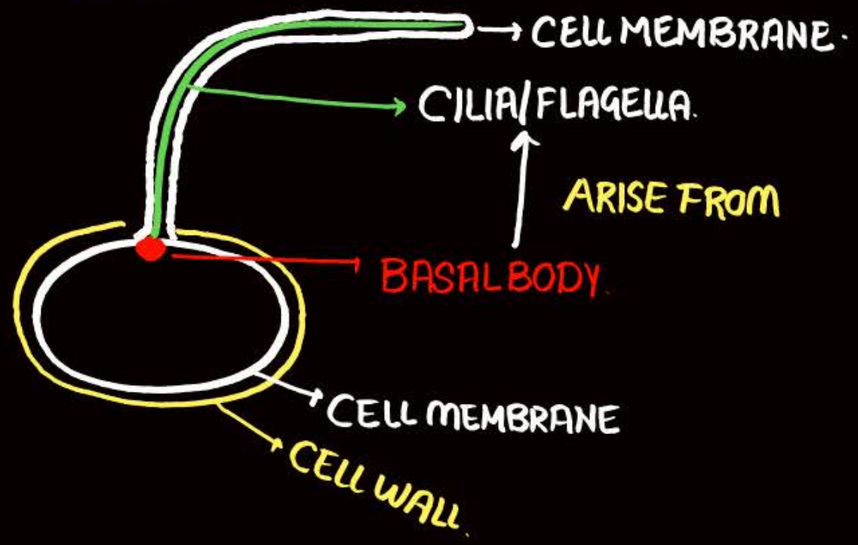
* CELL DIVISION (ANIMAL CYTOKINESIS) → NEXT CHAPTER.
* INTERCELLULAR JUNCTION.
* SECRETION (PROTEIN MOVE OUTSIDE CELL THROUGH MEMBRAN.
* CELL GROWTH.
* MAIN FUNCTION: TRANSPORT

NOTE: PROTEIN: LARGE SIZE (NO FLIP-FLOP)
: LATERAL MOVEMENT OF PROTEIN CONFIRM FLUIDITY OF CELL MEMBRANE.

CILIA & FLAGELLA

	EUKARYOTE	PROKARYOTE
		PROKARYOTE : FLAGELLIN EUKARYOTE : TUBULIN → STRUCTURE DIFFERENT.
①	EUKARYOTE	
②	MORE IN NO.	LESS IN NO.
③	SMALL	LARGE.
④	WORK LIK OARS. (OSCILLATORY MOVEMENT)	SNAKE LIKE MOVEMENT
	CELL MOVEMENT OR BEAT IN SURROUDING FLUID.	

EUKARYOTE FLAGELLA: EXTENSION OF CELL MEMBRANE.

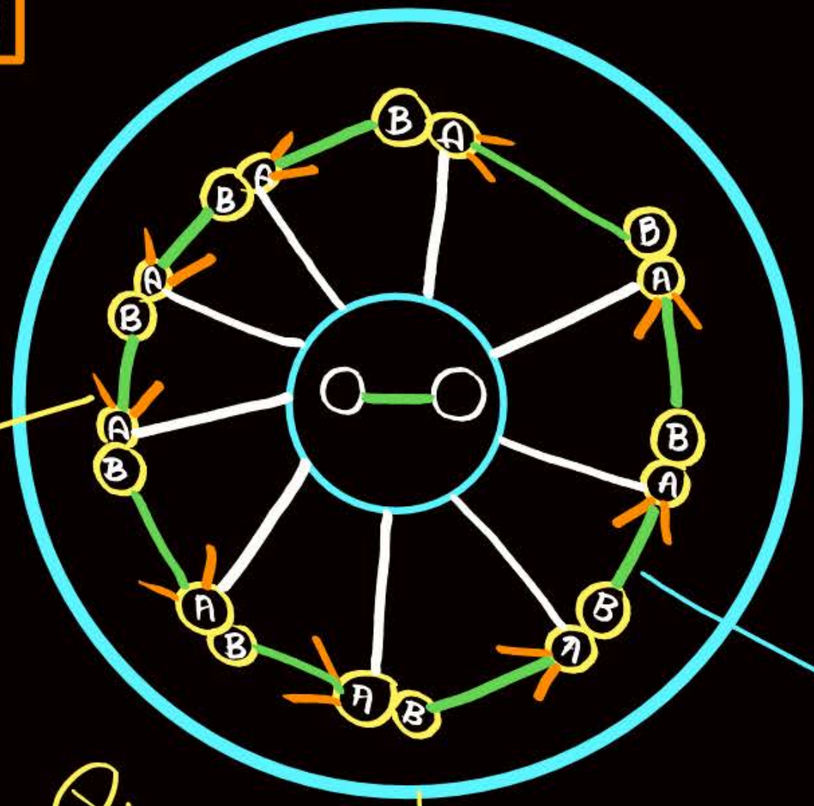


CILIA & FLAGELLA

★ (B) & (A) → MICROTUBULE (M·T)

