

YAKEEN NEET 2.0

2026

Cell - The Unit of Life

Botany

Lecture - 03

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Topics to be covered

1

PROKARYOTE

2

EUKARYOTE

3

NCERT BOOSTER (LAST CLASS &
3rd CLASS की)

4

Imp: TEST DAILY देते हो जब भी
मे PAPER देता हूँ ?

JUST WANT
TO LISTEN 'YES'

अपने PARENTS
और अपने लिये पढ़िये !

① अब NCERT BOOSTER PDF
के साथ Answer key मिलेगा

② Every week : Saturday
आपको Revision LECTURE
मिलेगा (DURATION: 5 MINUTES)

③ पूरे WEEK BOTANY का बकसे
पडना है, उसका Revision
Planner मिलेगा
(Lecture 1 to 3)

④ NOTES SHORT & CONCISE
रखना है वरन् तो OTHER
WISE बाद में PROBLEM होगा

⑤ TEST जो मे देता हूँ उसकी
Answer KEY में ZERO ERROR
होगा ! AFTER TYPING I
WILL DO PROOF READING

⑥ CLASS में बहुत ज्यादा focus
करना है

⑦ TEST में जो गलती देखी है
'ERROR ANALYSIS' की
PDF अलग बनाओ

⑧ वो पडना है जो NEET में
आता है, वो नहीं जो
मुझे (TEACHER) आता है
EXTRA KNOWLEDGE CAN
FEEL YOU BETTER BUT IN THE
END, आपको NCERT ही
याद रखना DIFFICULT हो जायेगा
Extra की वो बात ही बूझ दिजिए !

PROKARYOTIC CELL

CHROMATOPHORE: EXTENSION OF CELL MEMBRANE
(BLUE GREEN ALGAE)
IN CYTOPLASM IN SOME PROKARYOTES
WHICH CONTAIN PIGMENTS,
HELP IN PHOTOSYNTHESIS

GLYCOLYX ①
(OUTER)
(POLYSACCHARIDE)

HARD, THICK: **CAPSULE**

LOOSE: **SLIME LAYER**

NOTE: ITS THICKNESS, COMPOSITION VARY
IN DIFFERENT BACTERIA

PERIPLASMIC SPACE
(B/W CELL WALL &
CELL MEMBRANE)

MESOSOME

CELL WALL ②: PEPTIDOGLYCAN (SUGAR + AMINO ACID)
(MIDDLE)
★ SHAPE & STRUCTURAL SUPPORT TO CELL
★ PREVENT: BURSTING / COLLAPSING OF CELL.

CELL MEMBRANE ③: LIPID + PROTEIN, SELECTIVELY
(INNER) PERMEABLE (ALLOW H_2O & SOME SOLUTE),
★ IT INTERACT WITH OUTER ENVIRONMENT
★ ITS STRUCTURE ALMOST SIMILAR IN PROKARYOTE
& EUKARYOTE

FIMBRIAE

PILI

SURFACE STRUCTURE

- ★ SHORT
- ★ MORE IN NUMBER
- ★ BRISTLE LIKE,
ATTACHMENT TO ROCK /
HOST SURFACE.

- ★ LONG
- ★ LESS IN NUMBER
- ★ COMPOSITION: PILIN PROTEIN
- ★ ELONGATED, TUBULAR
(CYLINDRICAL) STRUCTURE.

NO ROLE IN LOCOMOTION

- ★ INVAGINATION OF CELL MEMBRANE
- ★ INCREASE SURFACE AREA & ENZYME CONTENT
- ★ RESPIRATION, SECRETION (RELEASE OF
PROTEIN INTO PERIPLASMIC SPACE)
- ★ DNA REPLICATION & ITS DISTRIBUTION
IN TWO DAUGHTER CELL
- ★ CELL WALL SYNTHESIS
- ★ VESICLE, LAMELLAE, TUBULE



(SHEET)



