

NEET 2025

BIOLOGICAL CLASSIFICATION

BIOLOGY

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Contents

- ☐ Archae bacteria ✓
- ☐ Eubacteria ✓
- ☐ Mycoplasma ✓
- ☐ Cyanobacteria ✓
- ☐ Actinomyces ✓

Classification

- **Scientific Grouping of organisms on the basis of similarities and dissimilarities.**
- **Placing the groups in a hierarchy of categories.**

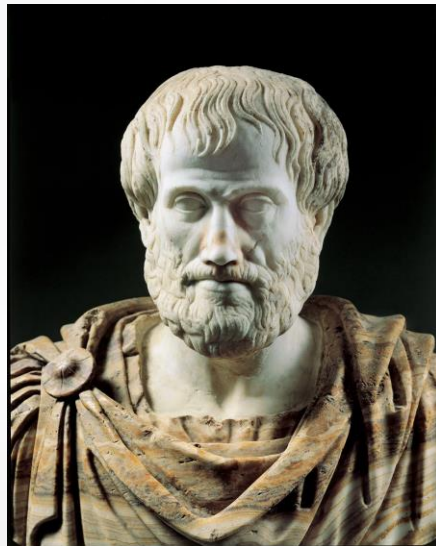
Types of Classification

- ❖ Artificial system of classification //
- ❖ Natural system of classification //
- ❖ Phylogenetic system of classification //

phylogeny:
Evolutionary
history

Artificial system of Classification

- ❖ Only one or two morphological characters for grouping of organism is used.✓✓
- ❖ Flowering and non-flowering plants, enaima and Anaima.
- ❖ This type of classification was developed by Aristotle, Theophrastus and even Carolous Linnaeus✓✓✓✓

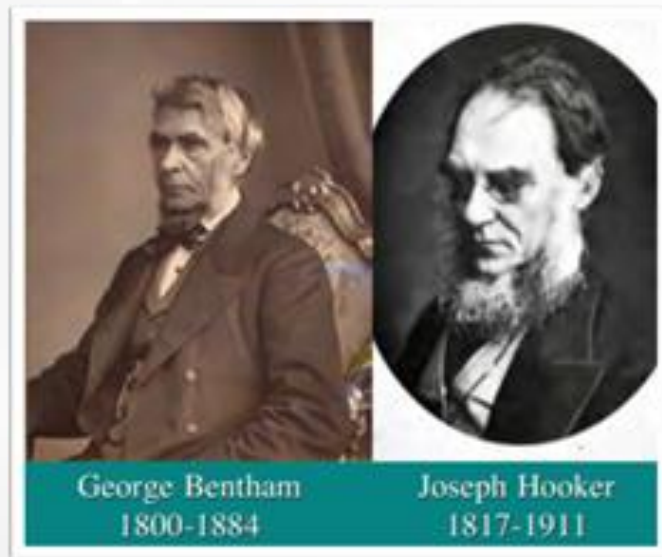


Natural system of Classification

- This system considers comparable study of a number of characters.
- Classification was based on Morphology, anatomy, cytology, physiology, ontogeny, biochemistry and taxonomy.

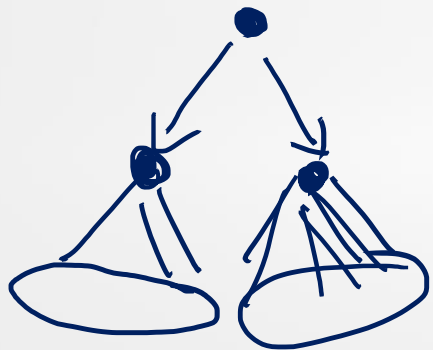
Natural system of Classification

- It brings out natural similarities and dissimilarities and hence natural relationships among the organisms.
- This system was developed by Bentham and Hooker and called as Bentham and Hooker classification



Phylogenetic system of Classification

- This system is based on the evolutionary relationship of organisms.
- In this system organisms are classified on the basis of their evolution on earth from primitive to highly evolved.
- This classification is called Engler and Prantl classification and Hutchinson classification, etc.



