

Flagella and Motility of Bacteria

By
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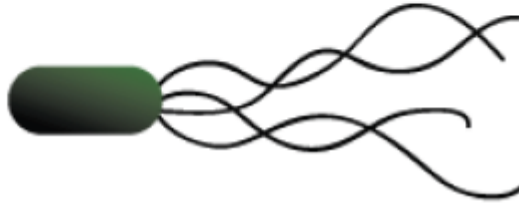
Introduction

- Bacterial flagella are thread like structure composed entirely of protein.
- They are organ of locomotion in bacteria.
- Bacterial flagella are made up of flagellin protein.
- If flagella remove from cell, flagella are rapidly form by synthesis and aggregate of subunit 3-6 minute.

A



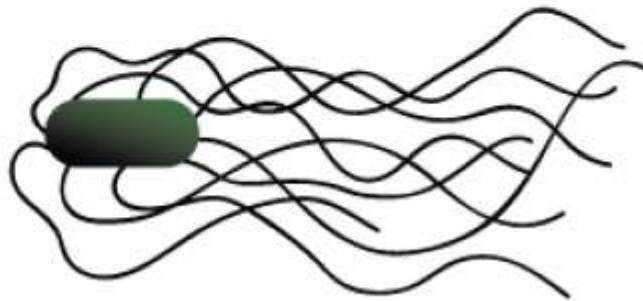
B



C



D



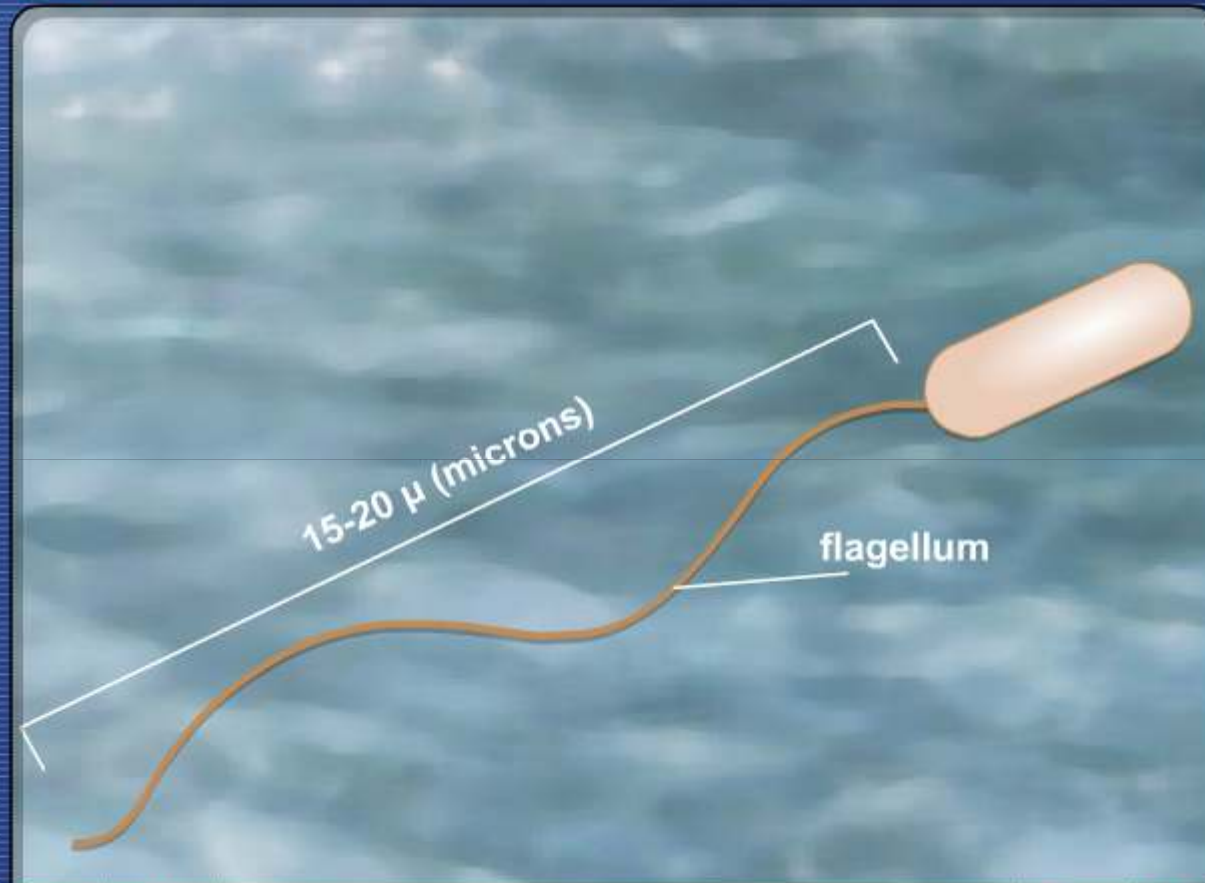
A – Monotrichous

B – Lophotrichous

C – Amphitrichous

D - Peritrichous

Bacterial Locomotion



Play



Pause



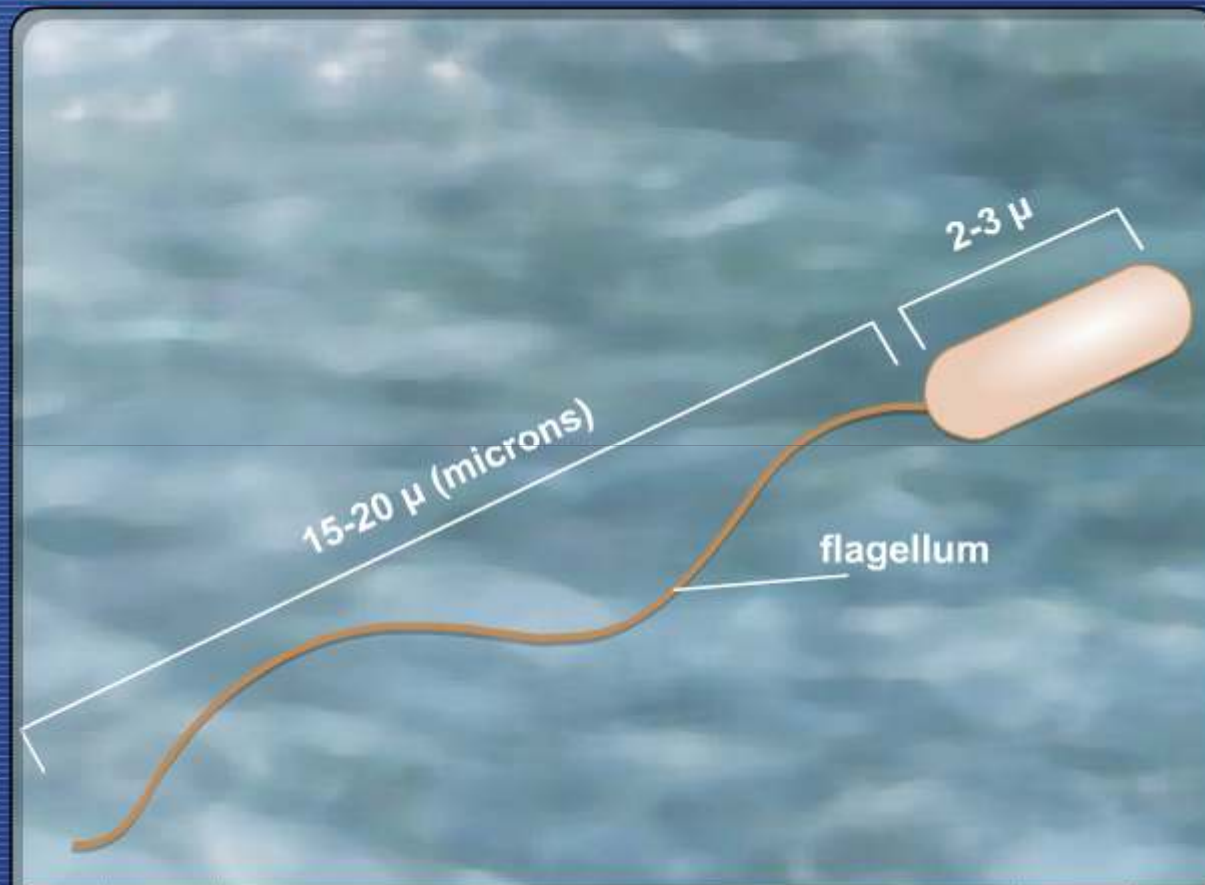
Audio



Text

Most motile bacteria move by means of flagella. A flagellum is a slender structure, about 15-20 μ (microns) long and about 20 nm (nanometers) wide.