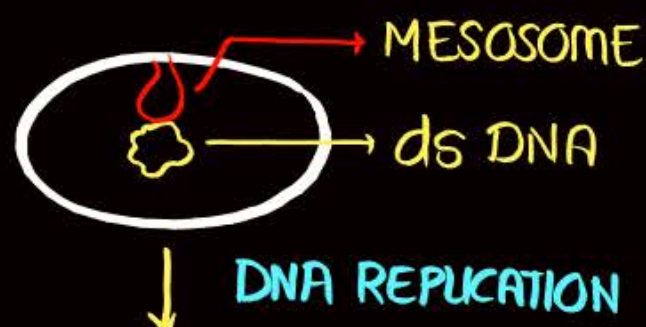
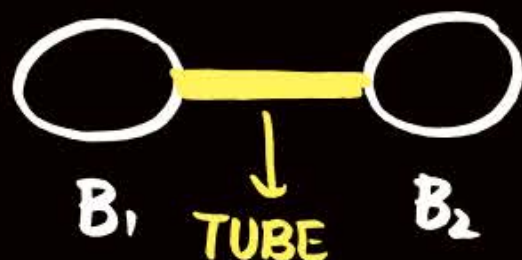
- ★ ① + ② + ③ = **CELL ENVELOPE**
- ★ TRIPLE LAYER HAVING
DIFFERENT FUNCTION.
- ★ TIGHTLY ATTACH.
- ★ ALL THREE WORK TOGETHER
AS SINGLE PROTECTIVE UNIT
- ★ CHEMICALLY COMPLEX.
- ★ MOST OF PROKARYOTE
(MAINLY BACTERIA): **PRESENT**

NOTE : GLYCOCALYX : ① IT HIDES BACTERIA FROM HOST IMMUNE SYSTEM. ② IT PROVIDE STICKY CHARACTER TO BACTERIA

EXTRA
POINT

PILI : IT FORM A TUBE WITH ANOTHER BACTERIA THROUGH WHICH DNA OF ONE BACTERIA TRANSFER TO OTHER

EXTRA POINT



MESOSOME DIVIDE & MOVE



EXTRA
POINT
(CONCEPT
BUILD)

BINARY
FISSION

CONJUGATION

SCIENTIST

GRAM STAINING

TECHNIQUE
(EXTRA POINT)

(VIOLET/
PURPLE)



CRYSTAL VIOLET (PRIMARY
STAIN)
+
IODINE SOLUTION



BACTERIA
APPEAR AS VIOLET/PURPLE

ETHANOL/
ACETONE
WASHING



STILL RETAIN
CRYSTAL VIOLET
DYE.

PURPLE/VIOLET
(GRAM
POSITIVE
BACTERIA)

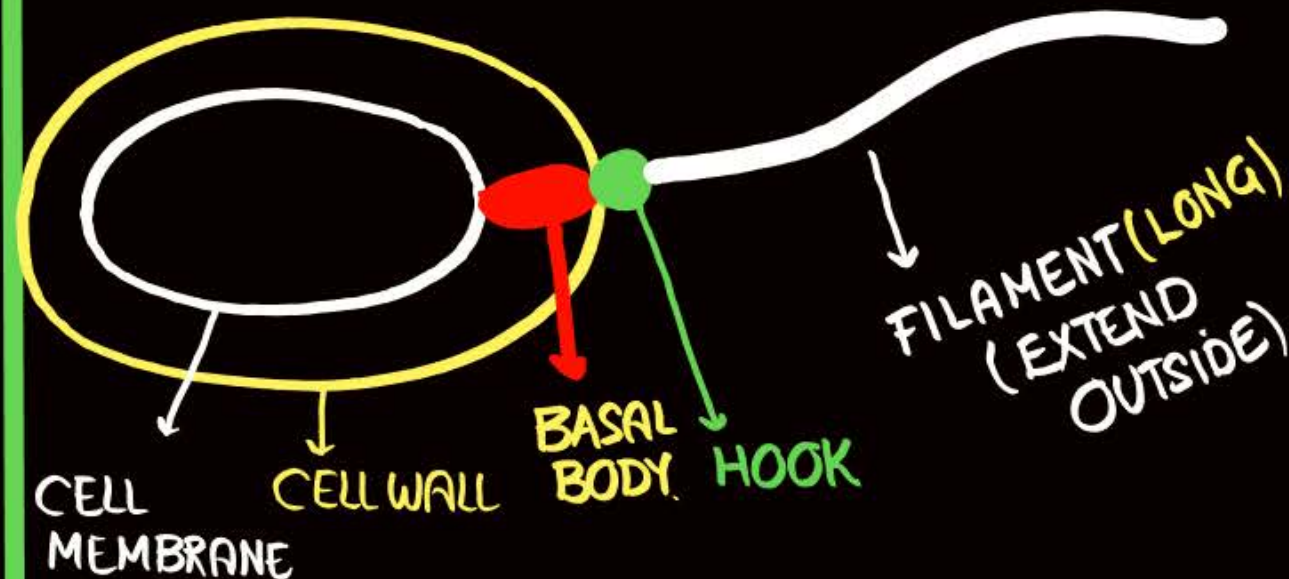
LOSE CRYSTAL VIOLET
SO APPEAR AS COLOURLESS