Two Kingdom Classification- Carolus Linnaeus

Kingdom plantae



Kingdom animalia



Drawbacks

- Prokaryotes and Eukaryotes were kept in the same group.

E.g.

- Prokaryotic Bacteria and Cyanobacteria were placed under Plant Kingdom.

- Heterotrophs and Autotrophs kept in the same group.

E.g.

- Fungi, (heterotrophs) were placed with plants.

Drawbacks

- Unicellular and multicellular organisms kept in the same group.

E.g.

- Protozoans were placed in animal kingdom.
- Some lower organisms have characters of both plants and animals.

E.g.

Euglena, It did not get a proper group.

Five Kingdom Classification

- R.H. Whittaker

✓ Mon era

✓ Protista

✓ Fungi

✓ Plantae

✓ Animalia



Five Kingdom Classification - R.H. Whittaker

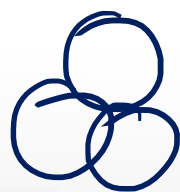
Complexity of cell structure

Prokaryotic and eukaryotic

Complexity of Body
structure ✓

Unicellular & Multi cellular

 Unicellular

 Multicellular

Five Kingdom Classification - R.H. Whittaker

Mode of Nutrition

(Autotrophic and Heterotrophic).

✓ Types of reproduction

(Asexual, Sexual and their modes).

✓ Phylogenetic relationship

Kingdom monera

Found in all types of habitats on earth,
like:

- Bottom of Oceans. ✓✓
- Below the icebergs. ✓✓
- Hot springs. ✓✓
- Inside and outside the bodies of other organisms. ✓✓
- Deserts. ✓✓

Monera



■ Archaeobacteria

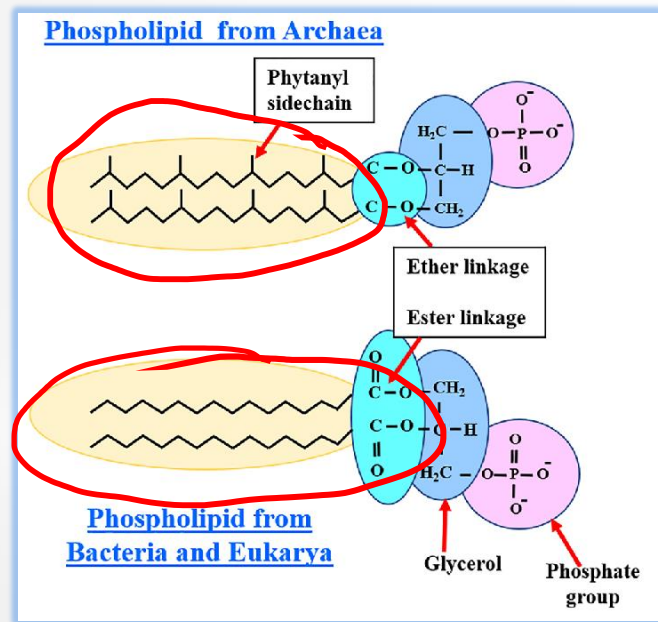
- Methanogens. 
- Halophiles. 
- Thermoacidophiles. 

■ Eubacteria

- Heterotrophic Bacteria 
- Mycoplasma. 
- Actinomyces. 
- Cyanobacteria. 

Archae bacteria

- Most primitive group of Organisms. ✓✓
- Found in most harsh conditions.
- Peptidoglycan is absent in cell wall. ✓✓
- Tolerance to extreme conditions is because of presence of branched lipid chain in the membrane.



Archae Bacteria - Classification

Non-sulphur medium

- **Methanogens (Obligate Anaerobes)**

Eg. *Methanobacterium*, *Methanococcus*.

- **Halophiles (facultative Anaerobes)**

Eg. *Halobacterium*, *Halococcus*.

Salty areas.

