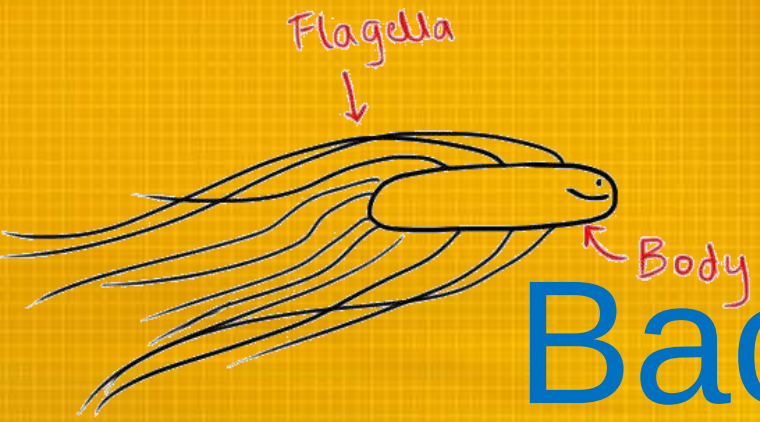



# Bacterial motility

## *Objectives*:

- To gain expertise in determining the motility of living bacteria.
- To learn about the different methods of motilty determination.

## *Principle:*

- The ability of an organism to move by itself is called **motility**.
- Motility is closely linked with **chemotaxis**, the ability to orientate along certain chemical gradients.
- Eucaryotic cells can move by means of different locomotor organelles such as cilia, flagella, or pseudopods.
- Procaryotes move by means of propeller-like **flagella** unique to bacteria or by special fibrils that produce a gliding form of motility.
- Almost all spiral bacteria and about half of the bacilli are motile, whereas essentially none of the cocci are motile.

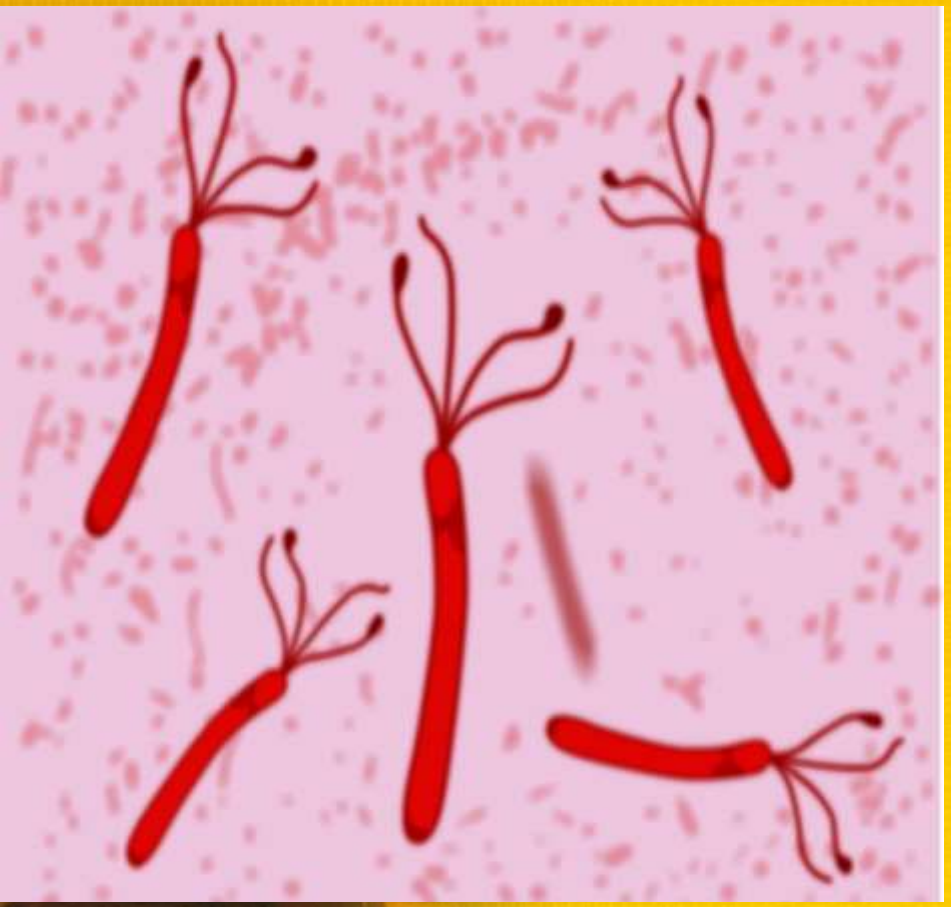
# *Site of flagella*

Peritrichous (E.coli)

