

YAKEEN NEET 2.0

2026

Cell - The Unit of Life

Botany

Lecture - 02

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Topics to be covered

1

Overview of cell

2

prokaryote

3

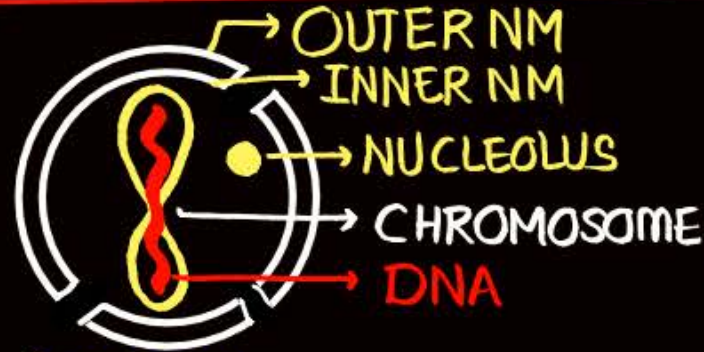
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OVERVIEW OF CELL

NM: NUCLEAR MEMBRANE

CHARACTER

EUKARYOTE



PRESENT

PRESENT

DNA (ds, LINEAR) + RNA + NON-HISTONE PROTEIN (ACIDIC) + HISTONE PROTEIN (BASIC)

PRESENT

PRESENT

CYTOPLASM (80S), MITOCHONDRIA 70S
CHLOROPLAST (70S IN PLANT),
RER (80S)

40S
(SMALL)

60S
(LARGE)

PROKARYOTE



ABSENT

ABSENT

HISTONE PROTEIN ABSENT

FALSE CHROMOSOME REPRESENT BY ds CIRCULAR DNA

ABSENT

PRESENT (ONLY 70S IN CYTOPLASM)

30S
(SMALL
SUBUNIT UNIT)

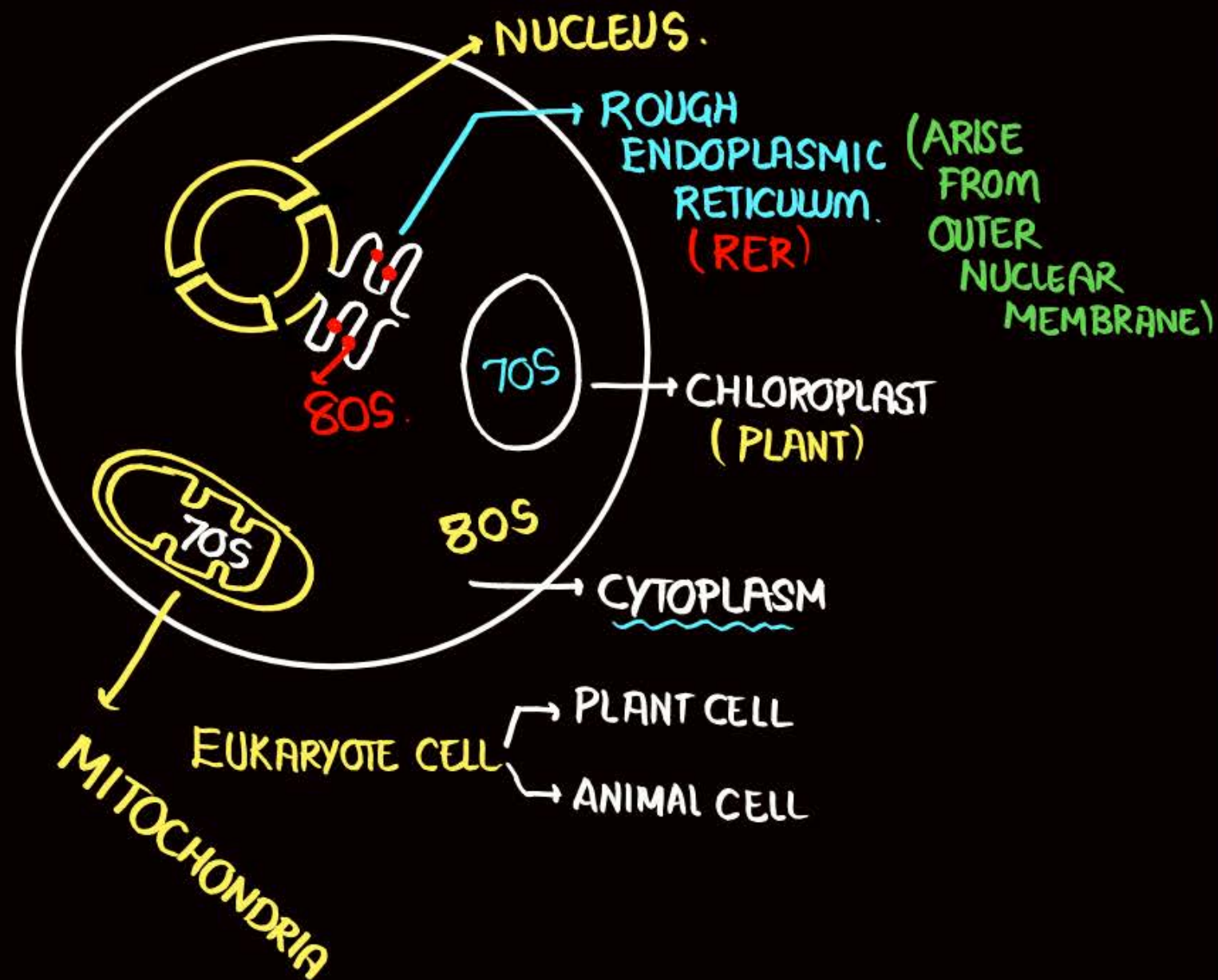
50S
(LARGE
SUBUNIT)