Archae Bacteria

Hot sulphur spring

- **Thermoacidophiles (facultative Anaerobes)**

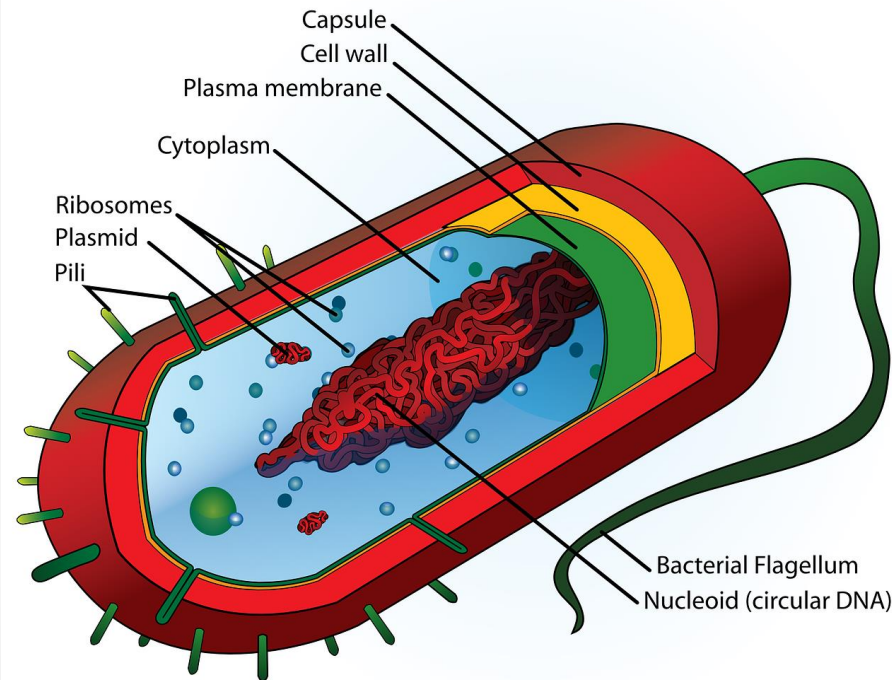
Eg.

Thermoplasma.