Bacterial Locomotion



Play



Pause



Audio



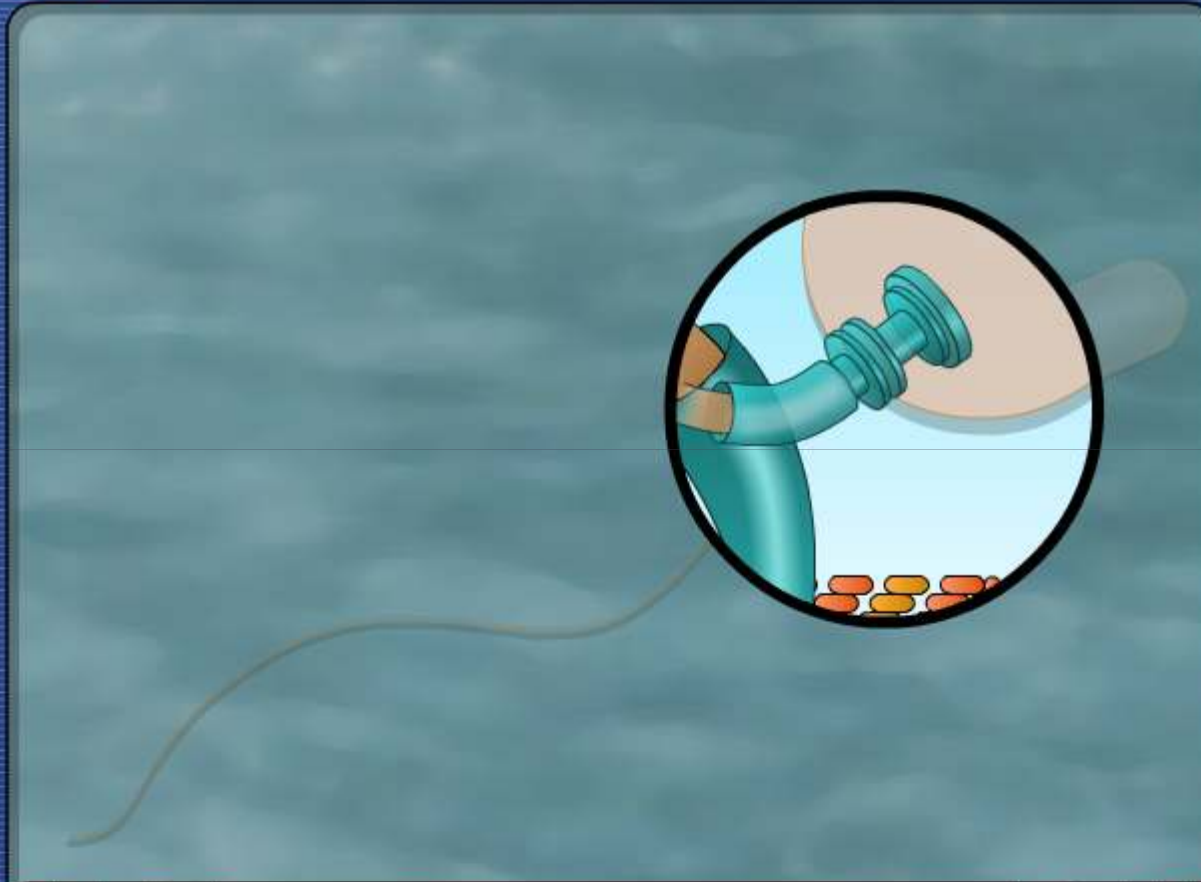
Text

A typical rod-shaped bacterial cell is 2-3 μ (microns) in length.

Attachment of flagellum to Bacterial cell

- Flagella is attached to the bacterial cell body by a complex structure consisting of a hook and a basal body.
- Hook is short curved structure that appear as universal joint between motor in basal body and flagellum
- The basal body bears a set of ring one pair in gram positive and two pair in gram negative bacteria.

Bacterial Locomotion



Play



Pause



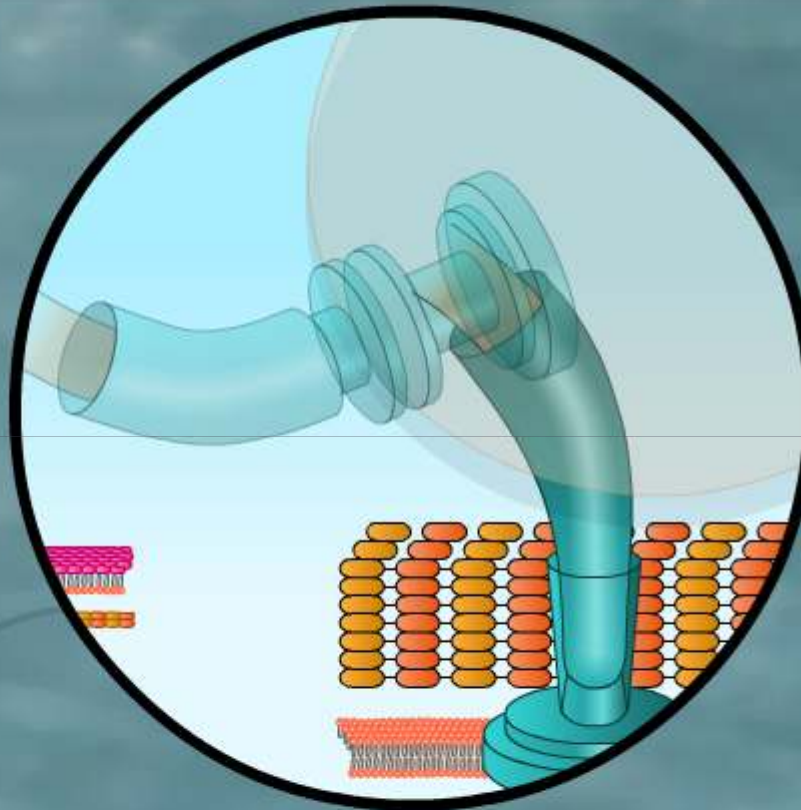
Audio



Text

The bacterial flagellum is composed of three parts; the basal body, which is embedded in the cell membrane and wall,