① NUCLEOLUS, NUCLEAR MEMBRANE

② WELL DEFINED NUCLEUS
CHROMOSOME

③ MEMBRANE BOUND ORGANELLE
(ER-1, GOLGI BODY-1, MITOCHONDRIA-2
LYSOSOME-1, VACUOLE-1, MICROBODIES-1)

④ RIBOSOME (MEMBRANLESS,
SMALLEST, PROTEIN SYNTHESIS)



CYTOPLASM

- ★ PROKARYOTE, EUKARYOTE, SEMI-FLUID REGION.
- ★ CELLULAR ACTIVITY (PROTEIN SYNTHESIS/CHEMICAL REACTION) IN PLANTS, ANIMAL WHICH KEEP CELL IN LIVING STATE.

CENTROSOME

- ★ CONSIST OF TWO CYLINDRICAL STRUCTURE: CENTRIOLE (ONLY IN ANIMAL CELL) (EUKARYOTE)
- 90°
- HELPS IN CELL DIVISION



- ★ ABSENT IN PROKARYOTE
- ★ NON MEMBRANOUS.

| | ONION CELL (PLANT) | HUMAN CHEEK CELL (ANIMAL) |
|-------------|--|---------------------------|
| OUTER LAYER | CELL WALL | CELL MEMBRANE |
| | DELIMITING LAYER (MAKES BOUNDARY OF CELL.) | |

- ★ MYCOPLASMA (PROKARYOTE), SMALLEST CELL 0.3 μm in length.
 - ★ BACTERIA: 3 TO 5 μm
 - ★ OSTRICH EGG (LARGEST CELL)
 - ★ HUMAN RBC: 7 μm in diameter
 - ★ NERVE CELL: LONGEST
- UNICELLULAR.
- MULTICELLULAR ORGANISM.