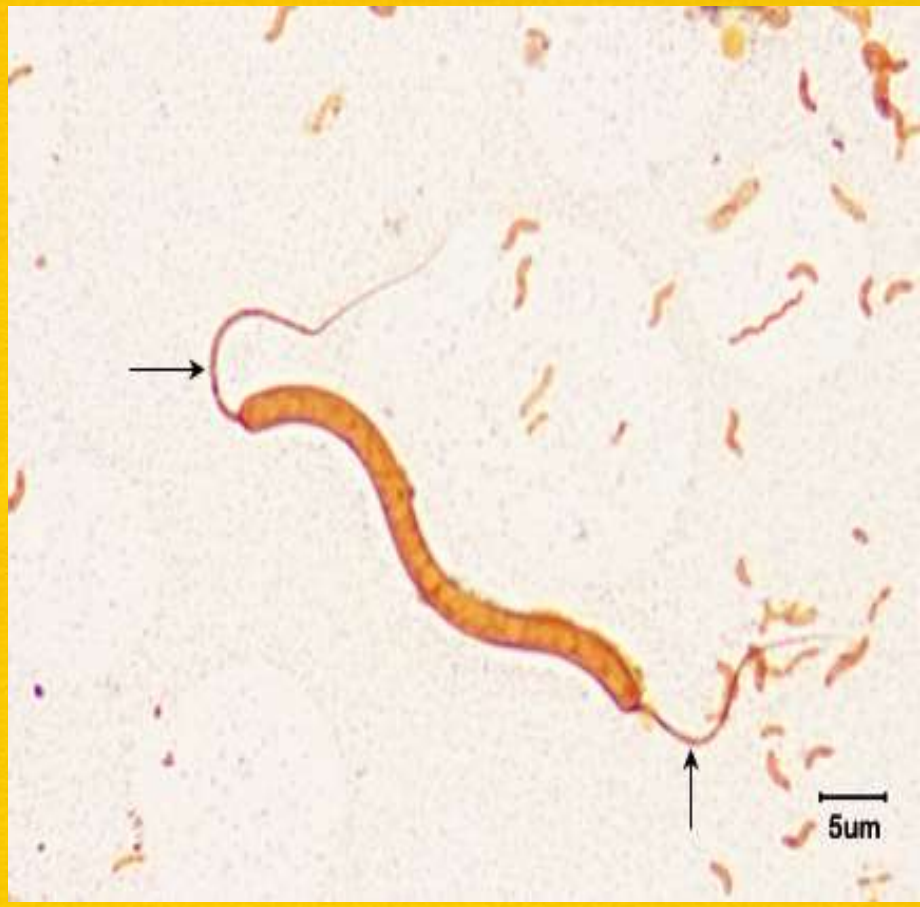
Monotrichous ( Vibrio cholerae)

# *Site of flagella*

Lophotrichous (pseudomonas)



amphitrichous (Spirillum volutans)



*Flagella compose from:*

- Filament – Composed of a protein called flagellin
- Hook – Base of filament near cell wall
- Basal Body - Anchors filament & hook to cell wall

*Types of movement :*

- Run : straight line movement occurs when the flagella rotates couterclockwise
- Tumbles : turning the direction by clockwise movement of the flagella

# *Motility testing*

- Motility could be detected by:

1. Wet mount slide
2. Hanging Drop technique.
3. Flagella stain.
4. Semi-Solid media Inoculation.

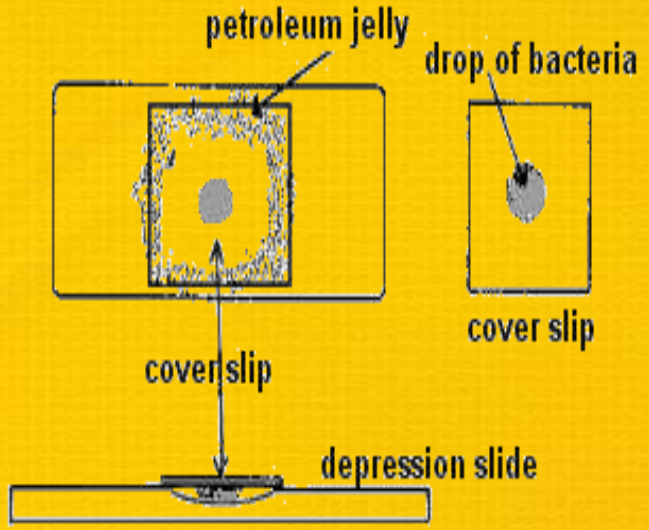
# 1. Wet Mount slide

When working with non-pathogens, the simplest way to determine motility is to place a few loopfuls of the organism on a clean slide and cover it with a cover glass. Organisms are observed in a drop that is suspended under a cover glass in a concave depression slide

# 2. Hanging Drop slide

The slide for a hanging drop is ground with a concave well in the centre; the cover glass holds a drop of the suspension.

