

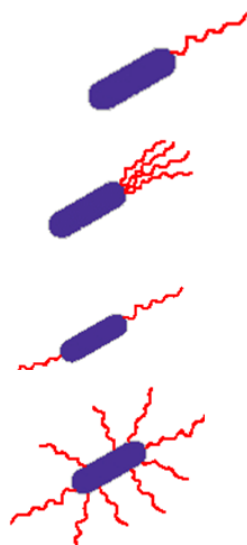
Motility testing

- ❖ A large number of bacteria are motile.
- ❖ Most possess one or more flagella on their surface that allow them to swim.
- ❖ Bacterial flagella are tiny hair like organelles of locomotion. Originating in the cytoplasm beneath the cell wall, they extend beyond the cell, usually equaling or exceeding it in length.

Bacterial Flagella

Prokaryotic vs eukaryotic

Arrangements



monotrichous

lopho-

amphi-

peri-

Motility testing

- ❖ The straight line movement is called a run and the turn is called a tumble.
- ❖ Runs and tumbles are controlled by the clockwise or counterclockwise rotation of the basal body of the flagellum, the motor that is anchored in the cell membrane.

Important !!!!!,

You should be able to differentiate true motility from Brownian motility

- Brownian movement is usually caused by the activity of water molecules. (characterized by back and forth movement)
- True motility (the bacterial cells runs and tumble.)

❖ **Motility could be detected by:**

1. Flagellar stain.
2. Hanging Drop technique.
3. Semi-Solid media Inoculation

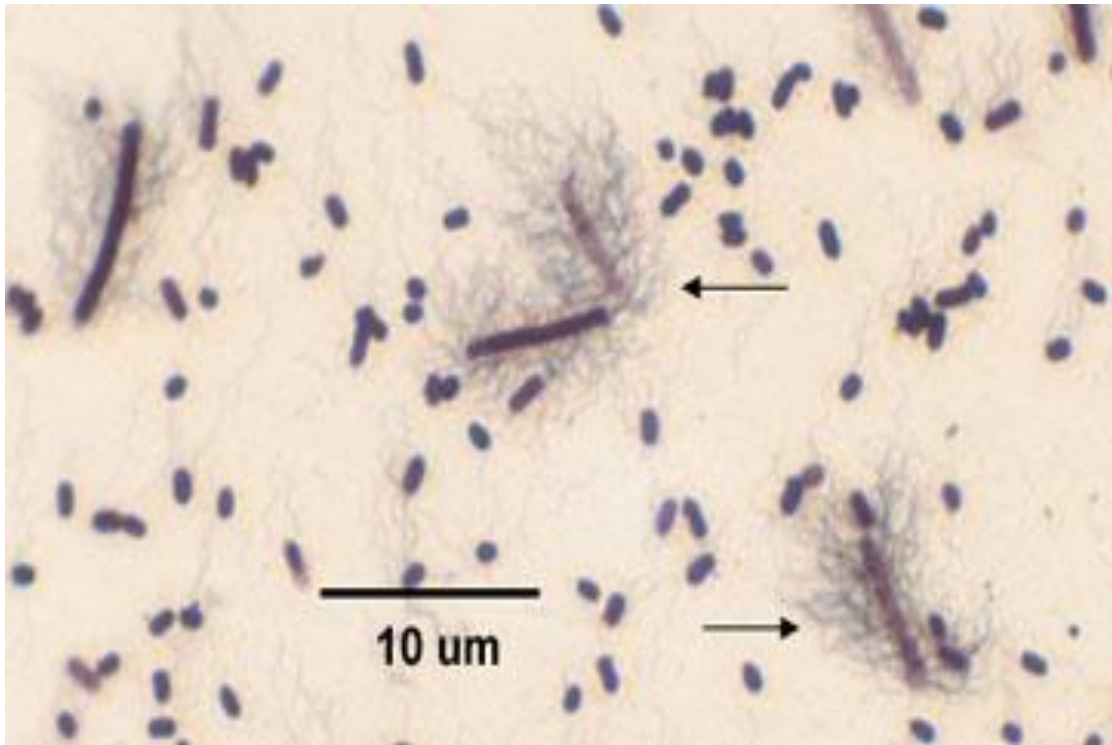
Motility testing

1- Flagellar stain.

