ARJUNA

NEET 2026

BOTANY

CELL: THE UNIT OF LIFE

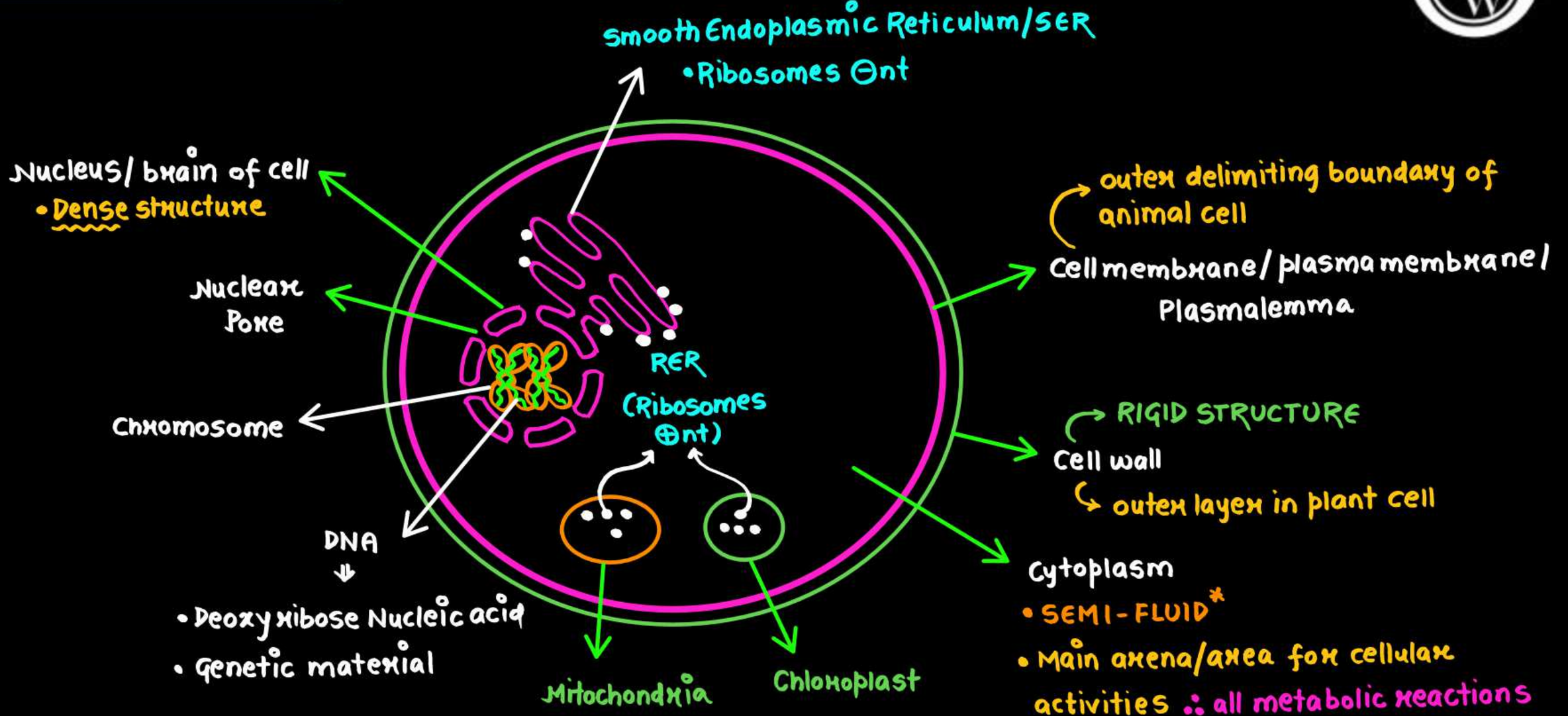
Lecture: 02

By: Vipin Sharma Sir

Topics *to be covered*

1.) **Overview of a Cell**

OVERVIEW OF A CELL



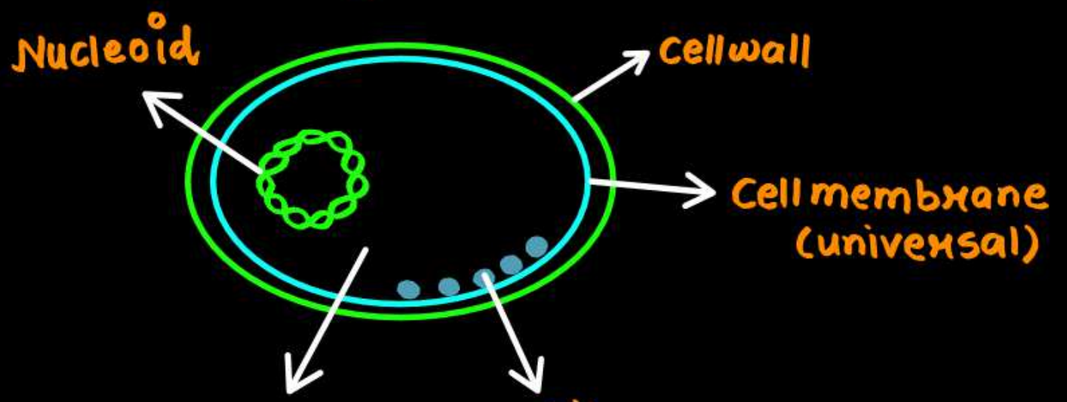
PROKARYOTIC CELL VS EUKARYOTIC CELL

- Pro, Karyon → Nucleus
  - Primitive / not well developed
- well defined nucleus is absent
  - In prok. cell, nuclear membranes/envelope are absent
- Membrane bound organelles are absent
- Cell membrane present
- Usually smaller
- Ribosome = 70s
  - = Svedberg unit

Eu, Karyon → Nucleus
