YAKEEN NEET 2.0

2026

Cell - The Unit of Life

Botany | Lecture - 04

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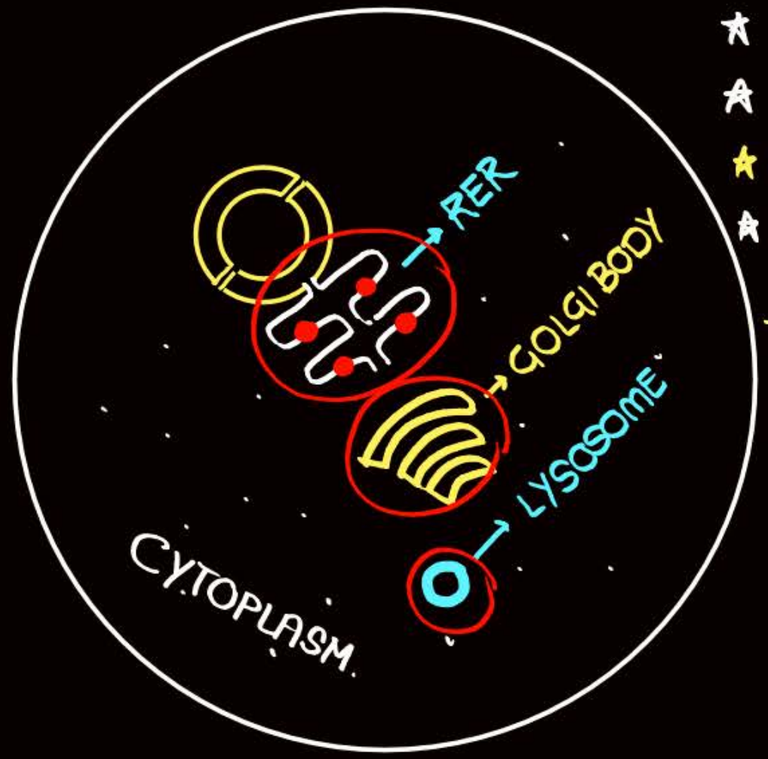
Topics to be covered

1. CELL WALL
2. EUKARYOTIC CELL
3. ER.
4.

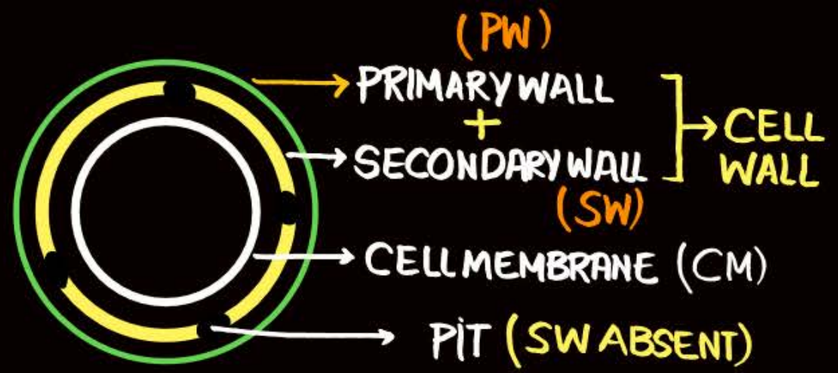
EUKARYOTIC CELL.



- ★ CYTOPLASM DIVIDE INTO COMPARTMENTS BZ MEMBRANE BOUND ORGANELLE PRESENT
- ★ PROKARYOTES : COMPARTMENTS : ABSENT : " " " ABSENT.
- ★ GENETIC MATERIAL (DNA) ORGANISED IN CHROMOSOME : EUKARYOTES.
- ★ CYTOSKELETON (MICROTUBULE, MICROFILAMENT, INTERMEDIATE FILAMENT) : EUKARYOTE PRESENT
- ★ CILIA, FLAGELLA (LOCOMOTORY STRUCTURE) : COMPLEX IN EUKARYOTE. (EUKARYOTE)

	PLANT CELL	ANIMAL CELL
CELL WALL	✓	×
CHLOROPLAST (PLASTID)	✓	×
LARGE CENTRAL VACUOLE	✓	×
CENTRIOLE	ABSENT BUT PRESENT IN ALGAE.	✓