- ❖ Flagella are too thin to be seen by the ordinary light microscope.
- ❖ Flagella should be enlarged. Use a stain that is specifically deposited on Flagella thus increasing diameter.
- ❖ Some flagellar stains employ **rosaniline dyes** and a **mordant**, applied to a bacterial suspension fixed in **formalin** and spread across a glass slide. The formalin links to, or “fixes,” the flagellar and other surface protein of the cells. The dye and mordant then precipitate around these “fixed” surfaces, enlarging their diameters, and making flagella visible when viewed under the microscope.
- ❖ Another method, a **ferric-tannate mordant** and a **silver nitrate** solution are applied to a bacterial suspension. The resulting dark precipitate that forms on the bacteria and their flagella allows them to be easily visualized under the microscope. This silver-plating technique is also used to stain the very slender spirochetes.

Motility testing

❖ The techniques are somewhat sensitive.

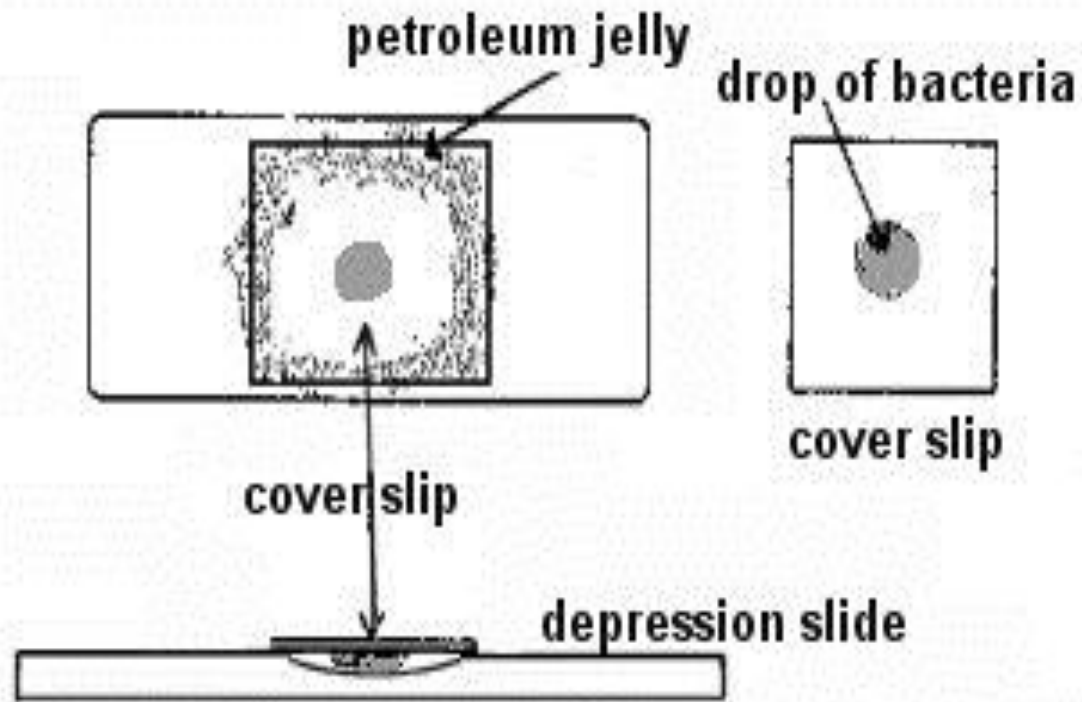


2-Hanging Drop technique

1. Place a drop of the bacterial culture (optimally from a young broth culture) in the middle of a cover slip.
2. Place a thin line of petroleum jelly around the edge of the cover slide.
3. Turn the depression slide upside-down (depressed area facing down) and gently touch the cover slide. The jelly holds the cover slip to the slide and also keeps the suspension from drying out.

Motility testing

4. Now flip the entire microscope slide/cover slip combination over. It should look like the diagram below



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

Motility testing

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.

❖ **Property it tests for:** This test is done to help differentiate species of bacteria that are motile.