NOTE: CELL SHAPE VARY WITH FUNCTION

PROKARYOTIC CELL

(GENUS)

⇒ BACTERIA, BLUE GREEN ALGAE, MYCOPLASMA, PPLO (PLEURO PNEUMONIA LIKE ORGANISM)

⇒ CATTLE : LUNGS : PLEURAL FLUID : ISOLATE ORGANISM WHICH CAUSE PNEUMONIA DISEASE → NAME : PPLO

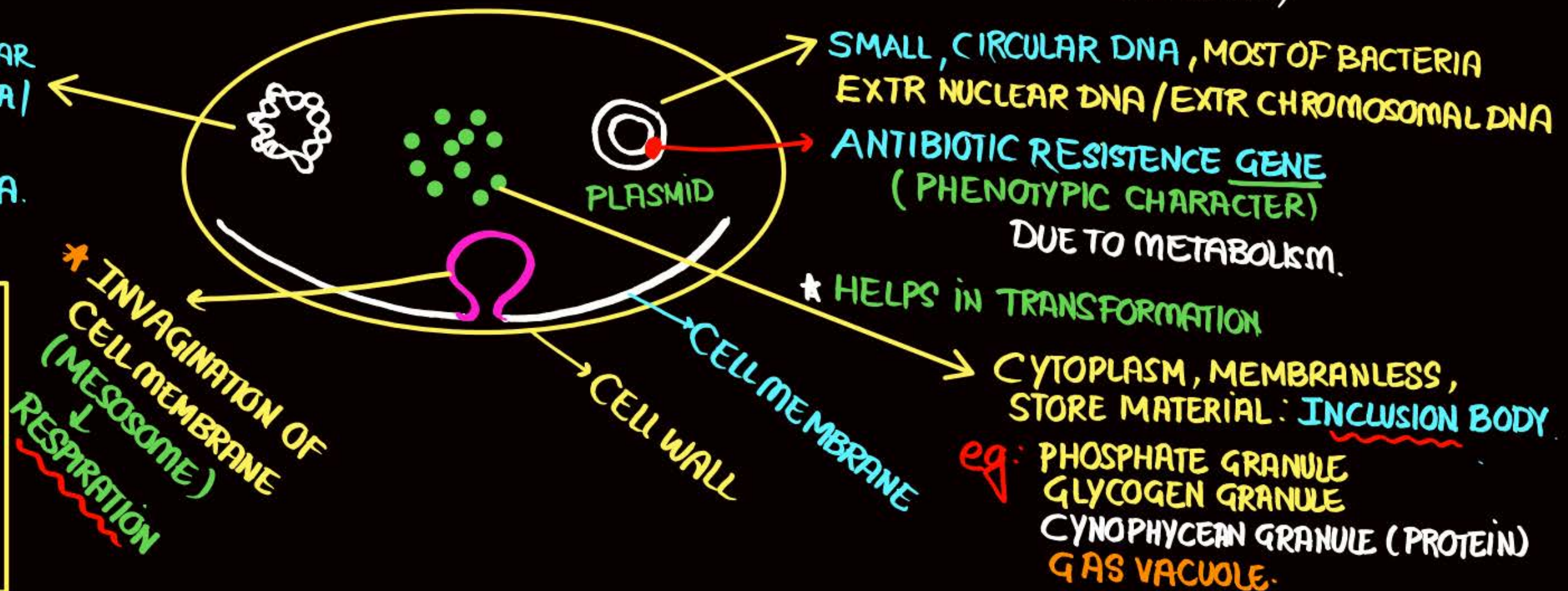
⇒ PROKARYOTE (SMALL), MULTIPLY FAST COMPARE TO EUKARYOTE.

SHAPE OF BACTERIA : 4 TYPES.

COCCUS : ○ SPHERICAL. BACILLUS : □ ROD LIKE : VIBRIO : > COMMA SPIRILLUM : { SPIRAL
(COMMON)

NOTE : ORGANISATION OF ALL PROKARYOTES : SIMILAR BUT SHAPES & FUNCTION : VERY (CURD FORMATION, N_2 FIXATION, ANTIBIOTIC)

* SINGLE ds CIRCULAR DNA / GENOMIC DNA / NUCLEAR DNA / CHROMOSOMAL DNA.