Bacterial Locomotion



Play



Pause



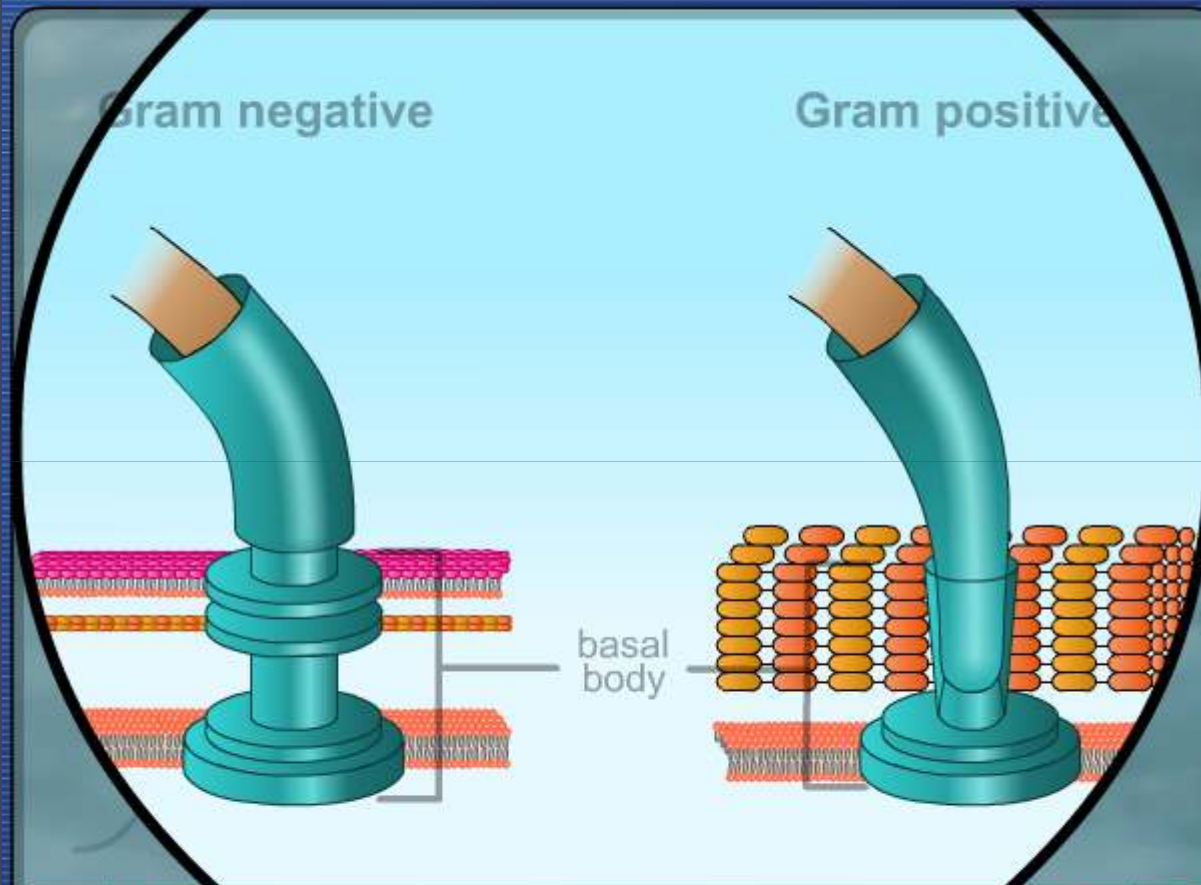
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Bacterial Locomotion



Play



Pause



Audio



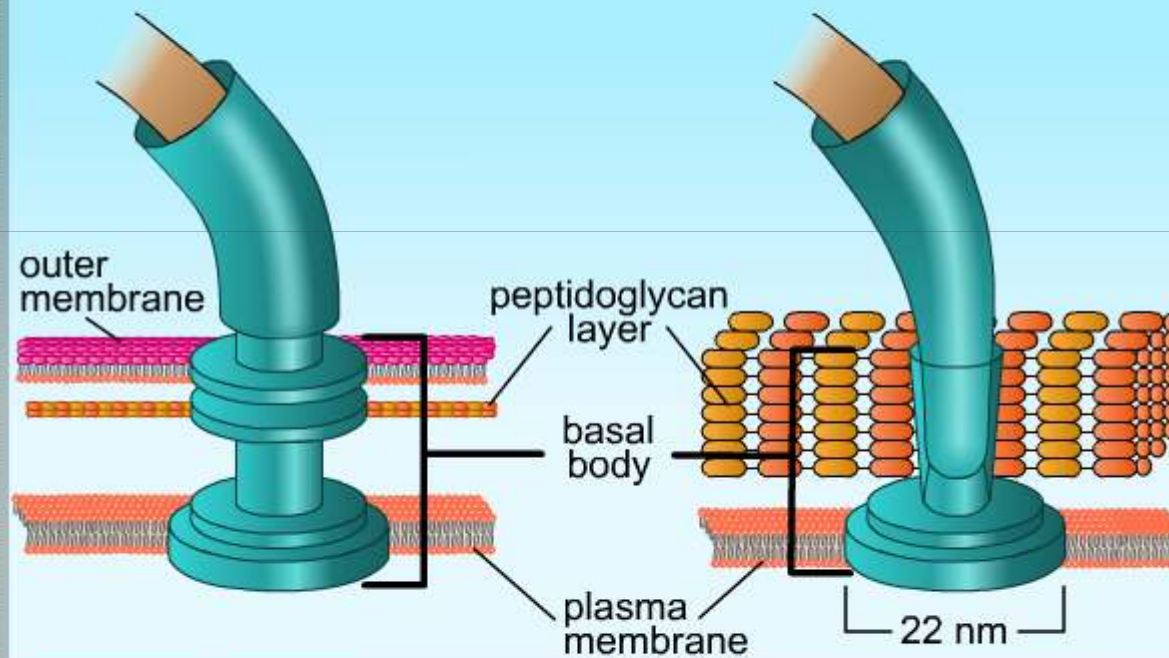
Text

The bacterial flagellum is composed of three parts; the basal body, which is embedded in the cell membrane and wall,