SAFRANIN (PINK)

APPEAR AS PINK
(GRAM NEGATIVE
BACTERIA)

IN NCERT

BACTERIAL FLAGELLA



① FILAMENT :

② HOOK : CONNECT ① & ③

③ BASAL BODY :

NOTE : BACTERIAL FLAGELLA IS EXTENSION OF CELL WALL
(ITS NOT COVERED BY CELL MEMBRANE)

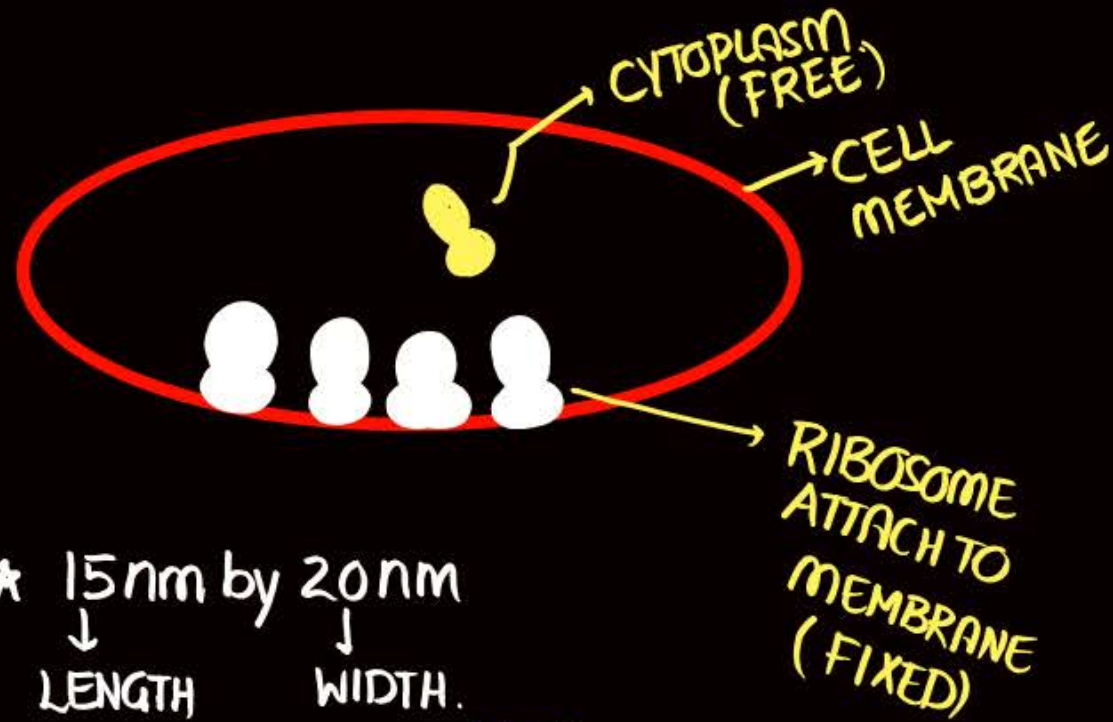
NOTE : FLAGELLIN PROTEIN (EXTRA POINT)

★ IF FLAGELLA PRESENT (MOTILE)
ABSENT (NON MOTILE)



★ NUMBER & DISTRIBUTION OF FLAGELLA : VARY

BACTERIAL RIBOSOME



* 15nm by 20nm
↓ ↓
LENGTH WIDTH.