Example: Gas vacuole

① PURPLE SULPHUR BACTERIA

② GREEN SULPHUR BACTERIA (PHOTOSYNTHETIC BACTERIA)

8.3 AN OVERVIEW OF CELL

You have earlier observed cells in an onion peel and/or human cheek cells under the microscope. Let us recollect their structure. The onion cell which is a typical plant cell, has a distinct cell wall as its outer boundary and just within it is the cell membrane. The cells of the human cheek have an outer membrane as the delimiting structure of the cell.

clearly visible

Cell membrane

Assertion (A) : cells of human cheek has outer membrane as delimiting structure ©

Reason (R) : cell wall is absent in animal cell ©

- (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.

Inside

each cell is a dense membrane bound structure called nucleus. This nucleus contains the chromosomes which in turn contain the genetic material, DNA. Cells that have membrane bound nuclei are called eukaryotic whereas cells that lack a membrane bound nucleus are prokaryotic. In both prokaryotic and eukaryotic cells, a semi-fluid matrix called cytoplasm occupies the volume of the cell.

Eukaryote

Correct (Plant)

- (A) ✓ onion cell have cell wall outer boundary just outside cell membrane
- (B) Inside each cell dense membrane bound structure : centrosome
- (C) chromosome contain genetic material basically RNA
- (D) ✓ membrane bound organelle absent in Rhizobium & present in Pinus

Ⓐ & Ⓓ
CORRECT.

→ PROKARYOTE

(EUKARYOTE)

The cytoplasm is the main arena of cellular activities in both the plant and animal cells. Various chemical reactions occur in it to keep the cell in the 'living state'.

Besides the nucleus, the eukaryotic cells have other membrane bound distinct structures called **organelles** like the endoplasmic reticulum (ER), the golgi complex, lysosomes, mitochondria, microbodies and vacuoles. The prokaryotic cells lack such membrane bound organelles.

Cytoplasm

- (A) semi fluid region ~~only~~ in eukaryotes
- (B) ~~site~~ of cellular activity in animal cell
- (C) ~~various~~ chemical reaction occur in it to keep cell in animate state (LIVING)
- (D) ~~both~~ (B) & (C) are correct

Ribosomes are non-membrane bound organelles found in all cells – both eukaryotic as well as prokaryotic. Within the cell, ribosomes are found not only in the cytoplasm but also within the two organelles – chloroplasts (in plants) and mitochondria and on rough ER.

Animal cells contain another non-membrane bound organelle called centrosome which helps in cell division.

Correct statement

- ☒ (a) eukaryote has Golgi body, lysosome, mitochondria Ribosome and all these are absent in prokaryote
- ☒ (b) Ribosome is membrane structure
- ☒ (c) ribosome also present in ER, chloroplast (~~animal~~) & plant (mitochondria)
- ☒ (d) animal cell contain non membrane bound structure called centrosome, helps in cell division

Options

- (A) semi fluid region only in eukaryotes
- (B) site of cellular activity in animal cell
- (C) various chemical reaction occur in it to keep cell in animate state
- (D) both (B) & (C) are correct

Reptar

Cells differ greatly in size, shape and activities (Figure 8.1). For example, Mycoplasmas, the smallest cells, are only $0.3\ \mu\text{m}$ in length while bacteria could be 3 to $5\ \mu\text{m}$. The largest isolated single cell is the egg of an ostrich. Among multicellular organisms, human red blood cells are about $7.0\ \mu\text{m}$ in diameter. Nerve cells are some of the longest cells. Cells also vary greatly in their shape. They may be disc-like, polygonal, columnar, cuboid, thread like, or even irregular. The shape of the cell may vary with the function they perform.