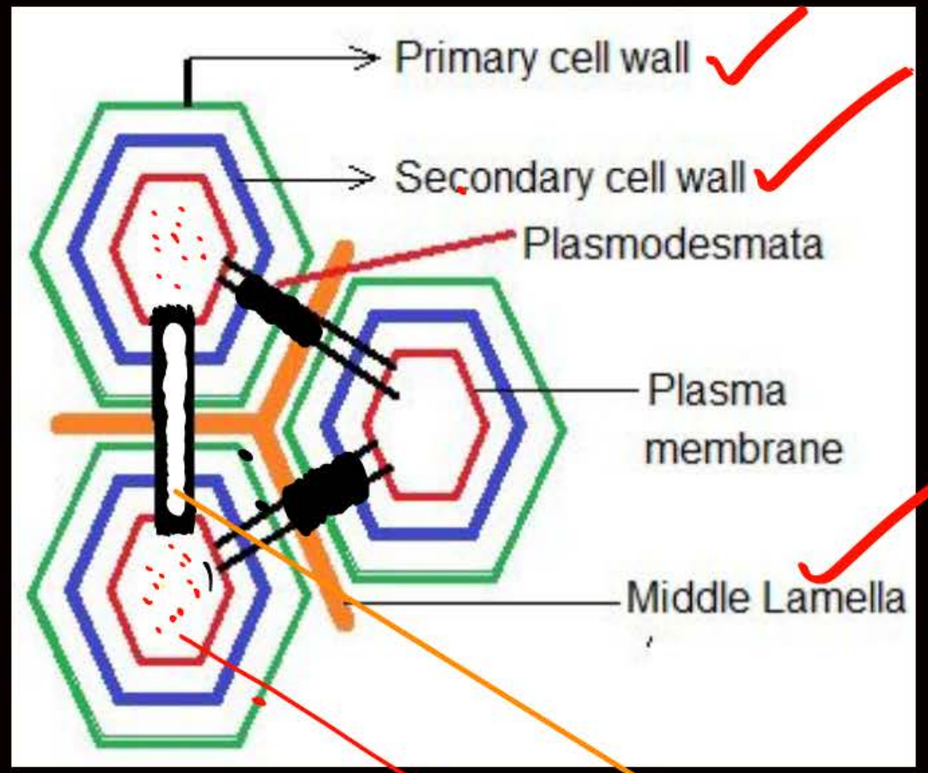
CELL WALL



* OUTER LAYER, HARD/RIGID
* DEAD, PERMEABLE
* PLANTS, FUNGI, BACTERIA, SOME PROTISTA
  - CELLULOSE, HEMICELLULOSE, PECTIN, PROTEIN
  - CHITIN
  - CELLULOSE, SILICA
* ALGAE: CELLULOSE, GALACTAN (→ GALACTOSE), MANNAN (→ MANNOSE), $CaCO_3$

PW	SW
★ OUTER, THIN	INNER, THICK.
★ LIGNIN ABSENT	PRESENT
★ CONTINUOUS	DISCONTINUOUS.
★ AS CELL MATURE PW GRADUALLY DIMINISHED/ REDUCE & SW FORMED INNER TO PW	

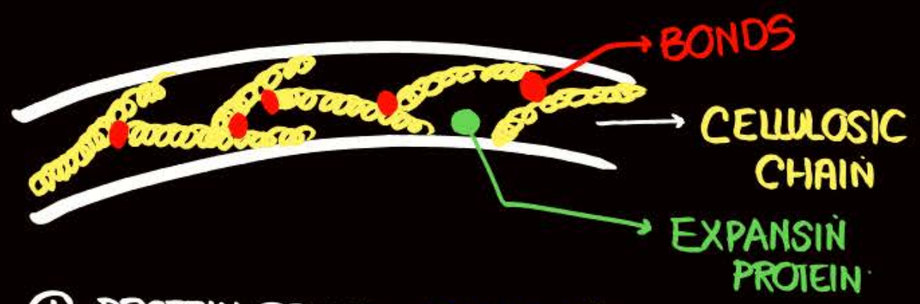
* YOUNG CELL (DIVIDING) (MERISTEMATIC CELL)
  - eg: PARENCHYMA.
* OLD/MATURE CELL



