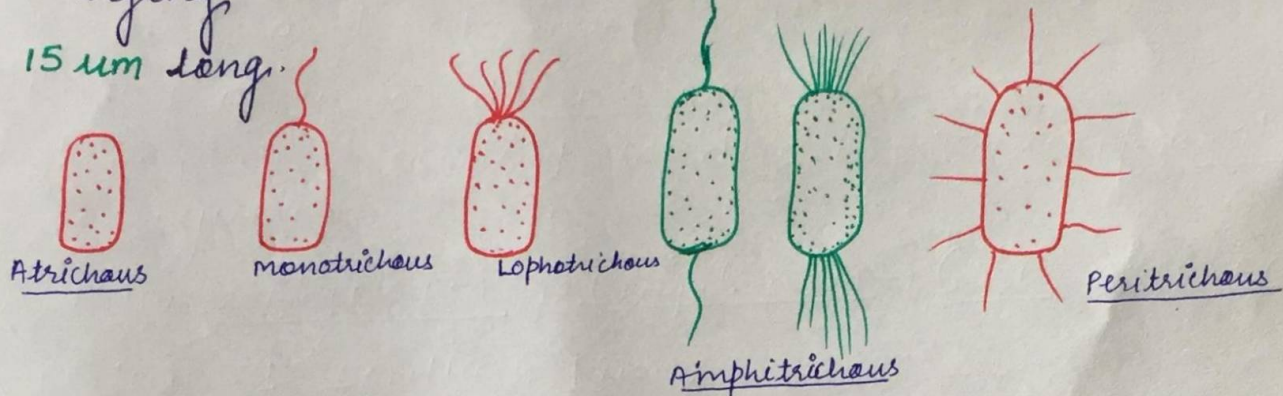


Bacteria

Flagella:

- The motile bacterium may possess a flagellum (Plural Flagella). The flagellum is hair like, helical and surface appendages emerging from the cell wall. It is 20-30 nm in diameter and 15 μ m long.



Structure of flagellum

- A flagellum consists of three basic parts: a flagellum arises from basal granule called blepharoplast.

1. Basal Body
2. Hook
3. Filament

1. Basal Body: The Basal body of a flagellum attaches the Flagellum to the cell wall and Plasma membrane. It is composed of a small central Rod inserted into a series of Rings.

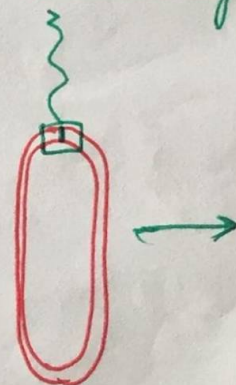
- in Gram-ve Bacteria: in Gram-negative Bacteria two pairs of rings, the Proximal ring and the distal ring, are connected by a central rod. These 2 pair rings i.e. Four Rings -