MADE: TUBULIN PROTEIN

(α) (β)



★ PERIPHERAL : 18 TUBULE
: 9 DOUBLET X 2 ⇒ 18

★ 1 DOUBLET : 2 M·T (A & B)

★ CENTRE : 2 SINGLET M·T

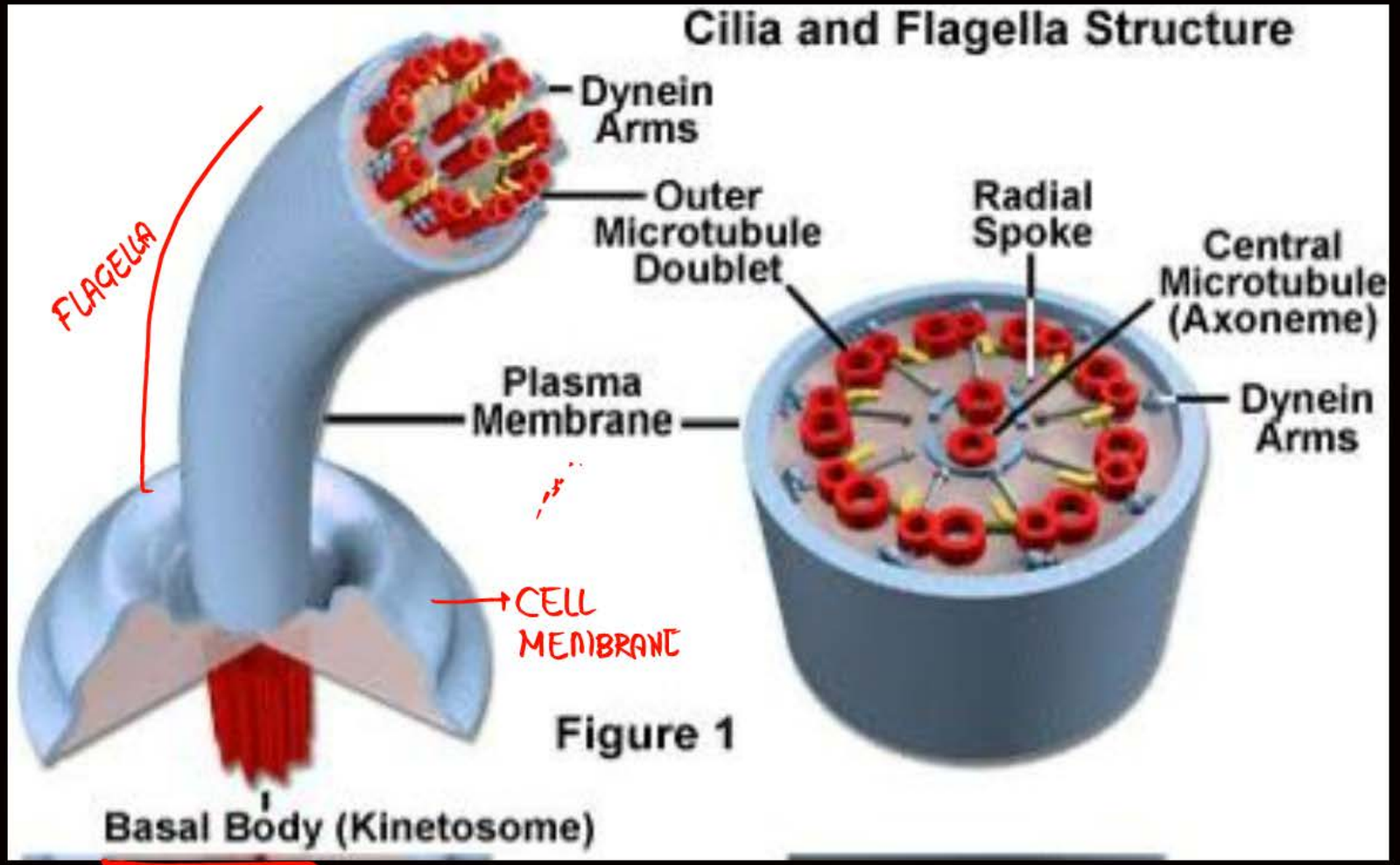
ARRANGEMENT : 9 (DOUBLET) + 2 ⇒ 18+2 ⇒ 20 M·T
PERIPHERY