CYTOPLASM

DESMOTUBULE (MODIFICATION OF ENDOPLASMIC RETICULUM)

PRIMARY WALL CAPABLE OF GROWTH



1. PROTEIN BREAKS BOND B/W CELLULOSIC CHAIN
2. LOOSENING OF WALL
3. ADD EXTRA CELLULOSE, HEMICELLULOSE FROM CYTOPLASM.
4. IT BECOMES EXPAND.

EXTRA

FUNCTION OF CELL WALL.

1. MAINTAIN SHAPE
2. PROTECTION FROM MECHANICAL DAMAGE & INFECTION. (PATHOGEN BINDS TO PROTEIN IN CELL WALL.
3. RESTRICT ENTRY OF UNDESIRABLE MACROMOLECULE (LARGE SIZE)
4. CELL TO CELL INTERACTION (MIDDLE LAMELLA)

MIDDLE LAMELLA

- COMMON LAYER B/W TWO CELL
- Ca- PECTATE (MAINLY).
  Mg PECTATE.

PLASMODESMATA

- CYTOPLASMIC CONNECTION B/W TWO CELL.
- LIVING STRUCTURE.
- FORMED BY DESMOTUBULE (ER)
- SO IT HELPS IN TRANSPORT FROM ONE CELL TO OTHER.
- CELL WALL & MIDDLE LAMELLA TRAVERSED/CROSS BY PLASMODESMATA.

ENDOMEMBRANE SYSTEM

INSIDE CYTOPLASM — MEMBRANE

CONNECTED/
FUNCTION PERFORM IN
COORDINATION

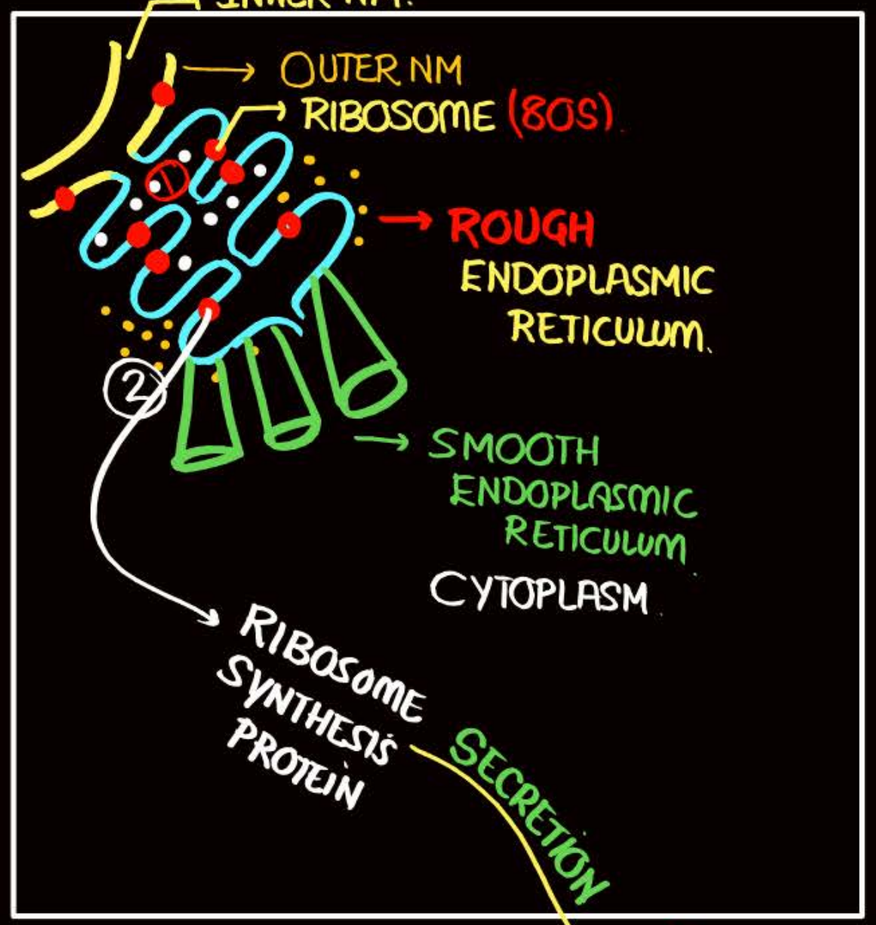
* ER (1) GB (1) LYSOSOME (1), VACUOLE (1)