- True / well defined

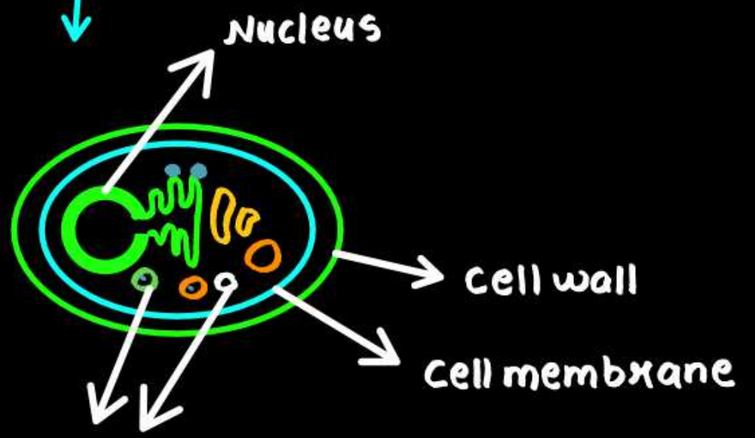
- In eukaryotic nucleus, nuclear envelope/membranes are present
- Membrane bound organelles are present
- Cell membrane present
- Usually bigger
- Ribosome = 80s, 70s → Mitochondria & chloroplast
  - 80s → cytoplasm/RER

PROKARYOTIC CELL VS EUKARYOTIC CELL



- associated with cell membrane
- 70s

- Smaller in size
- Divides faster



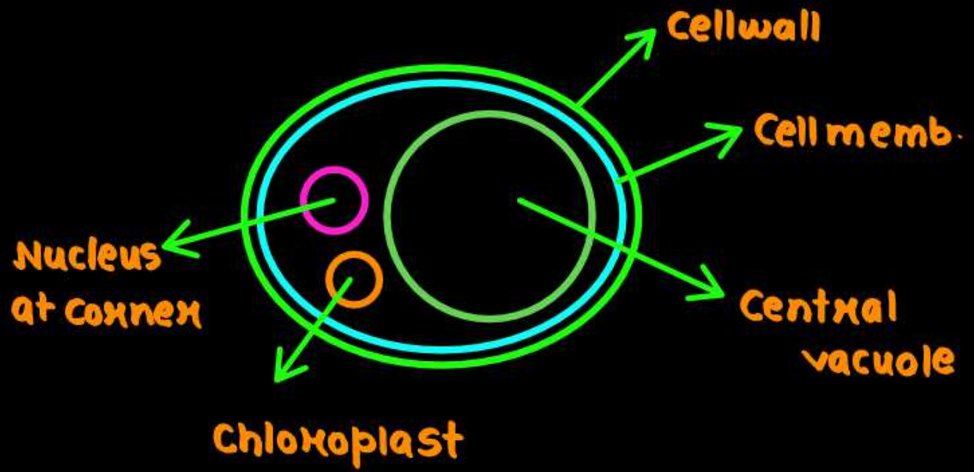
Membrane bound organelles

e.g., Nucles, Endoplasmic reticulum (ER), Golgi Body (GB), mitochondria, chloroplast, vacuole, peroxisome etc.