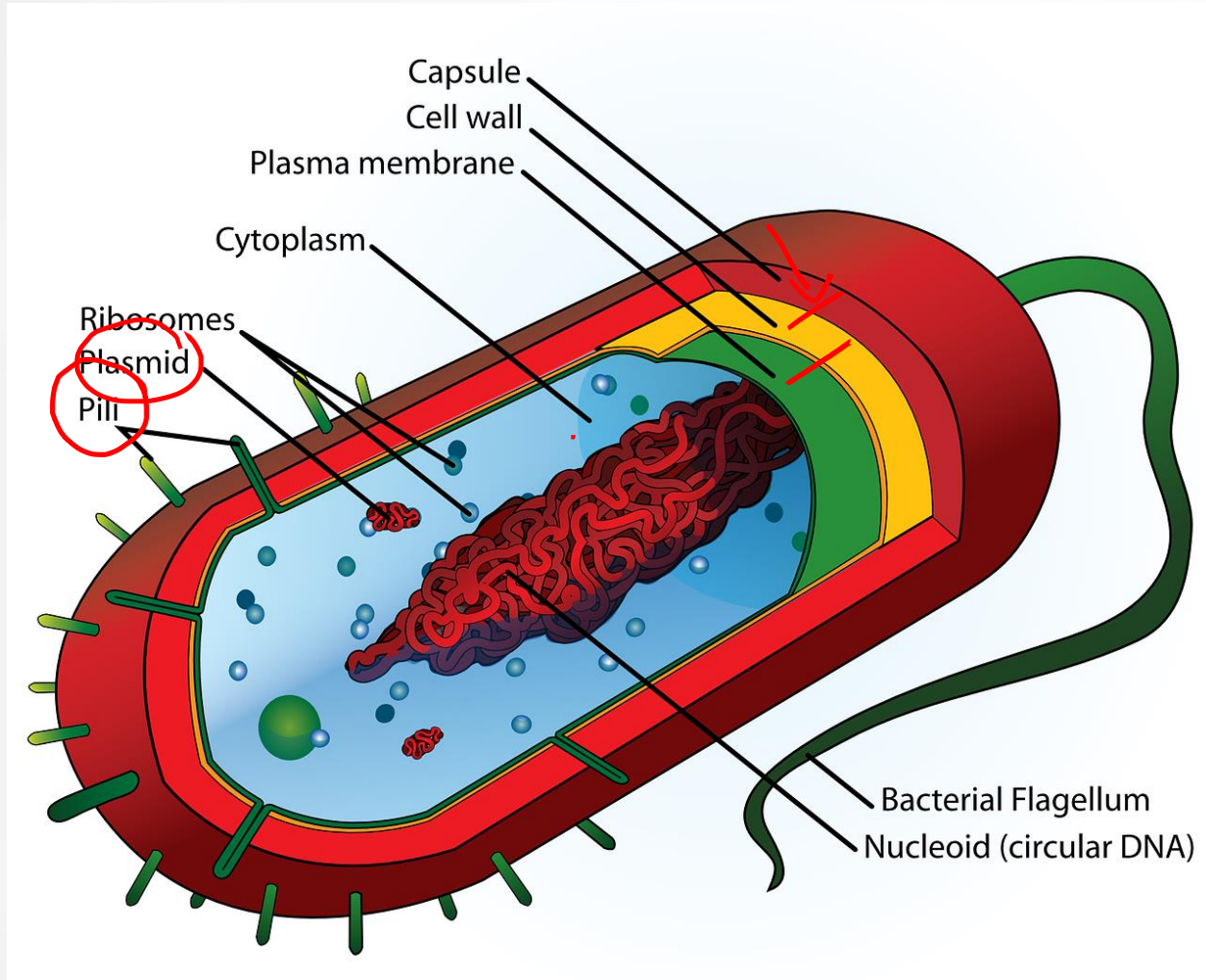
Thermoproteus.

Eubacteria

- Omnipresent, Unicellular, with variable shapes, mostly pathogenic.



Bacterial cell



Components of Bacterial cell

Cell Envelope

Nucleoid

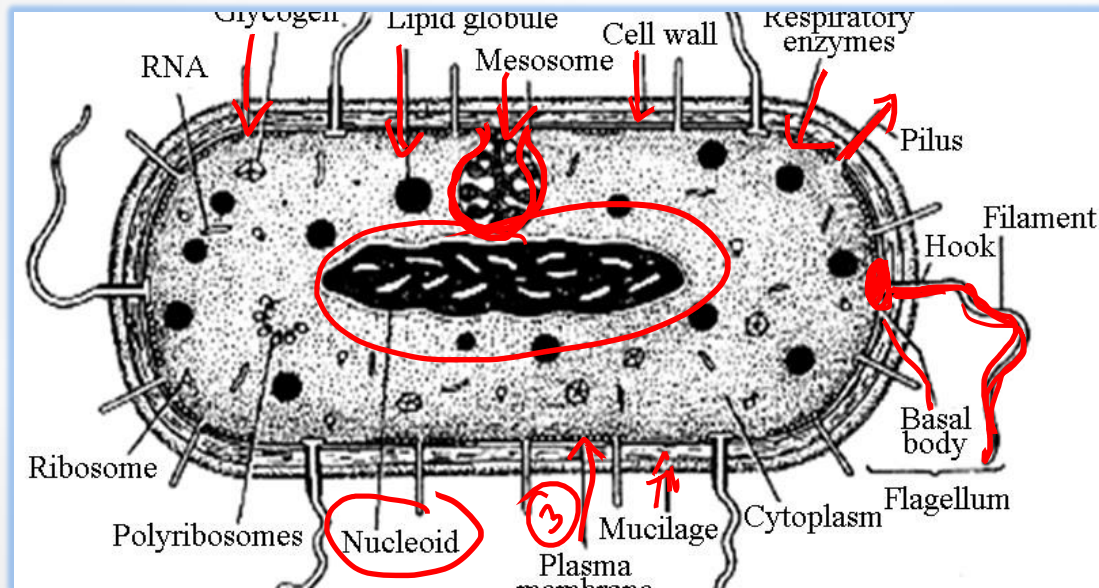
Cytoplasm

Plasmids

Flagella

Glycocalyx

Polyribosomes
Polyosomes



Outer envelope

- Outer covering.