* 70S { 30S
 50S

* POLYRIBOSOME/POLYSOME



8.4 PROKARYOTIC CELLS



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

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.

→ CELL WALL
ABSENT.

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 ^{not} enclosed by nuclear membrane

FALSE 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.

ZOOLOGY

Correct

- (A) Genomic DNA is ~~not~~ main genetic material
- (B) ~~Many~~ ^{SINGLE} genomic DNA PRESENT
- (C) single chromosome/DNA ~~IS~~ NOT GENOMIC DNA
- (D) many bacteria have ~~large~~ ^{small} 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 C
- (B) No organelle like ones in eukaryote are found in prokaryote ~~ribosome~~ RIBOSOME
- (C) infolding of cell membrane is mesosome in prokaryote ~~mesosome~~ C
- (D) inclusion body present in prokaryote C

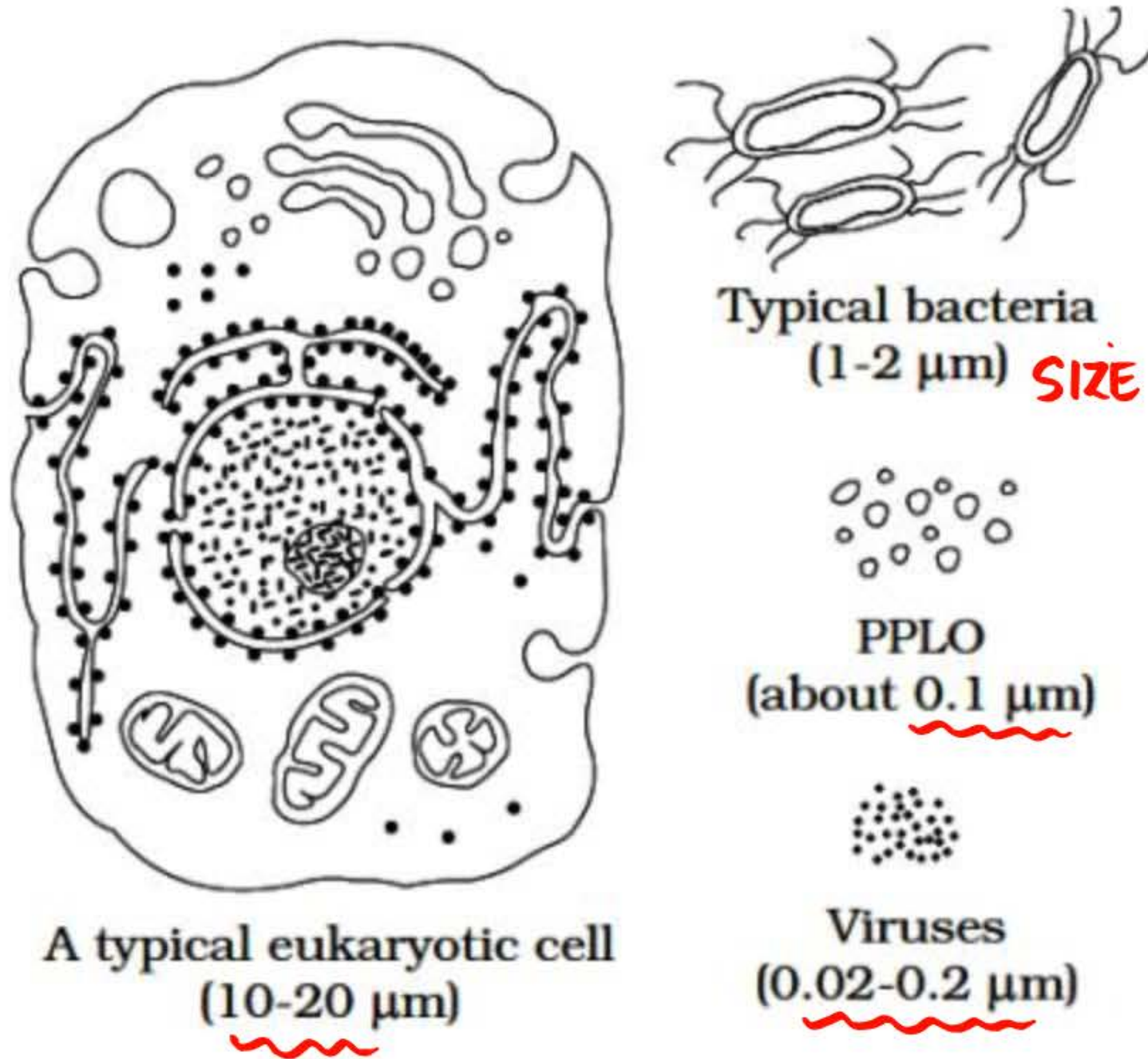


Figure 8.2 Diagram showing comparison of eukaryotic cell with other organisms

8.4.1 Cell Envelope and its Modifications

Most prokaryotic cells, particularly the bacterial cells, have a chemically complex cell envelope. The cell envelope consists of a tightly bound three layered structure i.e., the outermost glycocalyx followed by the cell wall and then the plasma membrane. Although each layer of the envelope performs distinct function, they act together as a single protective unit. Bacteria can be classified into two groups on the basis of the differences in the cell envelopes and the manner in which they respond to the staining procedure developed by Gram viz., those that take up the gram stain are Gram positive and the others that do not are called Gram negative bacteria.

G⁺ve : peptidoglycan MORE
G⁻ve : PEPTIDOGLYCAN LESS

RETAIN CRYSTAL VIOLET
LOSE CRYSTAL VIOLET

CRYSTAL VIOLET

Correct

- A. cell envelope is chemically ~~simple~~
- B. cell envelope is tightly bound