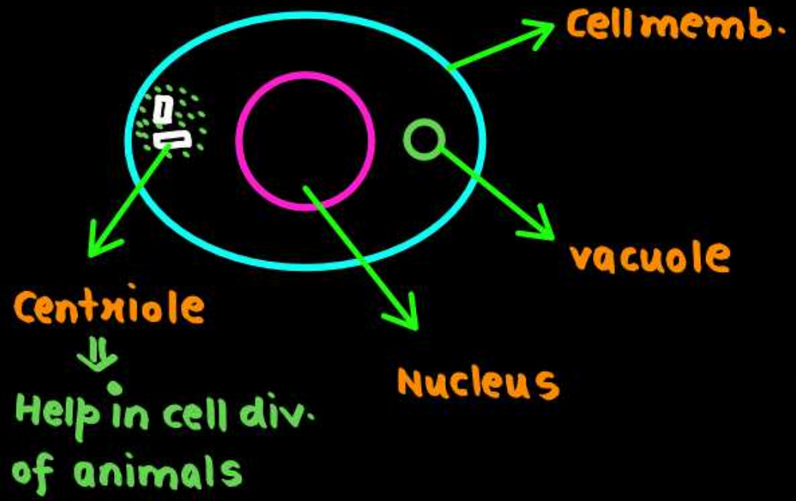
- Bigger in size
- Divides slowly

PLANT CELL VS ANIMAL CELL

- Cell wall present
- Chloroplast present
- Central vacuole present
- Absent



- Absent
- Absent
- Absent
- Centrioles & Centrosome present



Centriole ⇓ Help in cell div. of animals

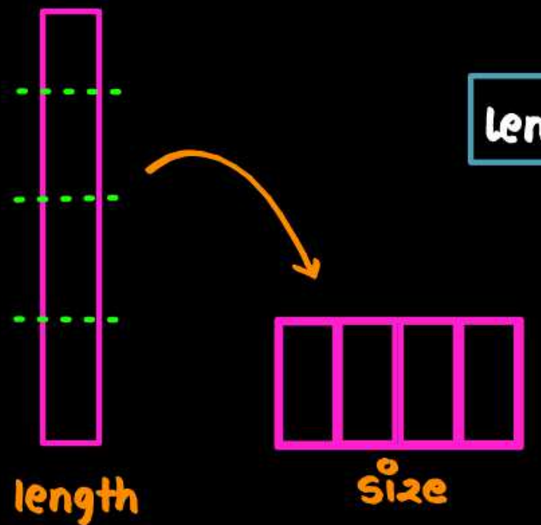
TRICK

Cellwall
Chloroplast
Central vacuole
Centriole

- A Typical plant cell: onion peel cell
- A typical human cell: human cheek cell

CELLS VARY GREATLY IN SHAPE, SIZE AND ACTIVITY

LENGTH AND SIZE



length > size

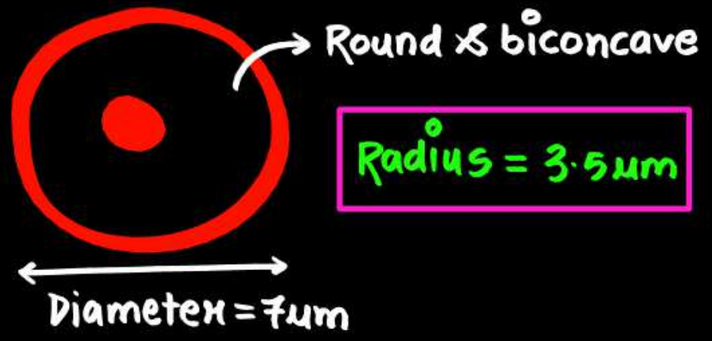
- Length of bacteria : 3-5 µm
- size of typical prokaryotic cell : 1-2 µm