Usually consists of 3 components:

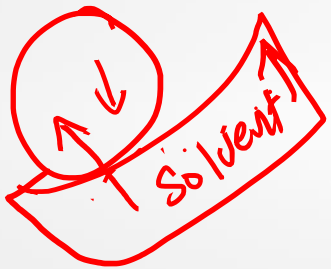
- Glycocalyx (Mucilage covering) ✓✓
- Cell Wall ✓✓
- Plasma Membrane ✓✓

Glycocalyx (Mucilage covering)

- Outermost layer, non-cellulosic polysaccharide with or without proteins.
- If it's a loose covering, it is called slime layer.
- If thick and tough, called capsule.
- Protective in function.

Cell Wall

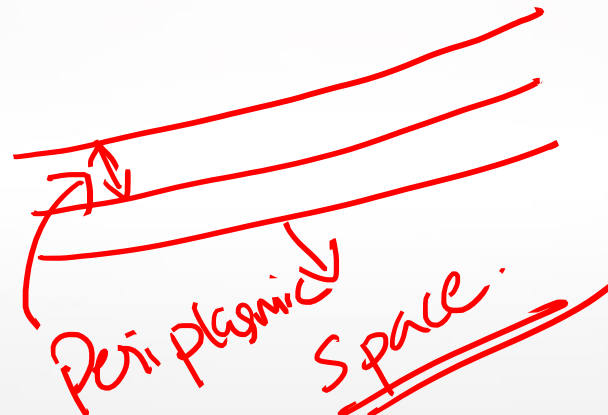
- Rigid, solid covering, protects bursting in hypotonic solution.
- Made of peptidoglycan. //
- Peptidoglycan chain is made of repeating units of N-acetyl Glucosamine (NAG) and N-acetylmuramic Acid (NAM).



hypertonic
hypotonic

Plasma membrane

- Selectively permeable. ✓✓
- It is metabolically active in Bacteria. ✓✓
- It takes part in respiration, synthesis of lipids and cell wall components. ✓✓
- Space between plasma membrane and cell wall is called Periplasmic space. ✓✓



Cytoplasm

- Membrane bound cell organelles absent.
- Cytoplasmic streaming and Sap vacuoles absent.
- Gas vacuoles present.
- It has the following components.

Mesosome

Ribosomes

Chromatophore

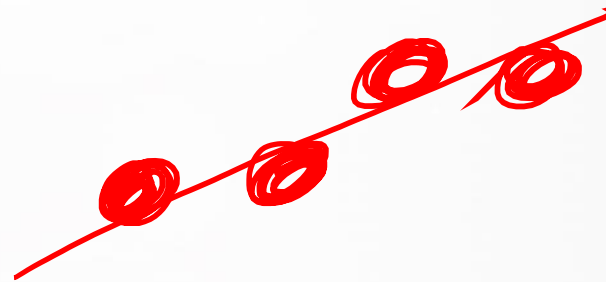
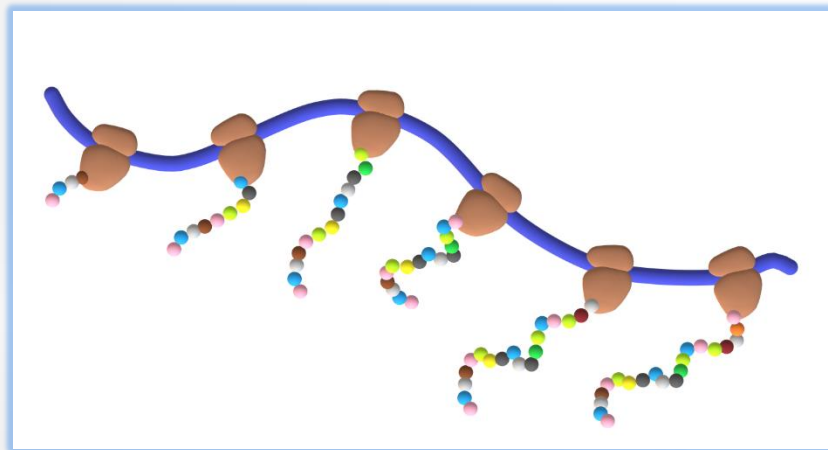
Mesosome