Correct

- ☒ (A) Cell not differ in shape, size, activities
- ☒ (B) mycoplasma, smallest cell, $0.3\ \mu\text{m}$ in length is not belong to monera (PROKARYOTE)
- ☒ (C) bacteria could be 3 to $5\ \mu\text{m}$
- ☒ (D) largest isolated cell is ostrich egg and it is multicellular. **Unicellular.**
- ☒ (E) all are incorrect

How many statement are correct

- ☒ (a) Among unicellular organism human RBC are about $7\ \mu\text{m}$ in diameter
- ☒ (b) Nerve cell some of longest cell
- ☒ (c) cell vary greatly in shape
- ☒ (d) shape may very disc, polygonal, columnar, cuboidal
- ☒ (e) shape of cell not vary with function

Option

- (A) 1 (B) 2 ☒ (C) 3 (D) 0

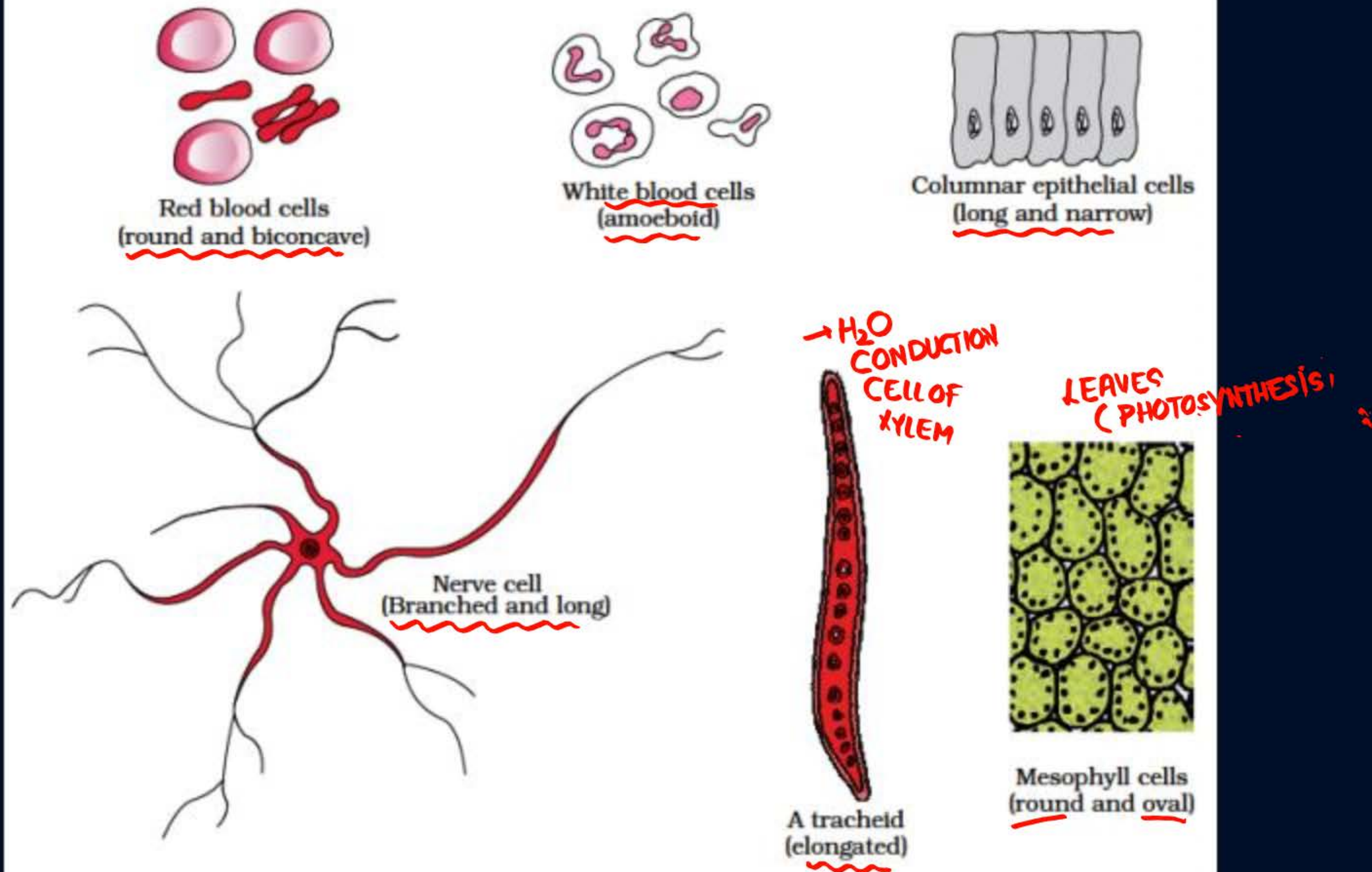


Figure 8.1 Diagram showing different shapes of the cells

8.4 PROKARYOTIC CELLS

ONLY 5 QUESTION (HW): WILL DISCUSS IN NEXT CLASS.



The prokaryotic cells are represented by bacteria, blue-green algae, mycoplasma and PPLO (Pleuro Pneumonia Like Organisms). They are generally smaller and multiply more rapidly than the eukaryotic cells (Figure 8.2). They may vary greatly in shape and size. The four basic shapes of bacteria are bacillus (rod like), coccus (spherical), vibrio (comma shaped) and spirillum (spiral).

Correct

- (A) prokaryotic cell represent by bacteria, BGA, mycoplasma but not PPLO
- (B) prokaryote larger, multiply faster than eukaryote
- (C) bacillus (rod), coccus (spherical), vibrio (spiral), spirillum (comma)
- (D) all are incorrect

HW

