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Unit of Scientific Affairs
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Lecture title: *Bacterial Motility*

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Summary: Bacterial Motility

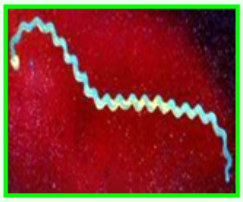
Bacteria can be divided according to motility:

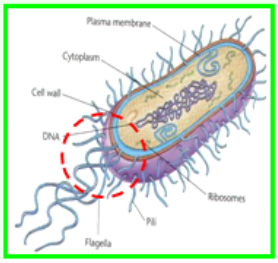
1-motile bacteria e.g. Proteus

2-non-motile bacteria e.g. Staphylococcus

There are several types of bacterial movement, True motility (self-propulsion)

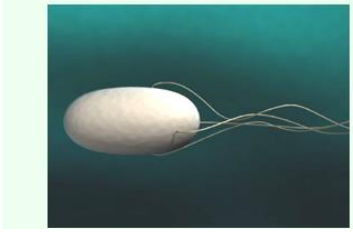
1. Flagellar movement: Bacteria that possess flagella exhibit flagellar movement.
2. Corkscrew-and bending-type movement: Spirochaetes bacteria.
3. Gliding movement: Bacteria are simply slide over moist surfaces like cyanobacterium.

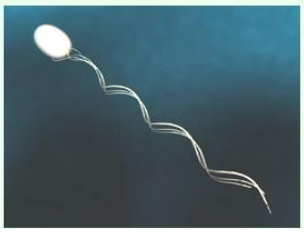




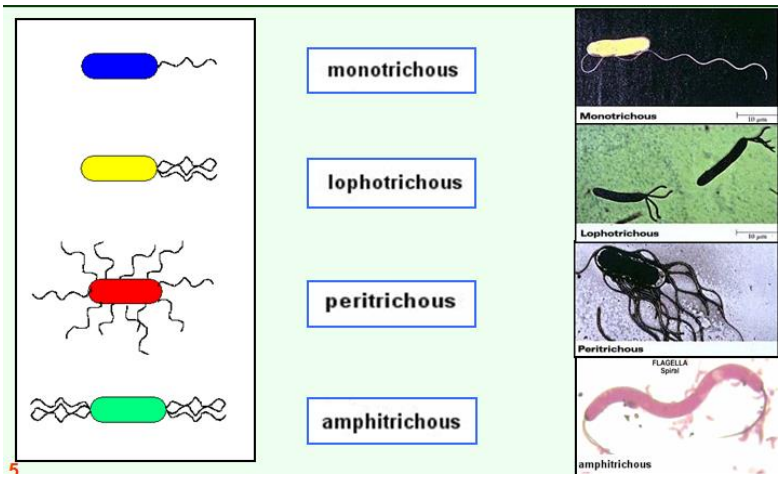
Flagella

The major organelles of motility in bacteria are flagella, which allow the cells to move toward nutrients in the environment. The flagellum is a rigid helical structure that extends as much as 10 micron out from the cell.





Arrangement of flagella



Corkscrew and bending type movement

Helical-shaped spirochetes have axial fibrils (modified flagella that wrap around the bacterium) that form axial filaments which provide the rigidity that enables the spiral bacterium to twist around the axis of the filament. As a result, the bacterium literally screws itself through the fluid. Reversal of the twist will send the bacterium in a reverse direction. Example of bacteria that move in this manner is Treponema pallidum.

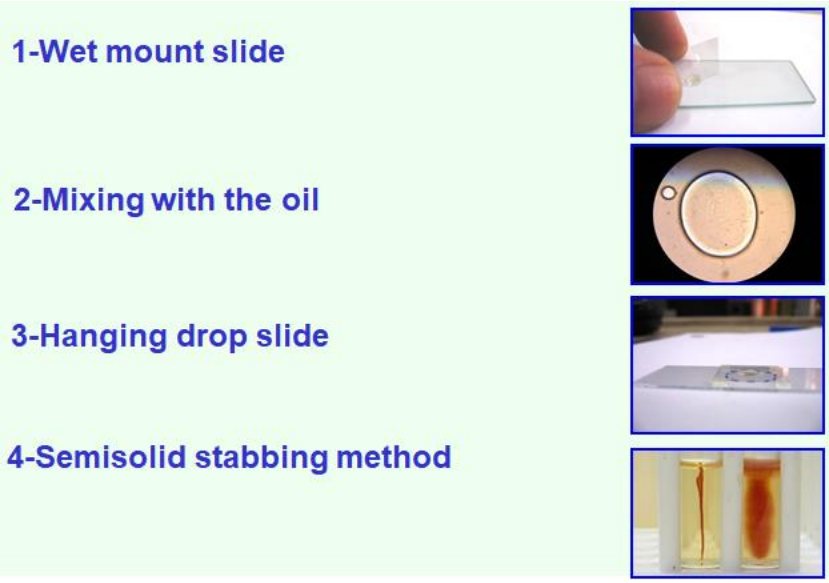
Brownian Motion

Brownian movement is a vibrational movement results from the random motion of the water molecules bombarding the bacteria and causing them to move. Bacteria can also

appear to move because currents can be created under cover glass when pressure is

exerted by focusing the oil immersion lens.

Method of motility determination



1- Wet mount slide

It is the simplest way to determine motility when working with nonpathogens.

• Place a few loopfuls of the organism on a clean slide and cover it with a cover glass then examine under an oil immersion objective.

• The disadvantage of this procedure is dryness of the prepared slide, always examine a wet mount immediately, once it has been prepared, because motility decreases with time after preparation.

2-Mixing with the oil

In this procedure, a drop of oil placed on the slide then a drop of bacterial suspension is mixed with the oil, the oil droplets will track the bacteria thus it can be seen clearly.

3-Hanging drop slide

Drying can be delayed by using this technique so, a drop of bacterial suspension is placed on a cover glass, which is then placed over a special slide that has a concave depression in its center. The glass is held in place with Vaseline, thus forming an enclosed glass chamber that prevents drying. Other method is placing Vaseline in the four corners of the cover slide for fast technique.

4-Semisolid stabbing method

-This method is widely used with pathogenic bacteria, don't use the three previous methods, to avoid infection.

-In this procedure the organism is inoculated by stabbing the semisolid medium (Gelatin 12-15% or 0.5-1% agar) with inoculating needle.

-Motile bacteria move away from the line of inoculation into the uninoculated surrounding medium, non-motile bacteria will be found only along the line of inoculation .