Bacterial Locomotion

Gram negative

Gram positive



Play

Pause

Audio

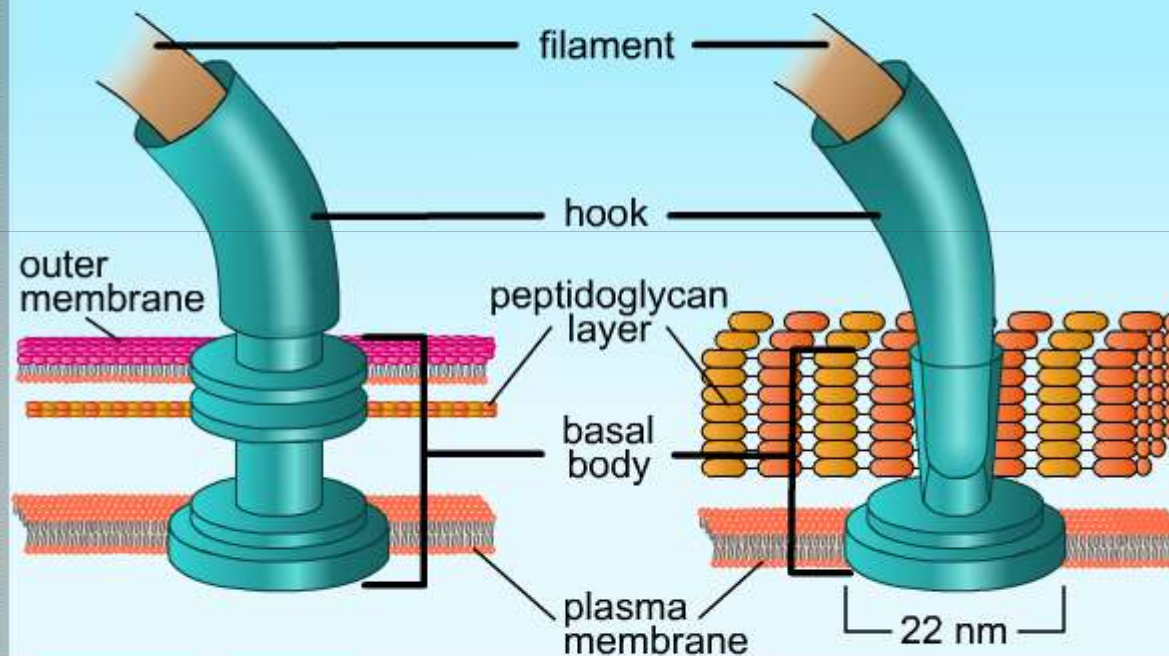
Text

a short curved segment called the hook, and the portion that extends out from the cell, called the filament.

Bacterial Locomotion

Gram negative

Gram positive



Play

Pause

Audio

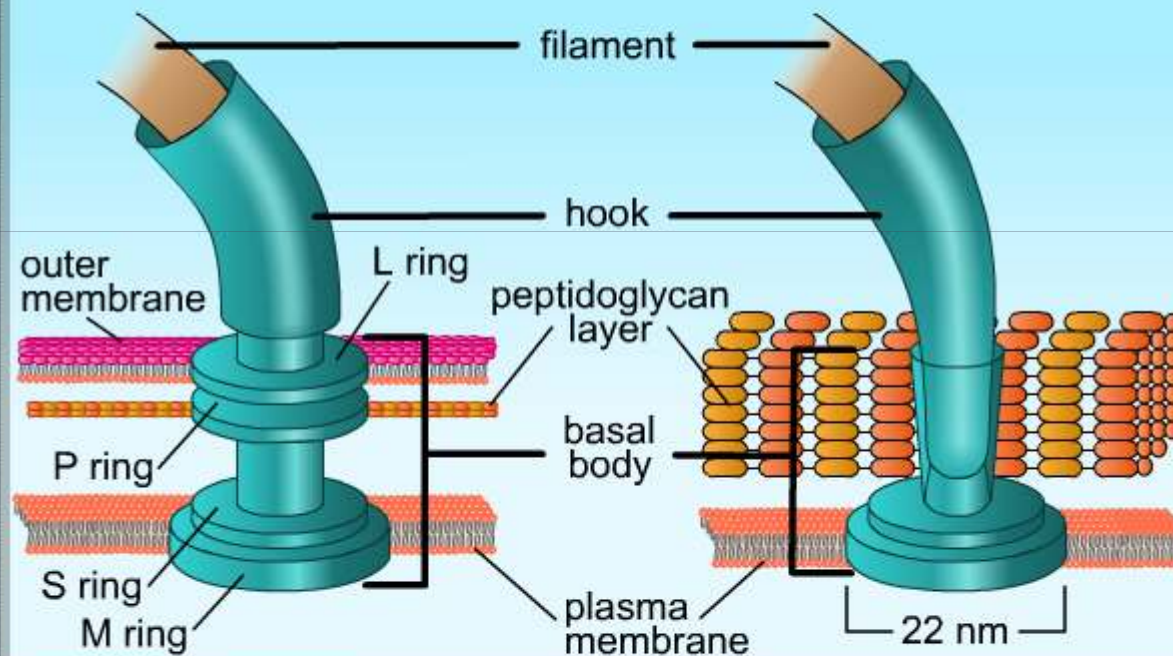
Text

The basal body consists of rings that correspond to the layers of the cell envelope and therefore differ in gram negative and gram positive bacteria.

Bacterial Locomotion

Gram negative

Gram positive



Play

Pause

Audio

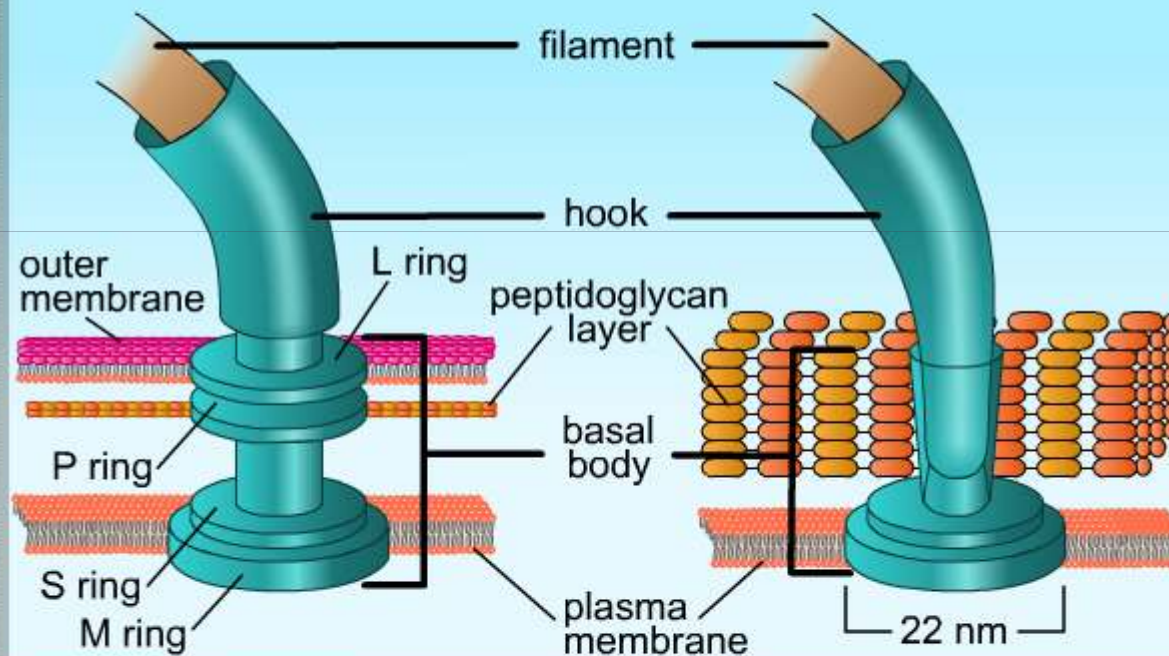
Text

The basal body consists of rings that correspond to the layers of the cell envelope and therefore differ in gram negative and gram positive bacteria.

Bacterial Locomotion

Gram negative

Gram positive



Play



Pause



Audio



Text

In most gram negative bacteria there are four rings connected to a central rod. Gram positive bacteria have only two basal body rings, one connected to the cell membrane and the other to the cell wall.