The organisation of the prokaryotic cell is fundamentally similar even though prokaryotes exhibit a wide variety of shapes and functions. All prokaryotes have a cell wall surrounding the cell membrane except in mycoplasma. The semi-fluid matrix filling the cell is the cytoplasm. There is no well-defined nucleus. The genetic material is basically naked, not enveloped by a nuclear membrane.

Correct

- (A) organisation of prokaryotic cell is fundamental dissimilar
- (B) prokaryote exhibit wide variety of shape & function
- (C) all prokaryote have cell wall
- (D) genetic material is naked enclosed by nuclear membrane

HW

In addition to the genomic DNA (the single chromosome/circular DNA), many bacteria have small circular DNA outside the genomic DNA. These smaller DNA are called plasmids. The plasmid DNA confers certain unique phenotypic characters to such bacteria. One such character is resistance to antibiotics. In higher classes you will learn that this plasmid DNA is used to monitor bacterial transformation with foreign DNA.

HW

Correct

- (A) Genomic DNA is not main genetic material
- (B) Many genomic DNA PRESENT
- (C) single chromosome/DNA IS NOT GENOMIC DNA
- (D) many bacteria have large circular DNA outside genomic DNA
- (E) None

Incorrect

- (A) small DNA IS PLASMID
- (B) Plasmid provide phenotypic character to bacteria
- (C) plasmid not helps in transformation
- (D) resistance to antibiotic is phenotypic character

Nuclear membrane is found in eukaryotes. No organelles, like the ones in eukaryotes, are found in prokaryotic cells except for ribosomes. Prokaryotes have something unique in the form of inclusions. A specialised differentiated form of cell membrane called mesosome is the characteristic of prokaryotes. They are essentially infoldings of cell membrane.