- Formed due to inward folding of plasma membrane.



Ribosome

- It is of two types Free Ribosome (Scattered in cytoplasm) and Fixed Ribosome (Attached to Plasma Membrane).
- Ribosomes generally occur in groups, called polyribosomes or polysomes (4-8 ribosomes are attached to a single strand of mRNA)

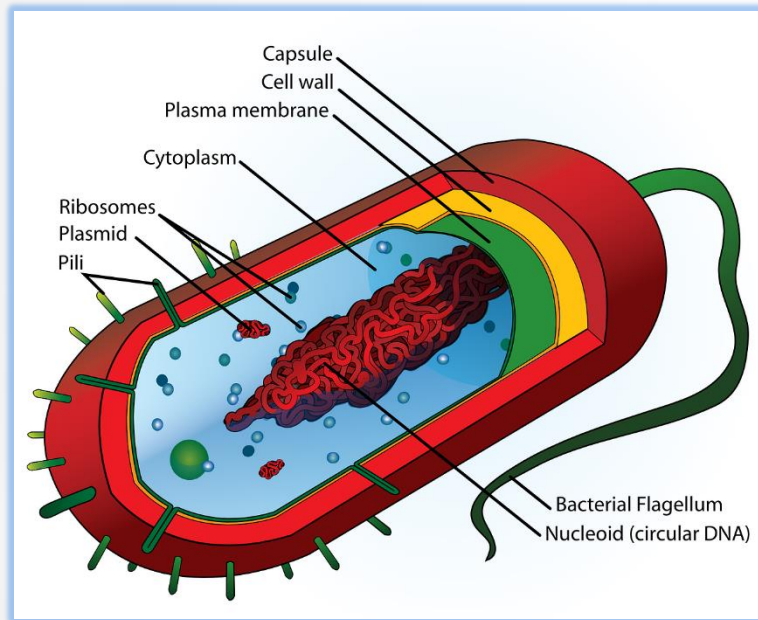


Chromatophore

- Found in photoautotrophic bacteria. ✓✓
- In green bacteria, they are also called Chlorosomes. ✓✓
- Chlorosomes contain photosynthetic pigments called Bacteriochlorophyll, Bacteriopheophytin and Carotenoids. ✓✓✓✓

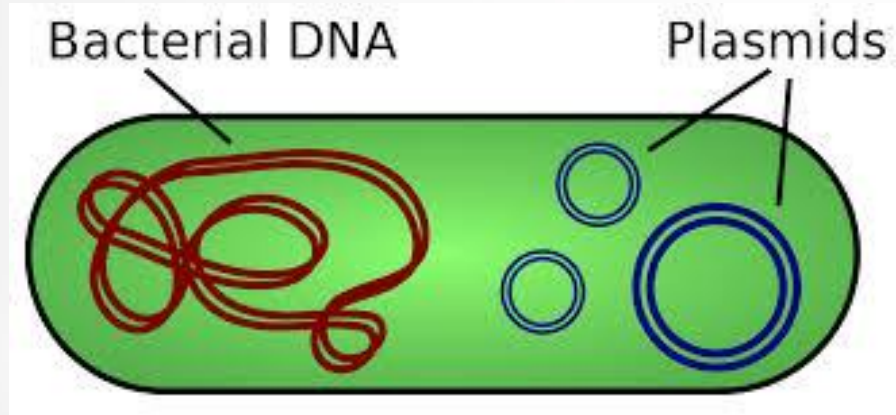
Nucleoid

- It is the genetic material of Bacteria.
- Consists of single circular, double stranded, supercoiled DNA.