(a) L- (Lipopolysaccharide) Ring

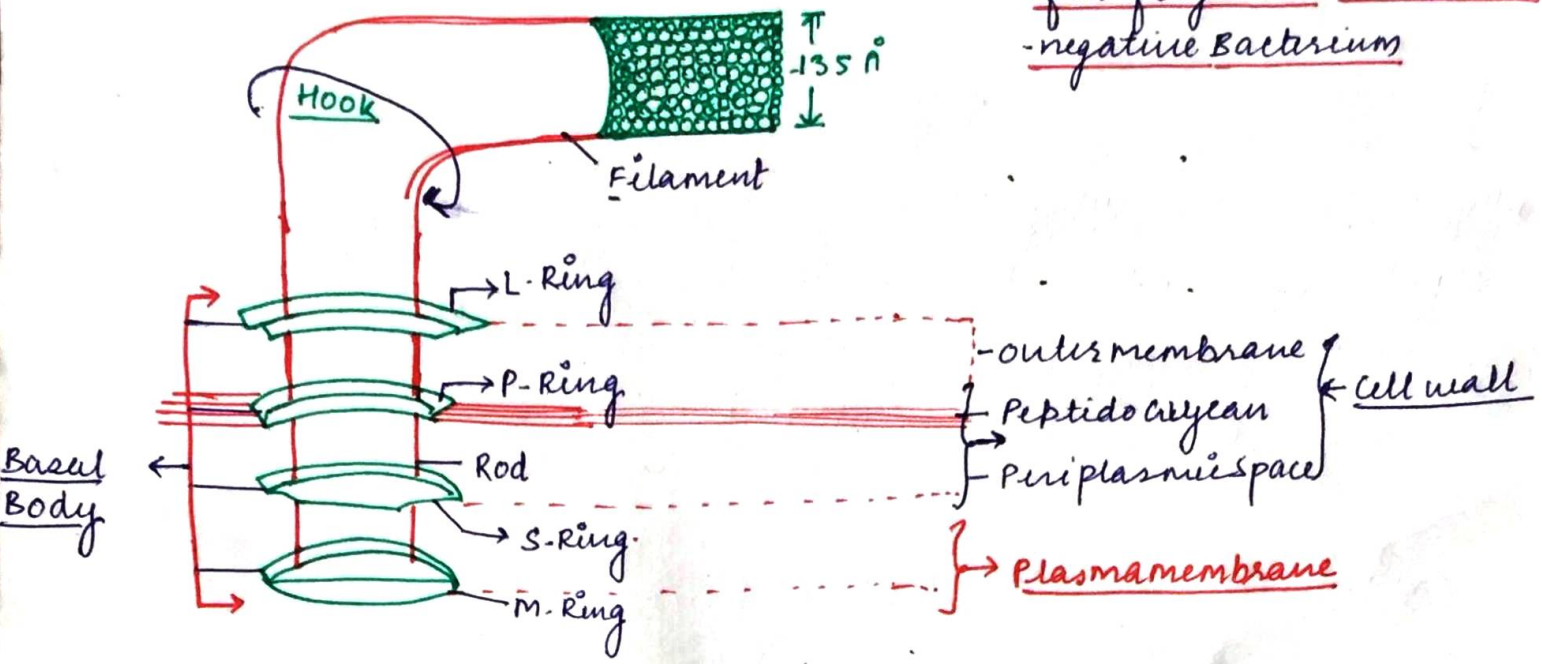
(b) P- (Peptidoglycan) Ring

(c) S- (Super membrane) Ring

(d) M (membrane) Ring



Different parts of attachment of a flagellum in a Gram-negative Bacterium



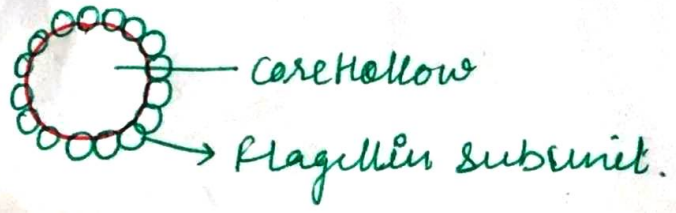
- The outer pair of rings, **L-ring** and **P-ring**, are attached to respective polysaccharide and Peptidoglycan layers of cell wall, and the inner pair of rings i.e. **S-ring** and **M-ring** are attached with cell membrane.

In Gram positive Bacteria

- in Gram positive Bacteria only the **Distal (inner)** pair of rings is present. **S-Ring** - is attached to inside thick layer of peptidoglycan and **M-ring** is attached to cell membrane.

2. **HOOK** → the Hook is present outside the cell wall and connect filament to the Basal Body. (longer in Gram +ve)

3. **Filament or shaft** → the outermost long region of the Flagellum is called filament or shaft. it has constant diameter and is made up of **Globular proteins** the Flagellin



Fimbriae or pilli :

- Besides Flagella, some tiny or small hair-like outgrowths are present on bacterial cell surface. These are called Pilli and are made of Pilin Protein. These are present in almost all Gram -ve Bacteria and few Gram +ve Bacteria. These are of 8 types: I, II, III, IV, V, VI, VII, and F types.
- I and F are called sex pilli.

Function: They form conjugation tube during conjugation. Secondly they help in attachment with other cells i.e. Agglutination or clump formation.

matrix

- Inner to wall layers, there is present matrix or Protoplasm. It contains many structures and some inclusion like.

1. Nucleoid or Genophore :

- In the centre of the bacterial cell, there is present nuclear material (DNA) without any nuclear membrane and nucleolus, and histone proteins.
- Besides this nuclear DNA, there is some Extranuclear or Extrachromosomal DNA, which is known as Plasmid. The plasmids are small, circular, double-stranded DNA molecules that are separate. The plasmid are small, circular, main bacterial chromosome and replicate independently. The term plasmid was given by

Lederberg (1952).

Ribosome, Mesosome.