Incorrect

- (A) Nuclear membrane absent in E.Coli
- (B) No organelle like ones in eukaryote are found in prokaryote except for ribosome
- (C) infolding of cell membrane is mesosome in prokaryote except
- (D) inclusion body present in prokaryote

HW

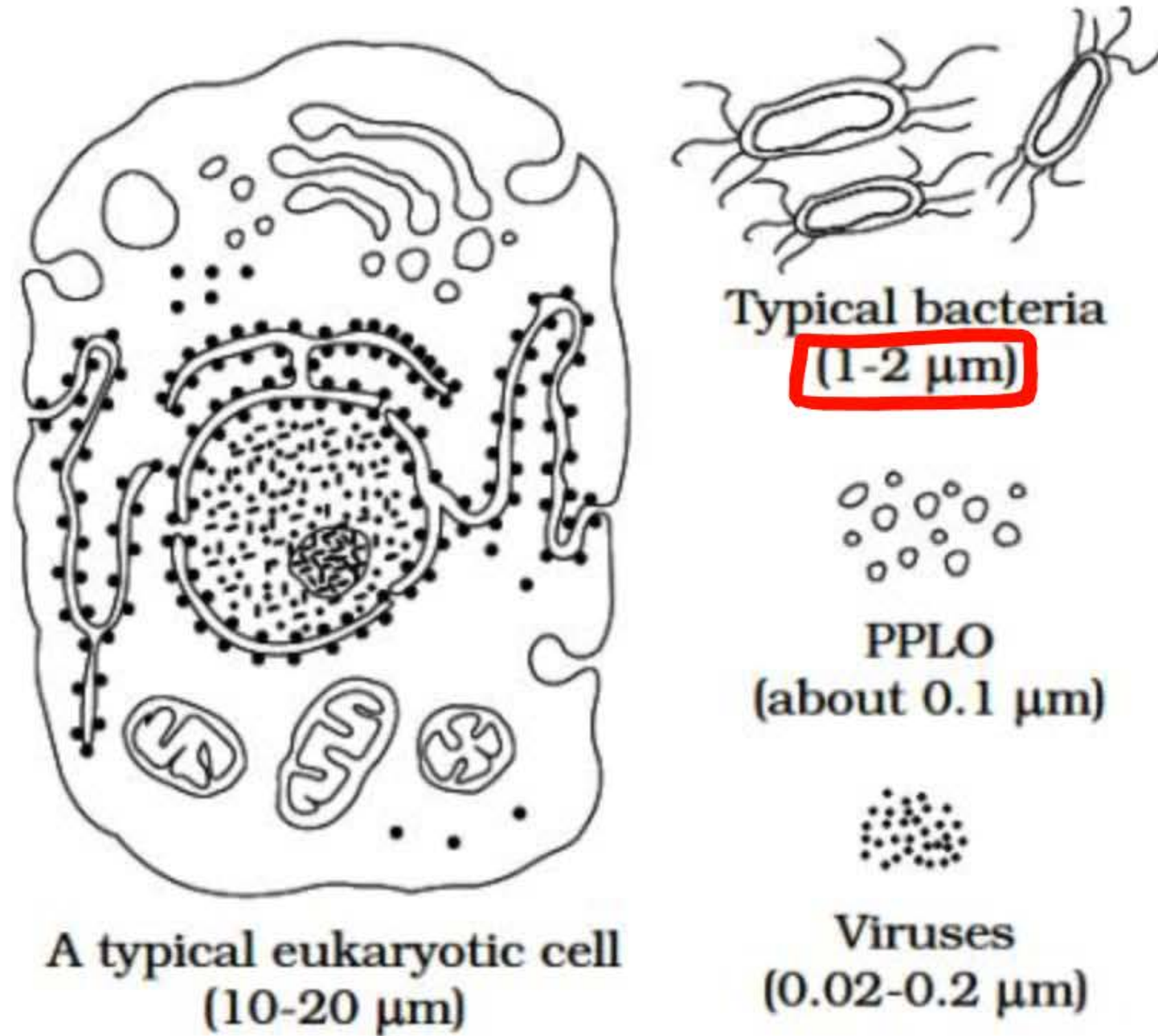


Figure 8.2 Diagram showing comparison of eukaryotic cell with other organisms

⇒ NCERT BOOSTER
PDF

Answer already
Discuss in
CLASS

⇒ TEST PAPER: ✓

THANK YOU