- C. all have ~~same~~ function but different composition
- D. all work as protective unit
- E. from outer to inner (glycocalyx-cell membrane-cell wall)

(A) 0 (B) 1 ☒ (C) 2 (D) 3

Correct

- (A) bacteria can be classify into gram positive & negative
- (B) criteria is ~~only~~ staining procedure
- (C) difference in cell envelope is ~~not~~ a criteria ☒
- (D) those take crystal violet are Gram negative and those do not are gram positive ☒

Glycocalyx differs in composition and thickness among different bacteria. It could be a loose sheath called the slime layer in some, while in others it may be thick and tough, called the capsule. The cell wall determines the shape of the cell and provides a strong structural support to prevent the bacterium from bursting or collapsing.

The plasma membrane is selectively permeable in nature and interacts with the outside world. This membrane is similar structurally to that of the eukaryotes.

Correct

- (A) Glycocalyx thickness composition same in all bacteria
- (B) loose sheath : capsule & thick tough : slime layer
- ☒ (C) cell wall determine shape & structural support
- (D) cell wall promote bursting & collapsing

Prevent

plasma membrane

- ☒ (A) semipermeable
- (B) do not interact with outside
- ☒ (C) its structure almost similar in prokaryote & eukaryote
- (D) none

A special membranous structure is the **mesosome** which is formed by the extensions of plasma membrane into the cell. These extensions are in the form of vesicles, tubules and lamellae. They help in cell wall formation, DNA replication and distribution to daughter cells. They also help in respiration, secretion processes, to increase the surface area of the plasma membrane and enzymatic content. In some prokaryotes like cyanobacteria, there are other membranous extensions into the cytoplasm called chromatophores which contain pigments.