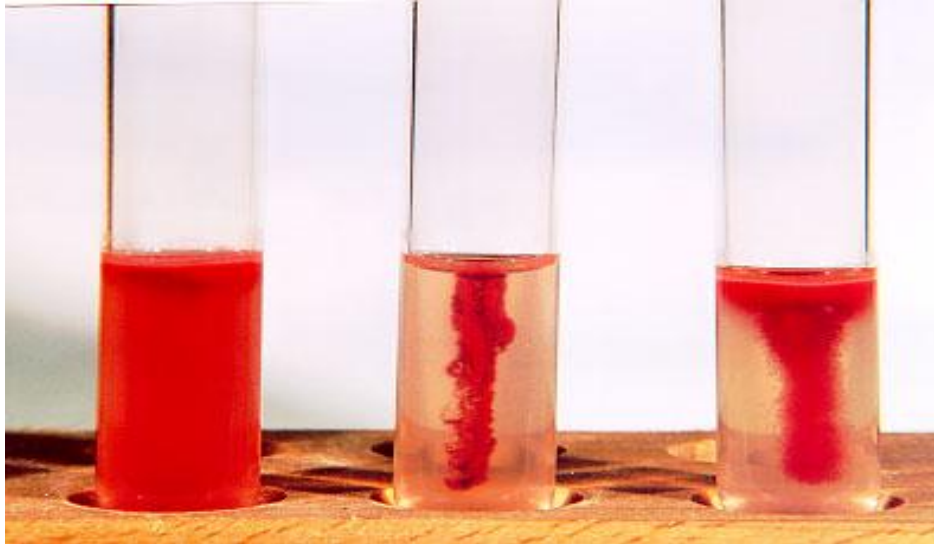
❖ **Media and Reagents Used:**

Motility media contains tryptose, sodium chloride, agar, and a color indicator.

❖ **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.

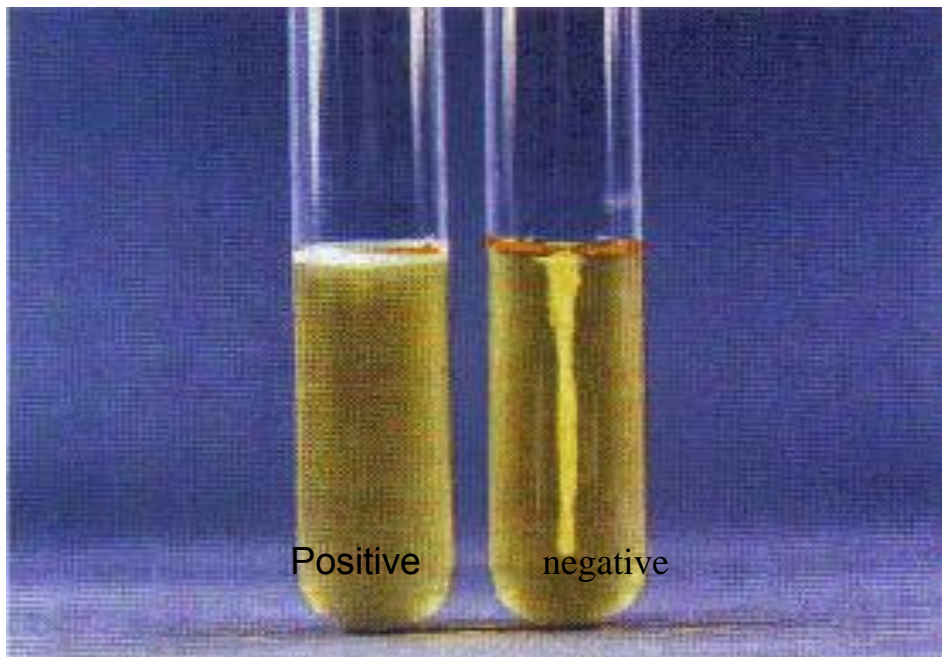
Motility testing



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Positive= Pattern of growth of a motile organism. The entire medium is turbid with the growth of the organism, which has moved away from the stab line.

Negative= Pattern of growth of a nonmotile organism. Only the stab line is turbid with growth.