Euk. cell is 10x bigger
∴ 10-20 µm

- Length of mycoplasma : 0.3 µm (prokaryotic)
  - Smallest living cell
- Size of PPLO : Pleuropneumonia Like organism : 0.1 µm
  - Type of mycoplasma
- Virus size : 0.02 - 0.2 µm (NOT LIVING)

RED BLOOD CELL

Erythrocyte



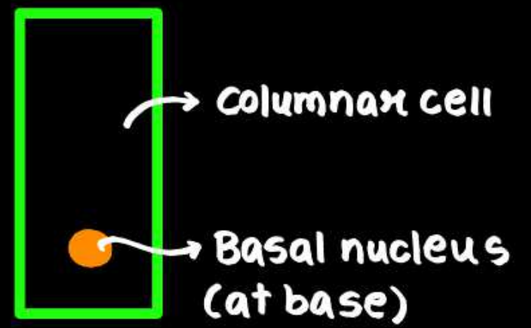
WHITE BLOOD CELL

Leucocyte (white)

Amoeboid/ Irregular

COLUMNAR EPITHELIA

स्तंभ : Pillar like



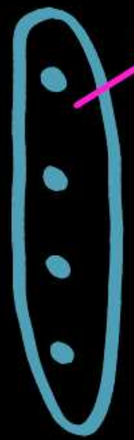
NERVE CELL

- Long, branched
- Longest cell

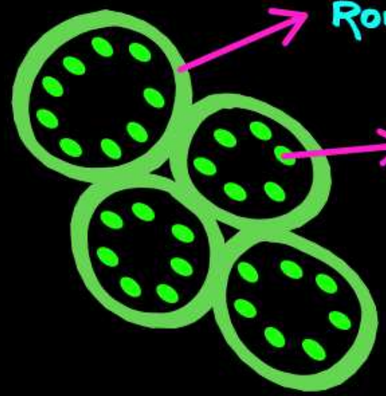
- Largest cell: ostrich egg

TRACHEID

Transports water/ dead cell



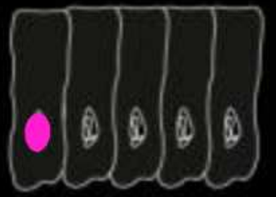
MESOPHYLL CELL



CELLS VARY GREATLY IN SHAPE, SIZE AND ACTIVITY

Red blood cells
(round and biconcave)

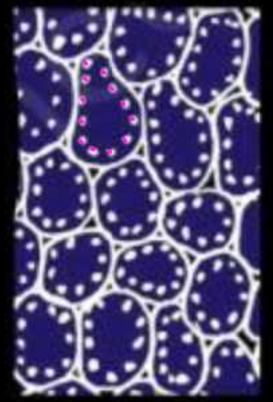
White blood cells
(amoeboid)



Columnar epithelial cells
(long and narrow)

Nerve cell
(Branched and long)

A tracheid
(elongated)



Mesophyll cells
(round and oval)

NCERT MAIYAAAA KI READING!!

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. 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. 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'.

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NEET-2015

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.

NEET-2015

The prokaryotic cells lack such membrane bound organelles.

NEET-2015

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.

NEET-2022

Cells differ greatly in size, shape and activities (Figure 8.1). For example, Mycoplasmas, the smallest cells, are only 0.3 µm in length while bacteria

NCERT MAIYAAAA KI READING!!

could be 3 to 5 µm. The largest isolated single cell is the egg of an ostrich. Among multicellular organisms, human red blood cells are about 7.0 µm 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.

