

Bacterial motility

Many bacteria show no motion and are termed **non-motile**. However, in an aqueous environment, these same bacteria appear to be moving randomly. This erratic movement is due to **Brownian movement**. Brownian movement results from the random motion of the water molecules shaking the bacteria and causing them to move. True **motility** (self-propulsion) has been recognized in other bacteria and involves several different mechanisms.

⇒ Bacteria that possess flagella exhibit **flagellar motion**.

⇒ Helical-shaped spirochetes have axial fibrils (modified flagella that wrap around the bacterium) that form axial filaments. These spirochetes move in a **corkscrew- and bending-type motion**.

⇒ Other bacteria simply slide over moist surfaces in a form of **gliding motion**.

When attempting to identify an unknown bacterium it is usually necessary to determine whether the microorganism is motile, there are four detecting method:

1. The Wet Mount Slide

The simplest way to determine motility is to suspended bacterial cells in a suitable fluid on a clean slide and covers it with a coverslip. Always examine a wet mount immediately, once it has been prepared, because motility decreases with time after preparation. One problem for beginners is the difficulty of being able to see the organisms on the slide. Since bacteria are generally colorless and very transparent, the beginner has to learn how to bring them into focus.

Advantages: This method is the simplest and quickest way to determine motility. It is also useful for determining cellular shape and arrangement which is sometimes destroyed during the staining process.

Disadvantages: This method is far too risky to use with highly pathogenic organisms.

2. The Hanging Drop Slide

Hanging drop slides are also useful in observing the general shape of living bacteria and the arrangement of bacterial cells when they associate together, hanging drop slide can be done as following:

1. With a toothpick, spread a small ring of Vaseline around the concavity of a depression slide.
2. After thoroughly mixing one of the cultures, use the inoculating loop to aseptically place a small drop of one of the bacterial suspensions in the center of a coverslip.
3. Put the slide onto the coverslip so that the drop overhangs into the center of the concavity of the slide. Press gently to form a seal.
4. Turn the hanging drop slide over and place on the stage of the microscope so that the drop is over the light hole.
5. Examine the drop by first locating its edge under low power and focusing on the drop. Switch to the high-dry objective and then, using immersion oil objective.

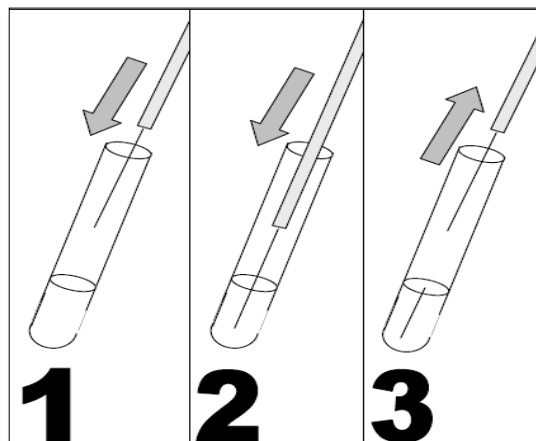
3. Tube Method

When working with pathogenic microorganisms, it is too dangerous to attempt to determine motility with slide techniques. A much safer method is to culture the organisms in a special medium that can show the presence of motility. The procedure is to inoculate a tube of semisolid or SIM medium that can show the presence of motility. Both media have a very soft consistency that allows motile bacteria to migrate freely through them causing cloudiness.

Procedure of tube method:

1. Label the tubes of semisolid (or SIM) media with the names of the organisms. Place your name on the tubes, also.
2. Flame and cool the inoculating needle, and insert it into the culture after flaming the neck of the tube.

3. Remove the cap from the tube of medium, flame the neck, and stab it way down to the bottom. Flame the neck of the tube again before returning the cap to the tube.
4. Incubate the tubes at room temperature for 24 to 48 hours.
5. If bacteria motile the tube appear cloudy or as a roots spread from the stab line.



Keep in mind



Bacteria move by flagella, and flagella arranged as :

a) **Polar:** flagella are attached at one or both ends of the cell. Three subtypes of this pattern are:

1-monotrichous: with a single flagellum.

2-lophotrichous: with small bunches or tufts of flagella emerging from the same site.

3-Amphitrichous : with flagella at both poles of the cell.

b) **Peritrichous:** flagella are spread randomly over the surface of the cell.