NON-ENDOMEMBRANE SYSTEM

* MITOCHONDRIA
* CHLOROPLAST
* PEROXISOME

→ NOT WORK IN COORDINATION

ER:



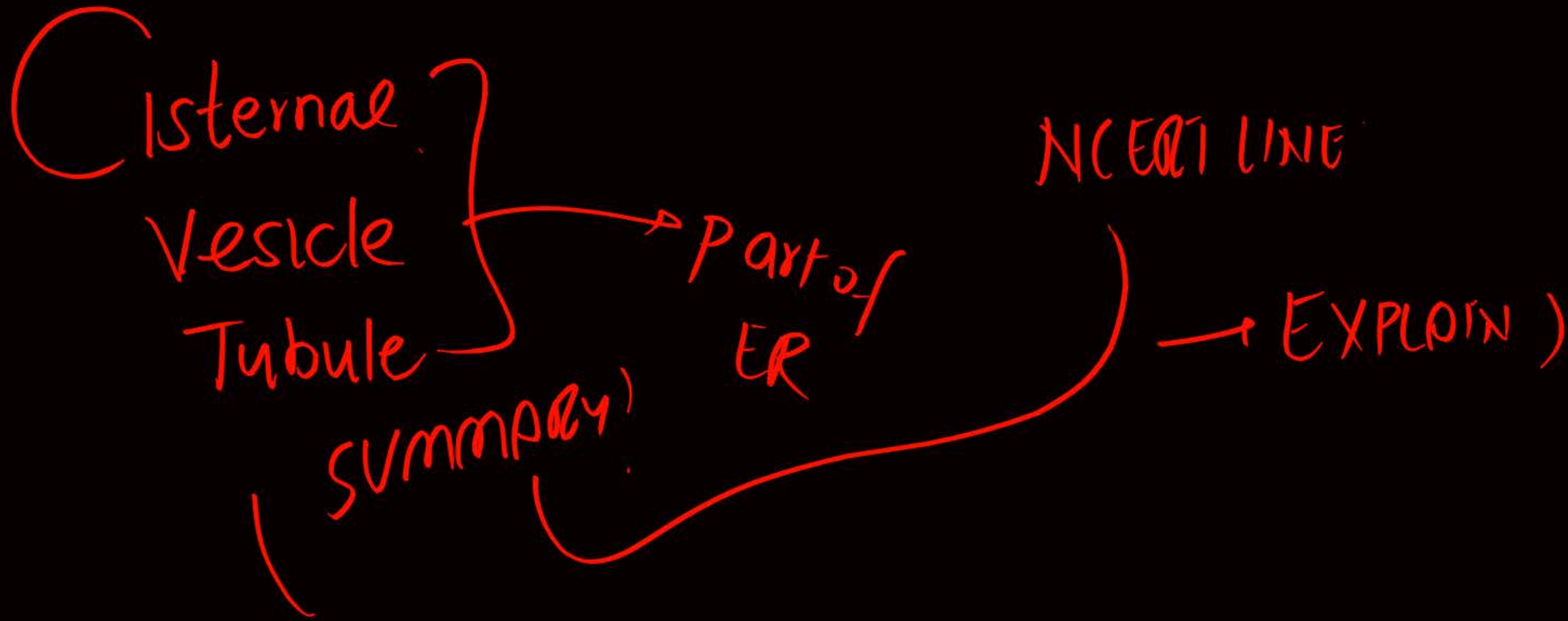
NM: NUCLEAR MEMBRANE

INTRACELLULAR SPACE
CYTOPLASM.