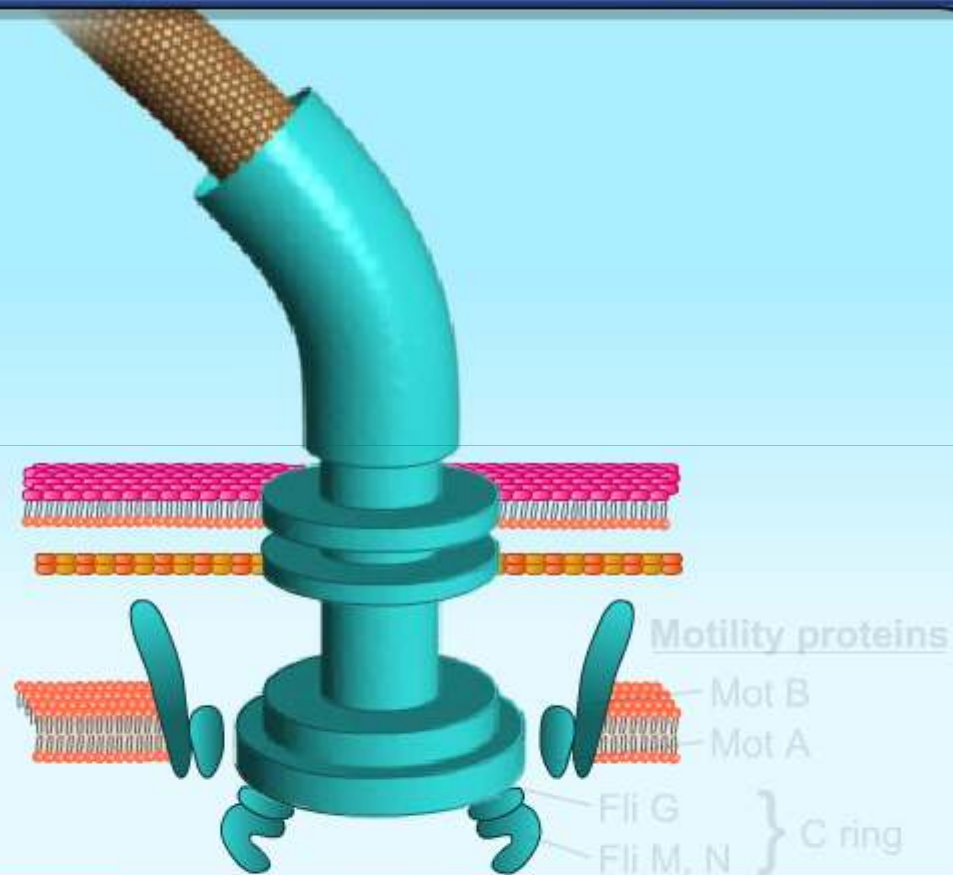
Motility

Flagellar motility

Gliding Motility

Vacuole motility

Bacterial Locomotion



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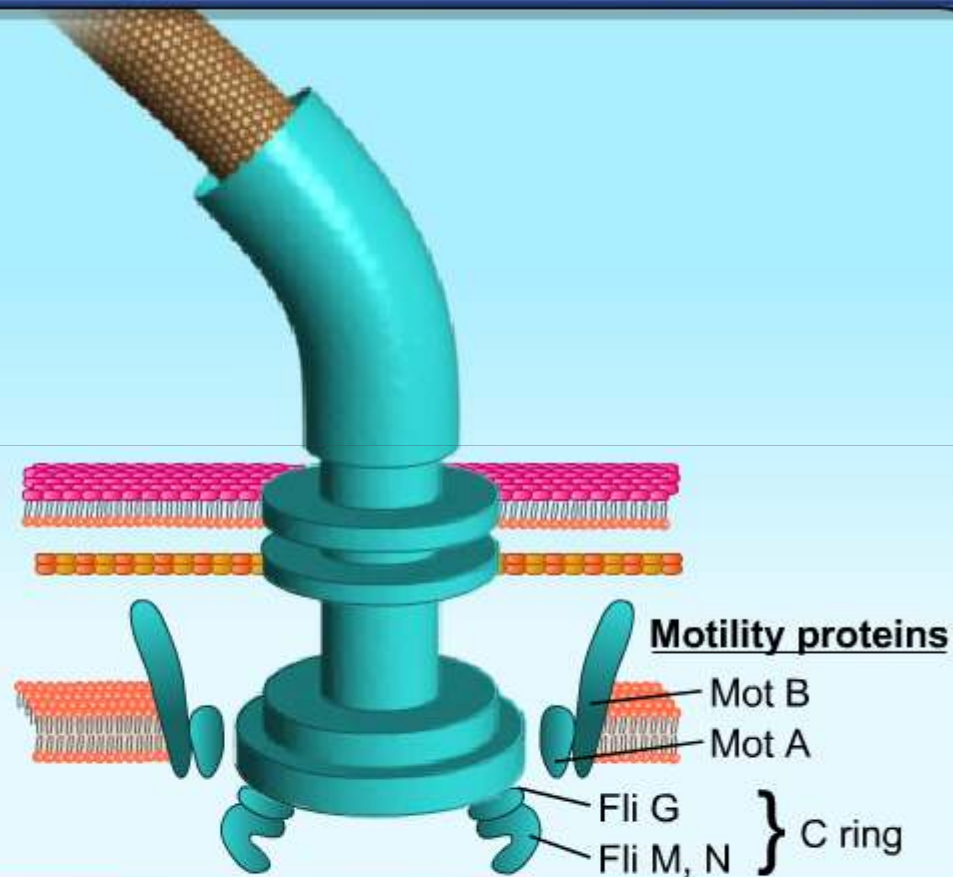
⏸ Pause

⏮ Audio

📄 Text

Motility is mediated by proteins associated with the plasma membrane and basal body and is powered by the proton motive force associated with the plasma membrane.