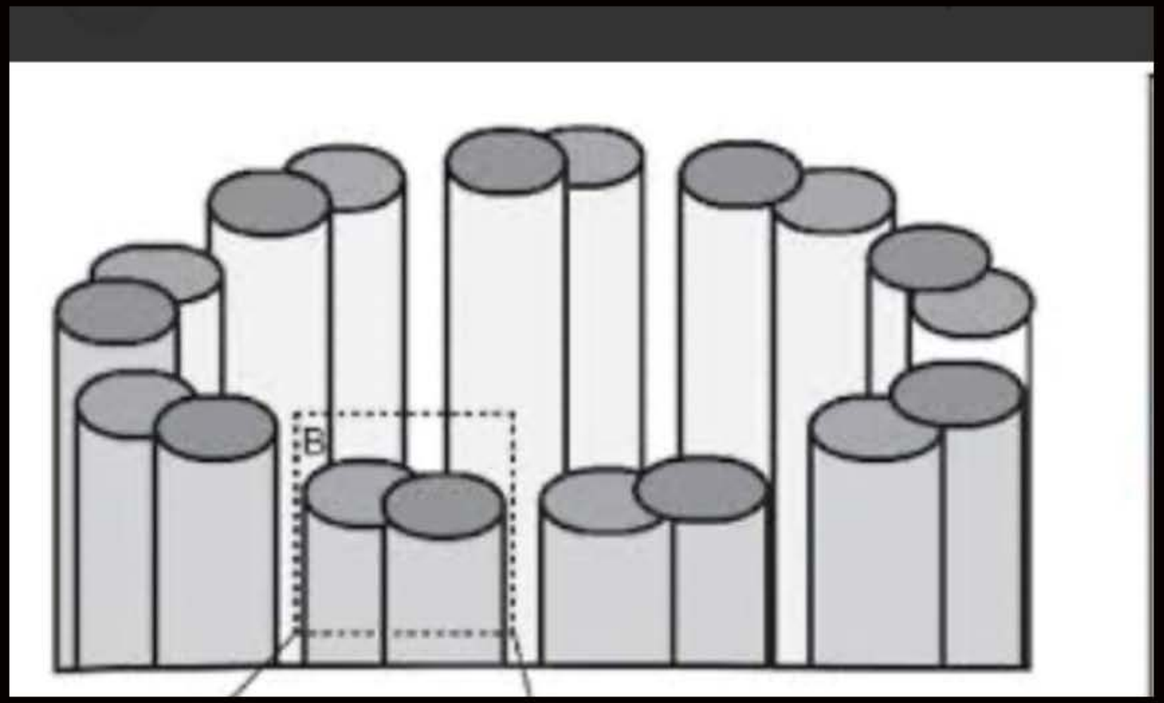
★ BRIDGE (——) : TWO CENTRAL M·T CONNECTED BY IT

★ → CENTRAL M·T COVERED BY CENTRAL SHEATH.

★ —— RADIAL SPOKE (PROTEIN) CONNECTED TO ONE M·T
9 RADIAL SPOKE

INTERDOUBLET / A-B LINKER : IT CONNECT TWO DOUBLET
(PROTEIN)
(NEXIN)


Cilia and Flagella Structure
Dynein Arms
Outer Microtubule Doublet
Radial Spoke
Central Microtubule (Axoneme)
Plasma Membrane
Dynein Arms
FLAGELLA
CELL MEMBRANE
Figure 1
Basal Body (Kinetosome)


B

8.5.1 Cell Membrane

The detailed structure of the membrane was studied only after the advent of the electron microscope in the 1950s. Meanwhile, chemical studies on the cell membrane, especially in human red blood cells (RBCs), enabled the scientists to deduce the possible structure of plasma membrane.

These studies showed that the cell membrane is mainly composed of lipids and proteins. The major lipids are phospholipids that are arranged in a bilayer. Also, the lipids are arranged within the membrane with the polar head towards the outer sides and the hydrophobic tails towards the inner part.This ensures that the nonpolar tail of saturated hydrocarbons is protected from the aqueous environment (Figure 8.4). In addition to phospholipids, membrane also contains cholesterol.

(Stability)
EUKARYOTE

HOPNOIDS
PROKARYOTES.