→ INSIDE ER: LUMINAL SPACE (1)

→ OUTSIDE ER: EXTRA LUMINAL (2)

	RER	SER
★ RIBOSOME:	✓	✗
★ CONTINUOUS WITH OUTER NUCLEAR MEMBRANE		ARISE FROM RER.
★ PROTEIN SYNTHESIS, LIPOPROTEIN (PROTEIN BINDS WITH LIPID)		LIPID & GLYCOGEN SYNTHESIS
★ SECRETION:		IN ANIMALS: SYNTHESIS OF STEROID HORMONES.


Cisternae
Vesicle
Tubule
Part of ER
NCERT LINE
EXPLAIN
SUMMARY

NCERT Booster

8.5 Eukaryotic Cells

2nd LECTURE

COMPARTMENTS

The eukaryotes include all the protists, plants, animals and fungi. In eukaryotic cells there is an extensive compartmentalisation of cytoplasm through the presence of membrane bound organelles. Eukaryotic cells possess an organised nucleus with a nuclear envelope. In addition, eukaryotic cells have a variety of complex locomotory and cytoskeletal structures. Their genetic material is organised into chromosomes.

MICROTUBULE
FILAME
INTER FIL.

HISTONE PROTEIN

Assertion (A) : In eukaryotic cell cytoplasm divided into compartment C

Reason (R) : membrane bound organelle present C

(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.

Eukaryotes

(A) protists, plant, animal, not fungi

(B) nucleus is not well organised

(C) complex locomotory & cytoskeleton structure absent

(D) genetic material is organised into chromosome

All eukaryotic cells are not identical. Plant and animal cells are different as the former possess cell walls, plastids and a large central vacuole which are absent in animal cells. On the other hand, animal cells have centrioles which are absent in almost all plant cells (Figure 8.3).