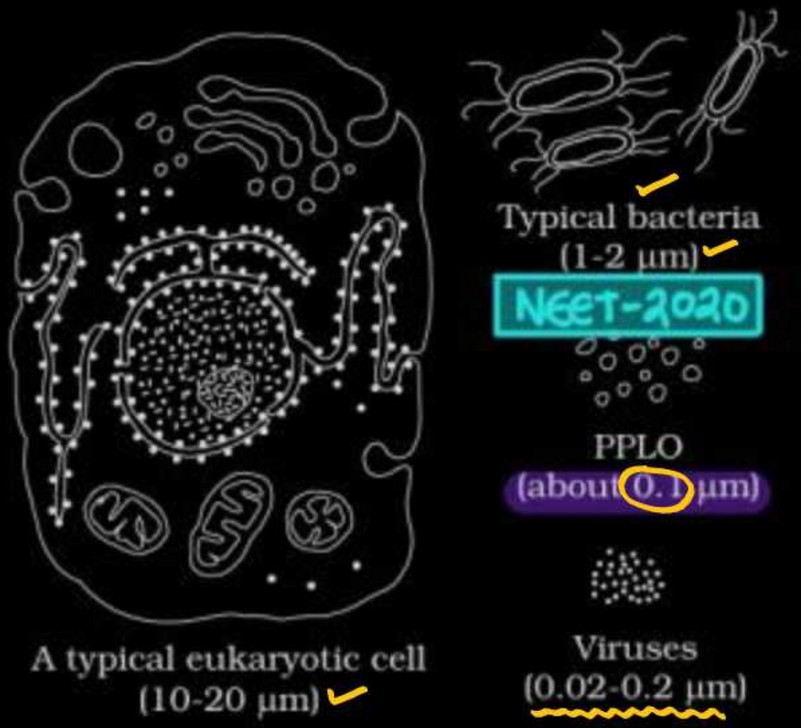
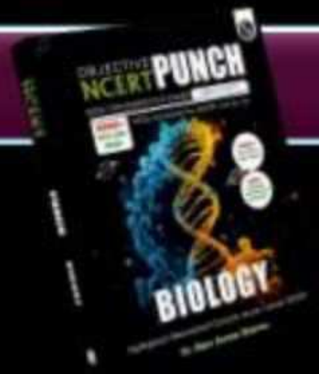


Figure 8.2 Diagram showing comparison of eukaryotic cell with other organisms

Punchayat

with Vipu Sir



QUESTIONS AND PYQs

1 Plant cell differs from animal cell in the:

(1) presence of centriole.
(2) presence of cell wall and chloroplast.
(3) absence of cell wall.
(4) absence of chloroplast.

2 Which of the following cell has a diameter of 7 micrometre?

(1) Erythrocyte
(2) Monocyte
(3) Neuron
(4) Blood platelets

3 The main arena of cellular activities in plant and animal cells is:

(1) Cell membrane
(2) Mitochondria
(3) Cytoplasm
(4) Ribosome

4 Ribosomes are found in;

(1) Prokaryotic cells only
(2) Prokaryotic cells, chloroplasts, mitochondria and eukaryotic cell cytoplasm.
(3) Prokaryotic cells, chloroplasts and vacuole
(4) Lysosome, mitochondria

5 Which of the following is present in both prokaryotes and eukaryotes?

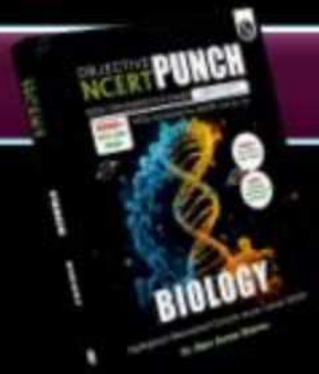
(1) Golgi complex
(2) Mitochondria
(3) Chloroplast
(4) Plasma membrane

6 Which of the following is the largest isolated single cell?

(1) Nerve cell
(2) Mycoplasma
(3) Ostrich egg
(4) RBCs

7 The shape of human red blood cell is:

(1) round and biconcave.
(2) flat and thread like.
(3) irregular.
(4) round and oval.



8 Different cells have different sizes. Arrange the following cells in an ascending order of their size. Choose the **correct** option among the followings.

I. Mycoplasma (1)
II. Ostrich eggs (4)
III. Human RBC (3)
IV. Bacteria (2)

(1) I, IV, III, II
(2) I, II, III, IV
(3) II, I, III, IV
(4) III, II, I, IV

Homework

Solve **OBJECTIVE NCERT PUNCH TOPIC WISE QUESTIONS**

Revise concepts from Botany MED EASY Book or from Class Notes

Module Questions
Aarabh: 11
Exercise-1: 1, 3, 4, 7, 8, 11, 12, 14
Exercise-2: 1, 2


THANK
YOU