Bacterial Locomotion



Play



Pause



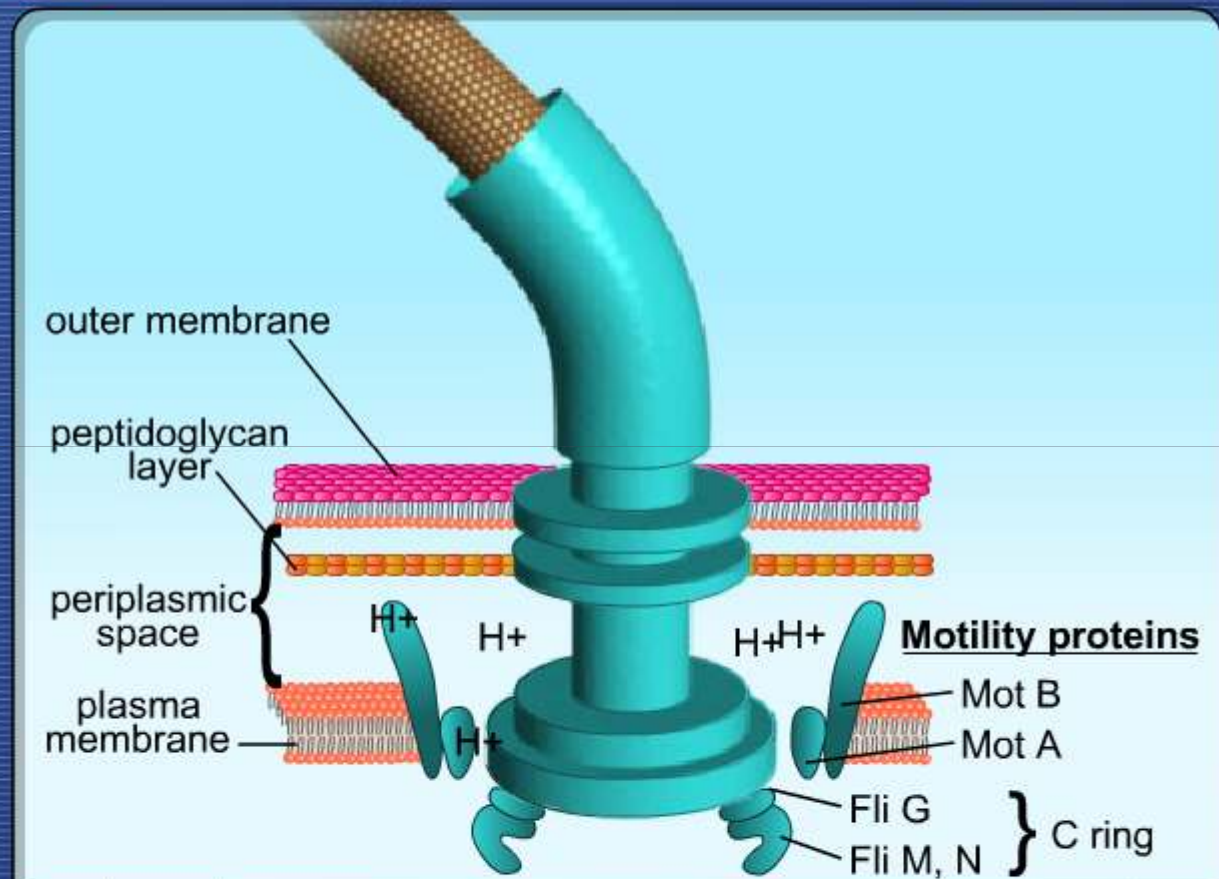
Audio



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Bacterial Locomotion



▶ Play

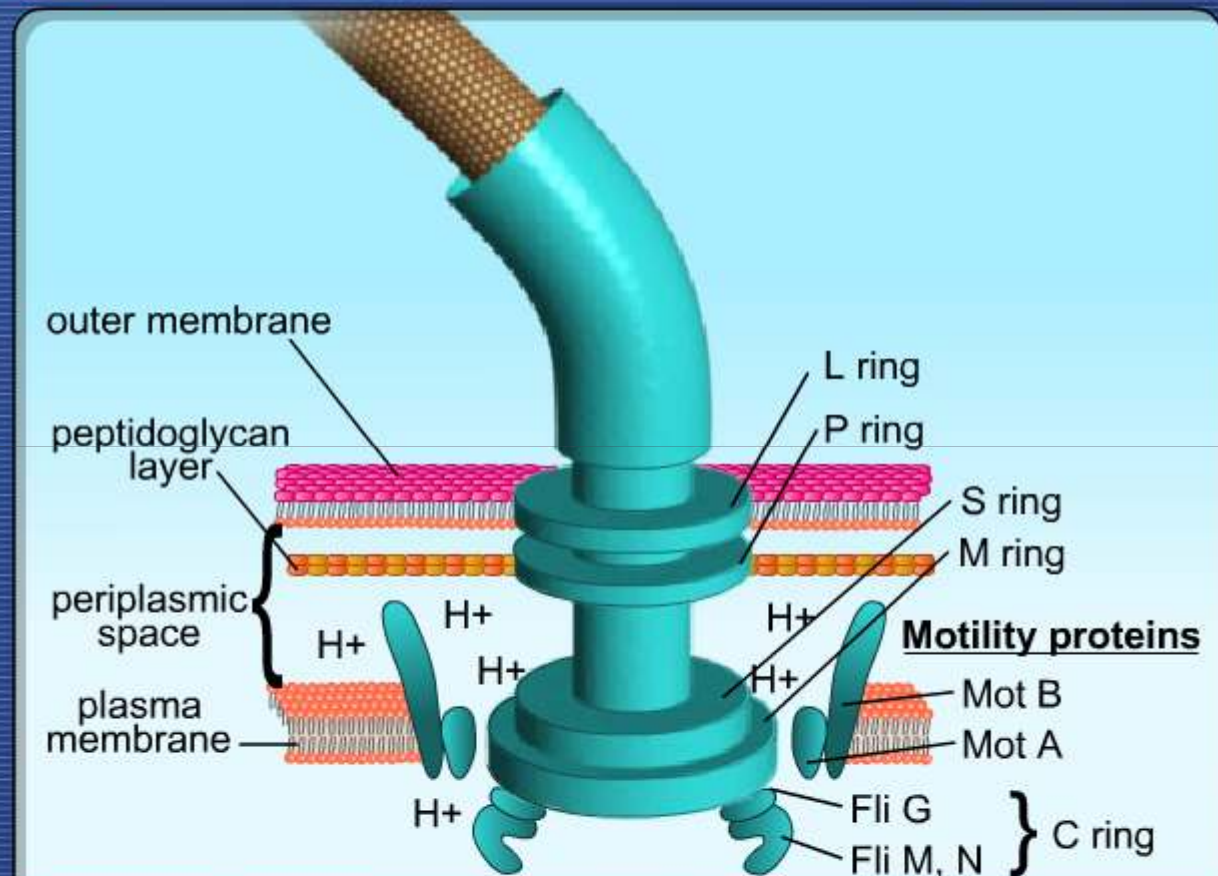
⏸ Pause

⏮ Audio

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Bacterial Locomotion