algae

Correct

(A) all eukaryotic cell is similar

(B) plant posses small central vacuole, plastid, cell wall

(C) animal cell have centriole which absent in almost all plant

(D) all are incorrect

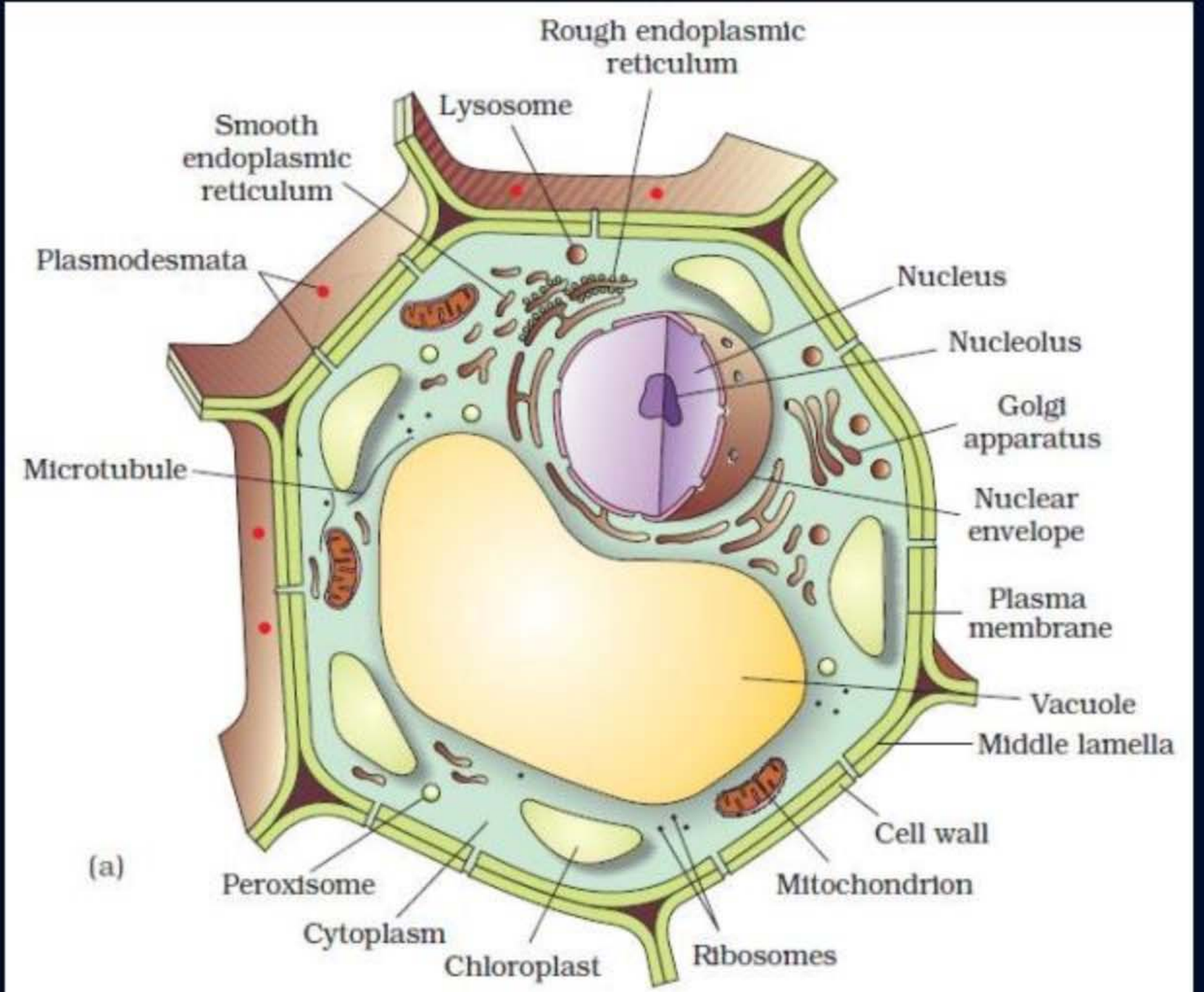


Figure 8.3 Diagram showing : (a) Plant cell (b) Animal cell

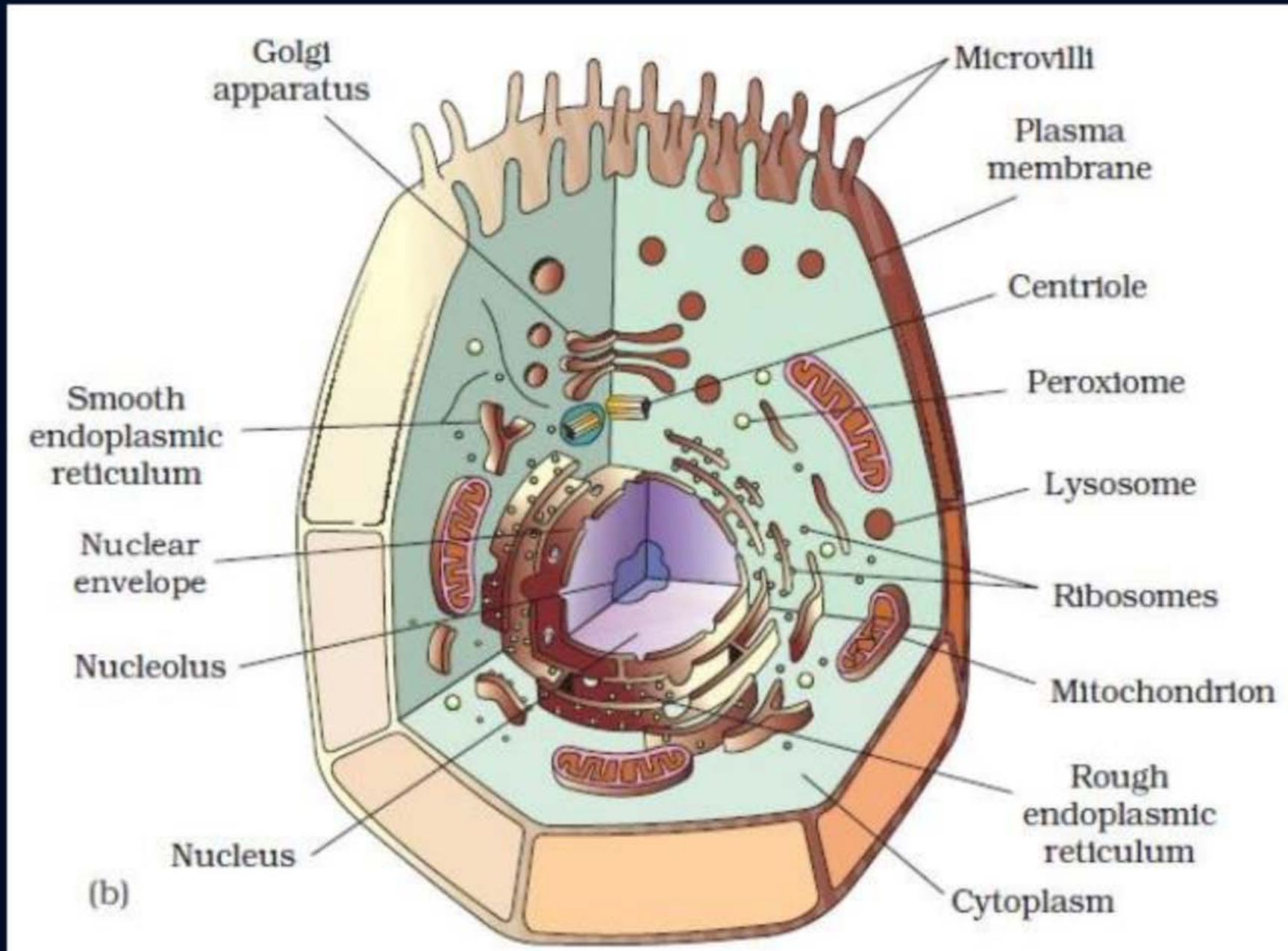


Figure 8.3 Diagram showing : (a) Plant cell (b) Animal cell

8.5.2 Cell Wall

DEAD → HARD

As you may recall, a non-living rigid structure called the cell wall forms an outer covering for the plasma membrane of fungi and plants. Cell wall not only gives shape to the cell and protects the cell from mechanical damage and infection, it also helps in cell-to-cell interaction and provides barrier to undesirable macromolecules.

Cell wall

(A) Non-living, rigid covering in fungi & plants only

(B) protect from mechanical damage, infection but not provide shape

(C) cell to cell interaction

(D) barrier to desirable macromolecules

Algae have cell wall, made of cellulose, galactans, mannans and minerals like calcium carbonate, while in other plants it consists of cellulose, hemicellulose, pectins and proteins. The cell wall of a young plant cell, the **primary wall** is capable of growth, which gradually diminishes as the cell matures and the secondary wall is formed on the inner (towards membrane) side of the cell.

Correct

A. algae cell wall : cellulose, galactan, Mannan not calcium carbonate

B. plant cell wall : protein present

C. primary cell wall is capable of growth, inner layer