BGA.

mesosome (incorrect)

- ☒ A. it works similar to mitochondria in eukaryotes **PRO**
- ☒ B. extension of ~~cell wall~~
- ☒ C. extension can have different form
- ☒ D. help in cell ~~membrane~~ **wall** synthesis
- ☒ E. helps in respiration, secretion process
- ☒ F. ~~Not~~ help in DNA replication & distribution in daughter cell

(A) 1 (B) 2 (C) 3 ☒ (D) 4

Correct

- ☒ (A) mesosome increase surface area & ~~decrease~~ enzyme content
- ☒ (B) ~~all~~ prokaryote have chromatophore
- ☒ (C) chromatophore present in some prokaryote where pigments ~~absent~~ **PRESENT**
- ☒ (D) chromatophore helps in photosynthesis, extension of cell membrane in cytoplasm

Bacterial cells may be motile or non-motile. If motile, they have thin filamentous extensions from their cell wall called flagella. Bacteria show a range in the number and arrangement of flagella. Bacterial flagellum is composed of three parts – **filament**, **hook** and **basal body**. The filament is the longest portion and extends from the cell surface to the outside.

mesosome (incorrect)

- ☒ (A) all bacteria have flagella
- ☒ (B) thick filamentous extension from cell membrane : flagella
- ☒ (C) all bacteria have fixed flagella
- ☒ (D) prokaryote flagella contain tubulin protein
- ☒ (E) All are incorrect

Flagellin

bacteria flagella

- ☒ (A) is similar to eukaryote flagella
- ☒ (B) consist of filament – hook – basal body
- ☒ (C) filament is shortest
- ☒ (D) none

LONGEST

Besides flagella, Pili and Fimbriae are also surface structures of the bacteria but do not play a role in motility. The **pili** are elongated tubular structures made of a special protein. The **fimbriae** are small bristle like fibres sprouting out of the cell. In some bacteria, they are known to help attach the bacteria to rocks in streams and also to the host tissues.

Correct

- (A) flagella, pili, fimbriae are surface structure of bacteria → **MOTILITY**
- (B) ~~all~~ do not play role in motility
- (C) pili are elongated, ~~shortest~~ compare to fimbriae
- (D) pili made up of ~~tubulin~~ protein → **LONG!**

Incorrect

- (A) Fimbriae are shortest & ~~less~~ in number
- ✓ (B) they helps in attachment to rock (bristle like)
- (C) both are correct
- (D) none

8.4.2 Ribosomes and Inclusion Bodies

In prokaryotes, ribosomes are associated with the plasma membrane of the cell. They are about 15 nm by 20 nm in size and are made of two subunits - 50S and 30S units which when present together form 70S prokaryotic ribosomes. Ribosomes are the site of protein synthesis. Several ribosomes may attach to a single mRNA and form a chain called **polyribosomes** or **polysome**. The ribosomes of a polysome translate the mRNA into proteins.

HOME WORK

Assertion (A) : Polysome consist of many ribosome on single m-RNA

Reason (R) : These ribosome translate mRNA into protein

- (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.

Correct

- (A) Ribosome not associated with cell membrane in bacteria
- (B) 15 nm length & 20 nm width
- (C) 50S @ 40S two units
- (D) ribosome do not synthesis protein