Later, biochemical investigation clearly revealed that the cell membranes also possess protein and carbohydrate. The ratio of protein and lipid varies considerably in different cell types. In human beings, the membrane of the erythrocyte has approximately 52 per cent protein and 40 per cent lipids.

Depending on the ease of extraction, membrane proteins can be classified as integral and peripheral. Peripheral proteins lie on the surface of membrane while the integral proteins are partially or totally buried in the membrane.

diff

easy

ONE LAYER.

BOTH LAYER (TUNNEL PROTEIN)

An improved model of the structure of cell membrane was proposed by Singer and Nicolson (1972) widely accepted as **fluid mosaic model** (Figure 8.4). According to this, the quasi-fluid nature of lipid enables lateral movement of proteins within the overall bilayer. This ability to move within the membrane is measured as its fluidity.

The fluid nature of the membrane is also important from the point of view of functions like cell growth, formation of intercellular junctions, secretion, endocytosis, cell division etc.

One of the most important functions of the plasma membrane is the transport of the molecules across it. The membrane is selectively permeable to some molecules present on either side of it. Many molecules can move briefly across the membrane without any requirement of energy and this is called the **passive transport**. Neutral solutes may move across the membrane by the process of simple diffusion along the concentration gradient, i.e., from higher concentration to the lower. Water may also move across this membrane from higher to lower concentration. Movement of water by diffusion is called **osmosis**.

① SIMPLE DIFFN
② FAC. DIFFN

(VERY LESS MUVEMENT (SIMPLE DIFFN)

FAC. DIFFN.

As the polar molecules cannot pass through the nonpolar lipid bilayer, they require a carrier protein of the membrane to facilitate their transport across the membrane. A few ions or molecules are transported across the membrane against their concentration gradient, i.e., from lower to the higher concentration. Such a transport is an energy dependent process, in which ATP is utilised and is called **active transport**, e.g., Na^+/K^+ Pump.

Active TRANSPORT.

Correct

A. plastid found in few plants & euglenoids

B. plastid observed under microscope as they are small

C. plastid have pigment, gives colour to plant

D. plastid are of three types on basis of pigment (chromoplast, chloroplast, amyloplast)

E. fat soluble pigment carotenoid present only in chromoplast & Chloroplast

(A) 1 (B) 2 (C) 3 (D) 4

Correct

A. chloroplast contain only chlorophyll pigment

B. pigment trap light energy essential for respiration

C. carotene & xanthophyll present in both chloroplast & chromoplast

D. chromoplast give colour to carrot/chillies

E. during ripening of tomato Chloroplast change into chromoplast

(A) 1 (B) 2 (C) 3 (D) 4

Assertion (A) : Leucoplast is colourless plastid

Reason (R) : pigment are absent

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is NOT the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

Leucoplast

A. carotenoid present but chlorophyll absent

B. three types on basis of pigment

C. amyloplast : starch (potato)

D. aleuroplast : protein & elaioplast : oil & fat

Incorrect

(A) 1 (B) 2 (C) 3 (D) 4

Correct

(A) majority of chloroplast present in mesophyll cells of stem

(B) lens, oval, disc, ribbon like

(C) length : 2 to 10 um & width : 5 to 10 um

(D) one chloroplast present in chlamydomonas placed in plantae kingdom

PROTISTA.

Correct
(A) 20 to 40 chromoplast present in mesophyll cells of leave
(B) mitochondria & chloroplast semiautonomous organelle
(C) both have single membrane
(D) inner membrane is more permeable

Correct
(A) ATP synthesis in ETC. takes place in inner membrane of chloroplast
(B) porins absent in inner membrane
(C) space limited by inner membrane of chloroplast is matrix
(D) flat membranous tubule : thylakoid

HW

Incorrect
(A) thylakoid present in stroma
(B) thylakoid arrange like piles of coin called grana site of dark reaction
(C) flat membranous tubule : stromal lamellae where dark reaction occur
(D) all except A option

Correct

A. membrane of thylakoid enclose a space called lumen
B. stroma contain enzymes for synthesis of carbohydrate and protein
C. RUBISCO present in stroma
D. Calvin cycle occur in grana
E. large circular dsDNA in chloroplast

(A) 2 (B) 3 (C) 4 (D) 1

HW

Correct

(A) all proteins synthesis of mitochondria and chloroplast so called semiautonomous organelle
(B) 80 s ribosome present in chloroplast
(C) ribosome of chloroplast is smaller than cytoplasmic ribosome
(D) None

THANK YOU