D. as cell mature primary wall diminish

E. secondary wall is formed on inner to primary wall

(A) 1

(B) 2

(C) 3

(D) 4

The middle lamella is a layer mainly of calcium pectate which holds or glues the different neighbouring cells together. The cell wall and middle lamellae may be traversed by plasmodesmata which connect the cytoplasm of neighbouring cells.

Correct

(A) Middle lamella consist of calcium pectate which glue different cell

(B) plasmodesmata connect cytoplasm & it is dead connection

(C) cell wall & middle lamella traversed by plasmodesmata

(D) both A & C are correct

8.5.3 Endomembrane System

While each of the membranous organelles is distinct in terms of its structure and function, many of these are considered together as an endomembrane system because their functions are coordinated. The endomembrane system include endoplasmic reticulum (ER), golgi complex, lysosomes and vacuoles.

Assertion (A) : ER, GB, lysosome, vacuole are parts of endomembrane system
Reason (R) : functions are coordinated

(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.

Since the functions of the mitochondria, chloroplast and peroxisomes are not coordinated with the above components, these are not considered as part of the endomembrane system.

Assertion (A) : Mitochondria, peroxisome, chloroplast not part of endomembrane system Reason

Reason (R) : not works in coordination

(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.

Homework from YAKEEN NEET 2.0 2026 Module

PRARAMB EXERCISE
(TOPIC WISE)

ER वाले QUESTION.

THANK YOU