Play



Pause



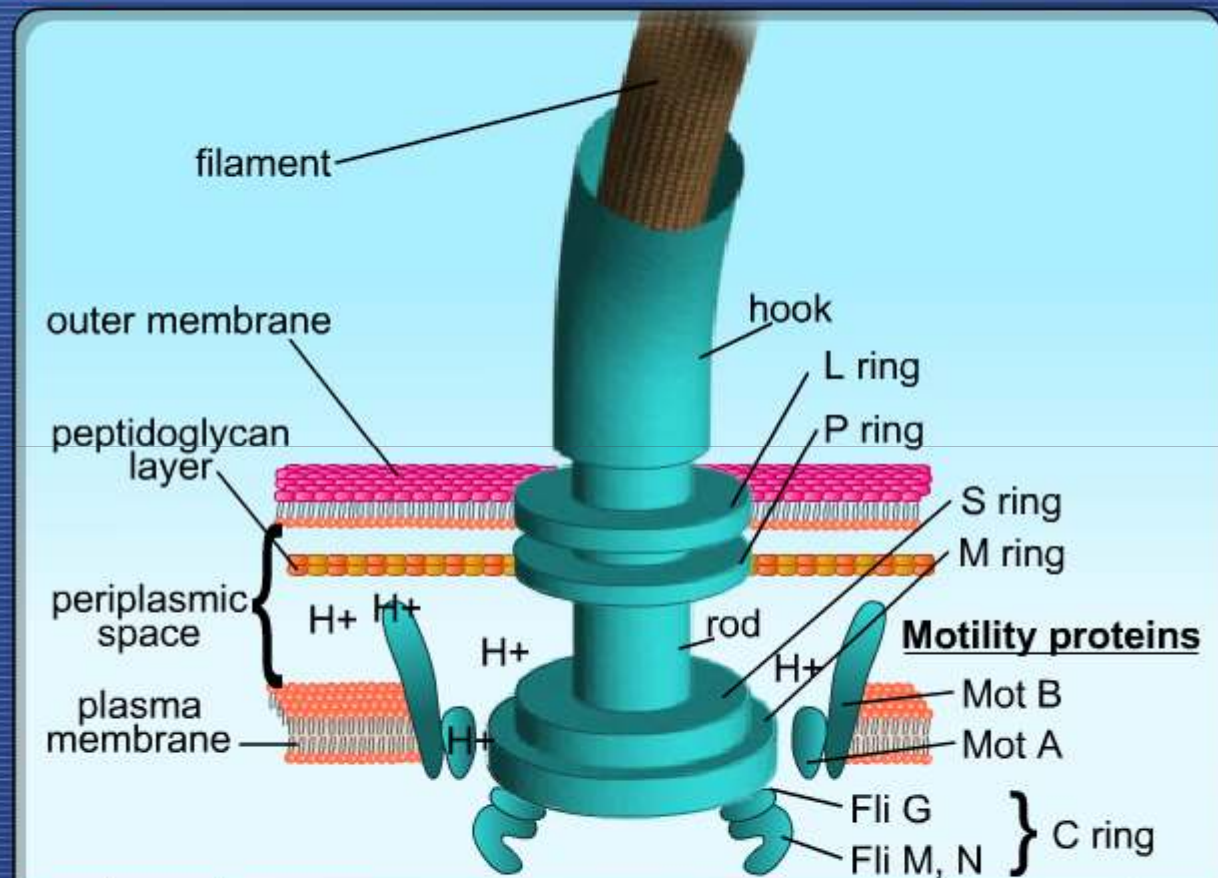
Audio



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Bacterial Locomotion



Play

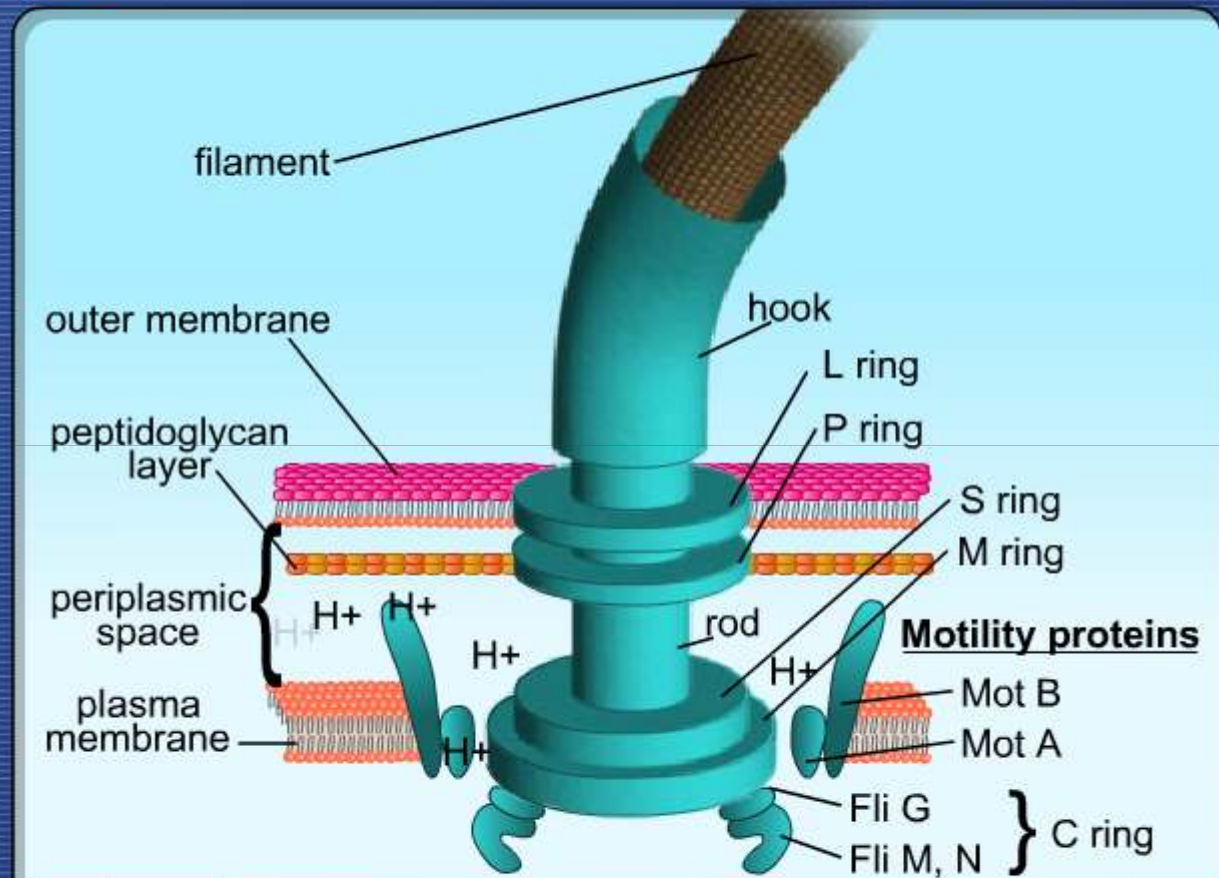
Pause

Audio

Text

The filament is a rigid structure which rotates to move the bacterial cell.