Plasmid

- Self replicating, circular, extra chromosomal segments of double stranded DNA.
- If they are temporarily associated with nucleoid, they are known as episomes.



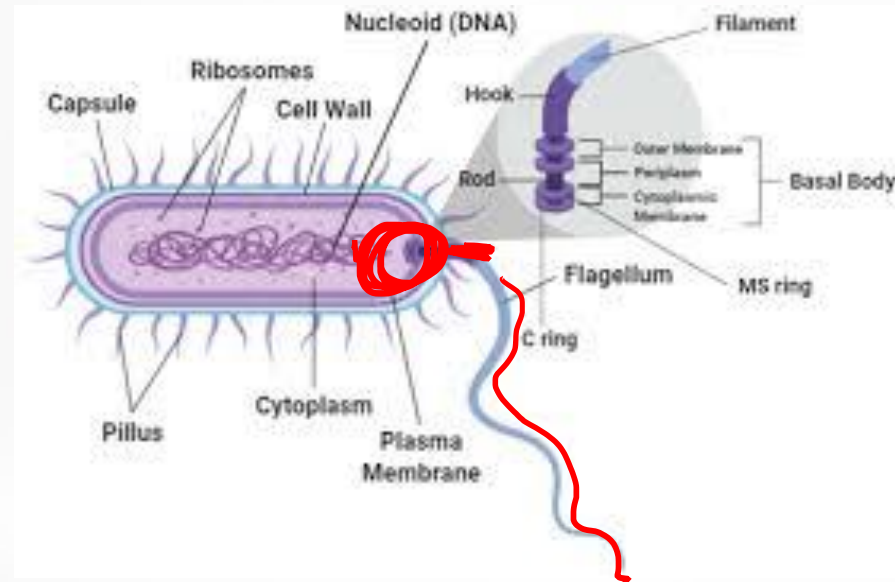
Flagella

- It consists of three parts:

- Basal body

- Hook

- Filament



Example

Match the organisms in column-I with habitats in column-II.

Column-I Column-II

- | | |
|----------------------|--------------------------|
| A. Halophiles | (i) Hot springs |
| B. Thermoacidophiles | (ii) Aquatic environment |
| C. Methanogens | (iii) Guts of ruminants |
| D. Cyanobacteria | (iv) Salty area |

Select the correct answer from the options given below.

- (a) A- (iv), B-(i), C-(iii), D-(ii)
- (b) A- (i), B-(ii), C-(iii), D-(iv)
- (c) A- (iii), B-(iv), C-(ii), D-(i)
- (d) A- (ii), B-(iv), C-(iii), D-(i)

Example

Which of the following are found in extreme saline conditions? (NEET 2017)

- (a) Eubacteria (b) Cyanobacteria
(c) Mycobacteria (d) ~~Archaeobacteria~~

Example

Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? (NEET 2017)

- (a) Pseudomonas (b) ~~Mycoplasma~~
(c) Nostoc (d) Bacillus

Example

Which of the following components provides sticky character to the bacterial cell? (NEET 2017)

- (a) Nuclear membrane
- (b) Plasma membrane
- (c) Glycocalyx
- (d) Cell wall

Example

Archaeobacteria differ from eubacteria in (2014)

- (a) cell membrane structure
- (b) mode of nutrition
- (c) cell shape
- (d) mode of reproduction.

Plasma → branched
lipid chain

Example

Which of the following are likely to be present in deep sea water? (NEET 2013)

- (a) Blue-green algae
- (b) Saprophytic fungi
- ☒ (c) Archaeobacteria
- (d) Eubacteria