- When the cover glass is inverted over the well of the slide, the drop hangs from the glass in the hollow concavity of the slide.
- Since the drop lies within an enclosed glass chamber, drying out occurs very slowly. A ring of Vaseline around the edge of the cover slip keeps the slide from drying out.



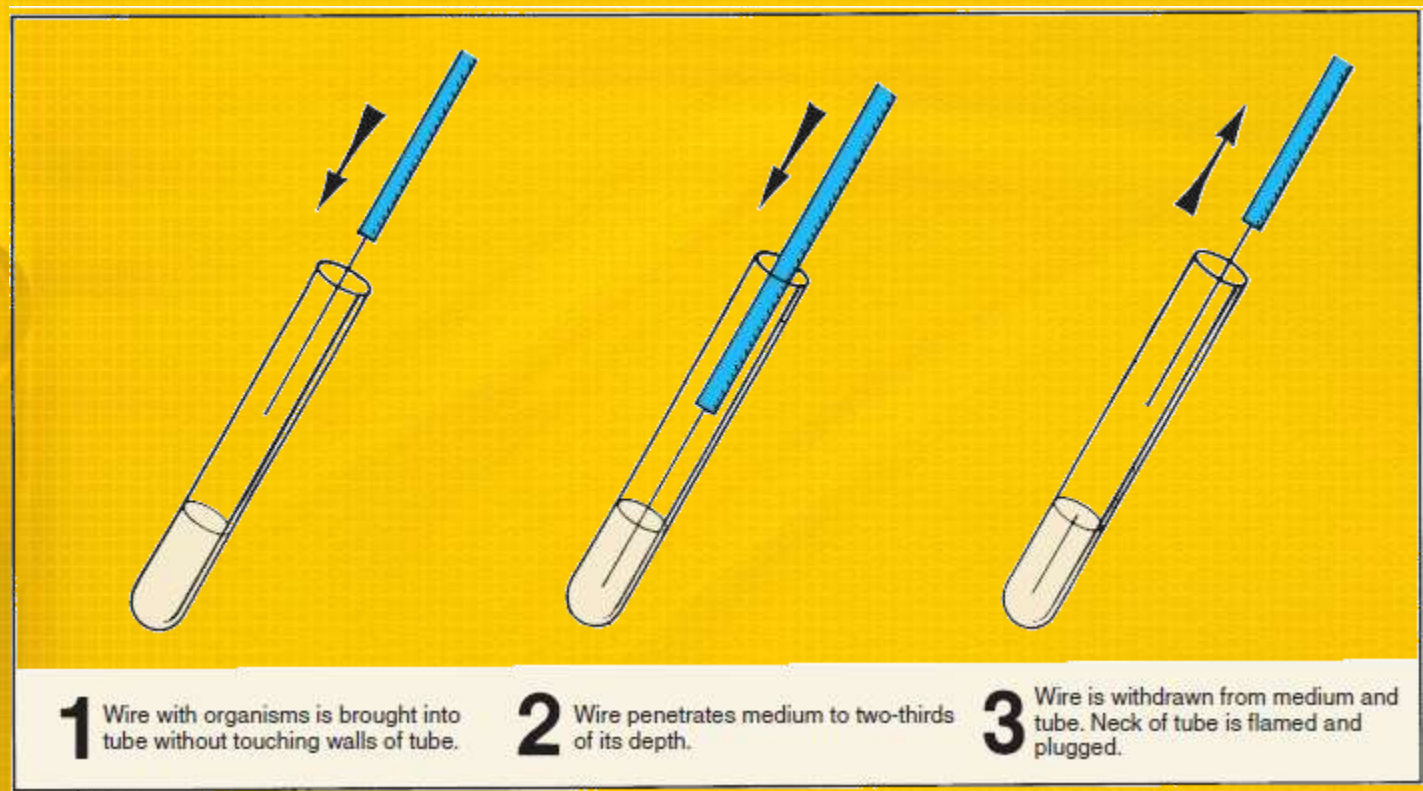
# *4. Semi-Solid media Inoculation*

- The most commonly used test for motility in microbiology lab.
- It depends on the ability of motile bacteria to move through semi-solid media.
- Ordinary solid media contain 1.5-2.0% Agar
- Semi solid media contain about 0.4% Agar

# *Procedure of Motility Test*

***How to Perform Test:***

- Using a sterile bacteriological needle, pick a colony of the test organism
- Stab quickly a tube of semi solid media. (avoid using bent needles).
- Incubate the semi solid media for 24 hours



- ***Reading Results:***

➢ If bacteria is motile, there will be growth going out away from the stab line, and test is positive.

➢ If bacteria is not motile, there will only be growth along the stab line.

➢ A colored indicator can be used to make the results easier to see.

***Semi solid media with tetrazolium chloride (color indicator)***