Bacterial Locomotion



▶ Play

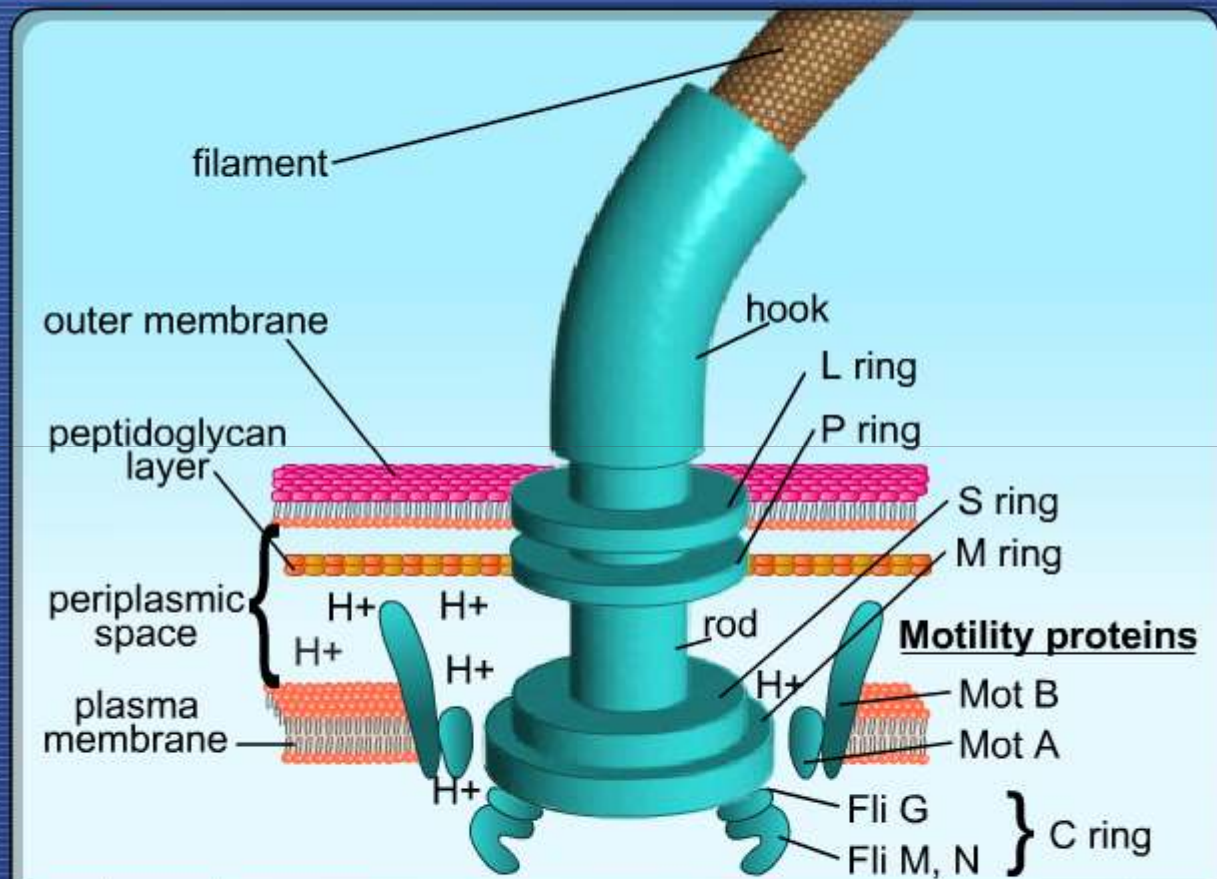
⏸ Pause

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Bacterial Locomotion



▶ Play

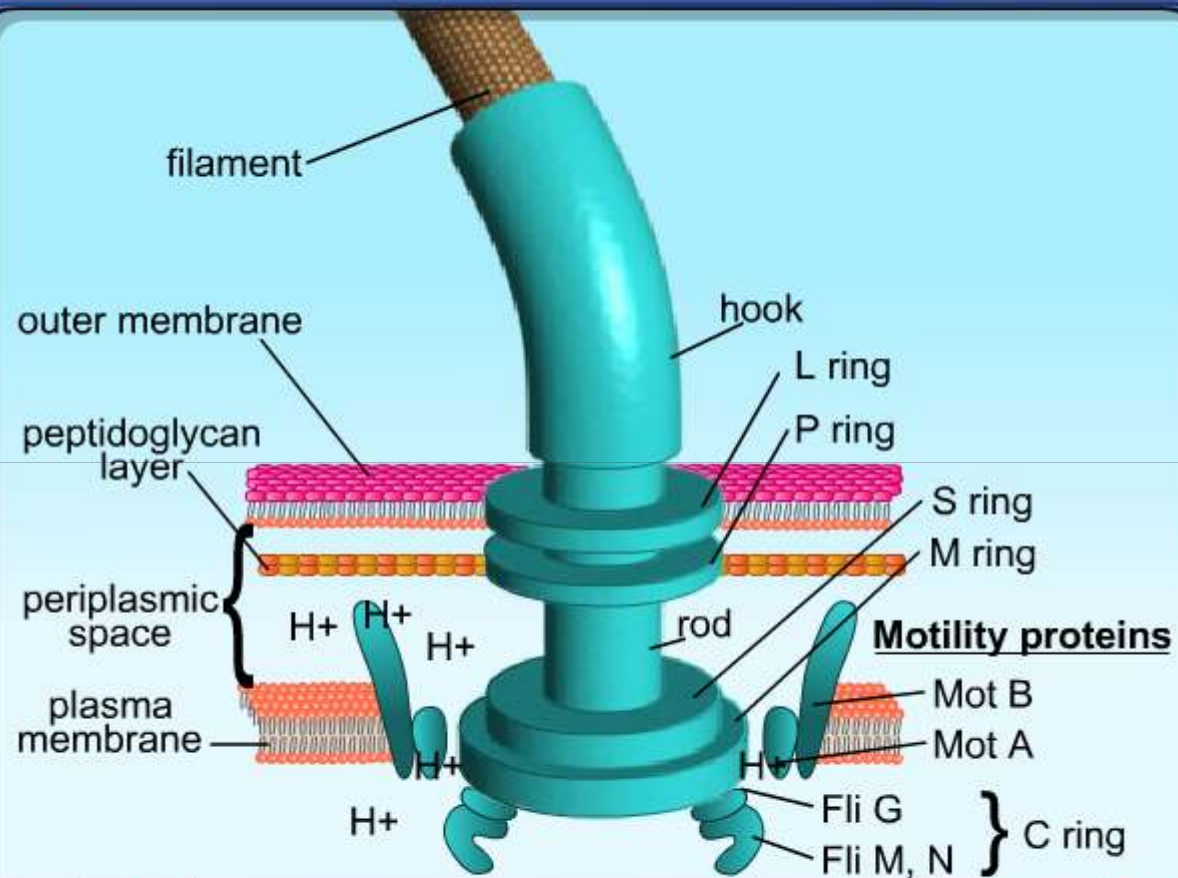
⏸ Pause

🔊 Audio

📄 Text

The filament is a rigid structure which rotates to move the bacterial cell.

Bacterial Locomotion



Play

Pause



Audio



Text

The filament is a rigid structure which rotates to move the bacterial cell.

Gliding Motility

- This method is effected by the secretion of a polysaccharide solution that binds to the solid surface.
- As the secreted goo, which binds to both the cell and to the surface the cell is gliding long, binds to the solid substrate the cell tends to get pulled in one direction or another.
- By controlling where the goo is secreted, the cell can control in which direction it moves.



Bacterial Locomotion

glass slide



▶
Play

⏸
Pause

◀
Audio

📄
Text

Some bacteria lack flagella or axial fibrils, but are motile if they are in contact with a solid surface. This type of movement is referred to as gliding motility.

Bacterial Locomotion

glass slide



▶
Play

⏸
Pause

◀▶
Audio

📄
Text

Some bacteria lack flagella or axial fibrils, but are motile if they are in contact with a solid surface. This type of movement is referred to as gliding motility.

Bacterial Locomotion

glass slide



Some bacteria lack flagella or axial fibrils, but are motile if they are in contact with a solid surface. This type of movement is referred to as gliding motility.

Bacterial Locomotion

glass slide



Play



Pause



Audio



Text

For some gliding bacteria, secretion of a slimy polysaccharide appears to be involved. Other bacteria appear to have special proteins on their surfaces that mediate gliding motility.

Bacterial Locomotion

glass slide



Play



Pause



Audio



Text

For some gliding bacteria, secretion of a slimy polysaccharide appears to be involved. Other bacteria appear to have special proteins on their surfaces that mediate gliding motility.

Vacuole motility

- Gas vesicles can be used to change the position of a microbe in the water column.
- This is affected by changing the organisms density, so that it either comes to the surface or sinks to the mixing layer.

Thankyou