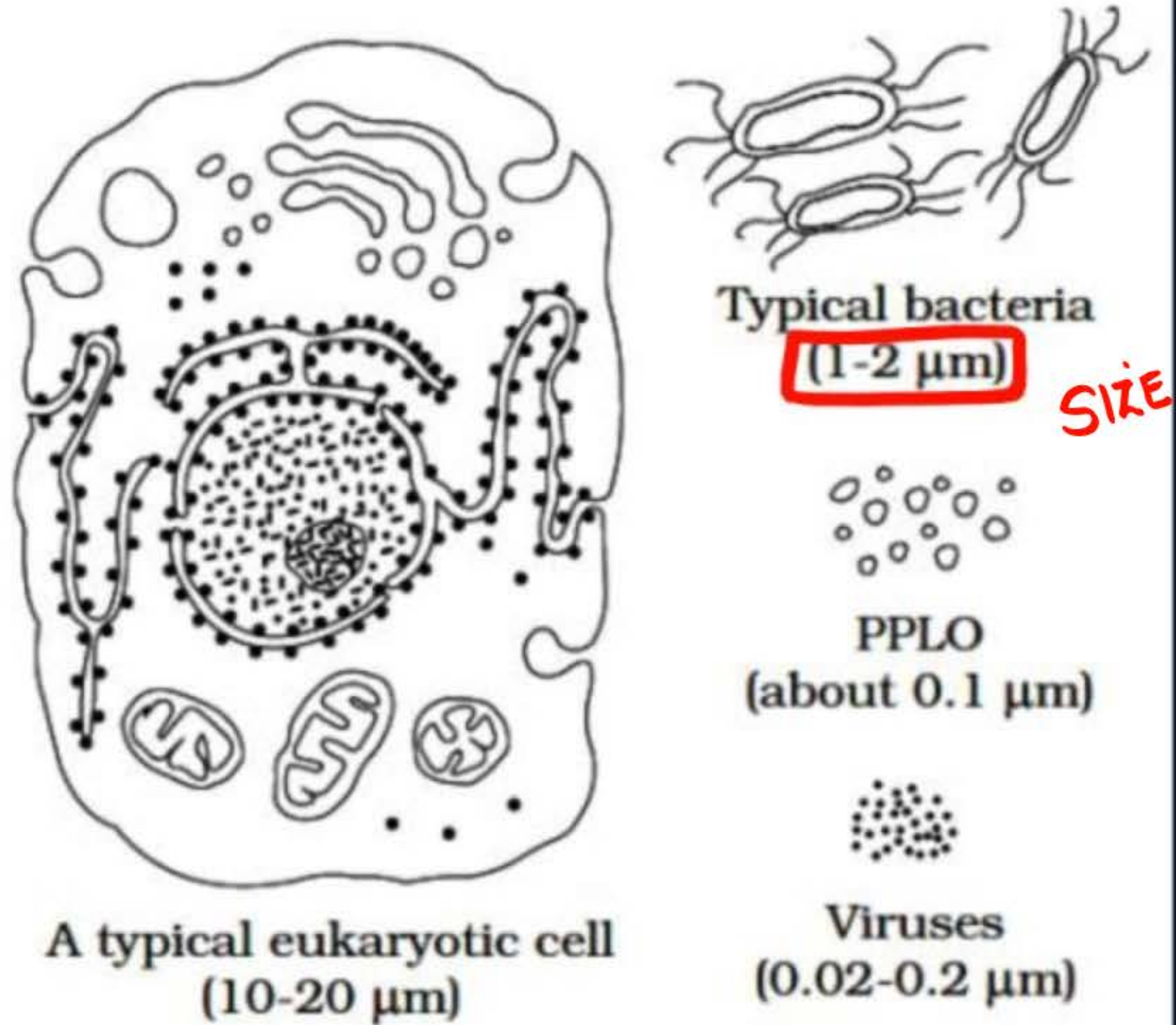


Figure 8.2 Diagram showing comparison of eukaryotic cell with other organisms



Homework from **YAKEEN NEET 2.0 2026** Module



Exercise PRARAMBH

TOPIC WISE

CELL, CELL
THEORY

PROKARYOTES.
(QUESTION
SOLVE)

REVISION PLANNER.

SATURDAY : L-3 (45 minutes) + L-2 Revision (15 minutes)

SUNDAY : L-3 Revision (20 minutes) + L-2 (10 minutes)

MONDAY : L-4 (1 hour) + L-2 & L-3 → 15 minutes

TUESDAY : L-5 (1 hour) + L-4 Revision (20 minutes)

WEDNESDAY : L-5 + L-4 Revision (35 minutes)

THURSDAY : L-1 to L-3 Revision (20 minutes)

FRIDAY : L-1 to L-5 (Revision : 30 minutes)

THANK
YOU