

Taxonomy of bacteria

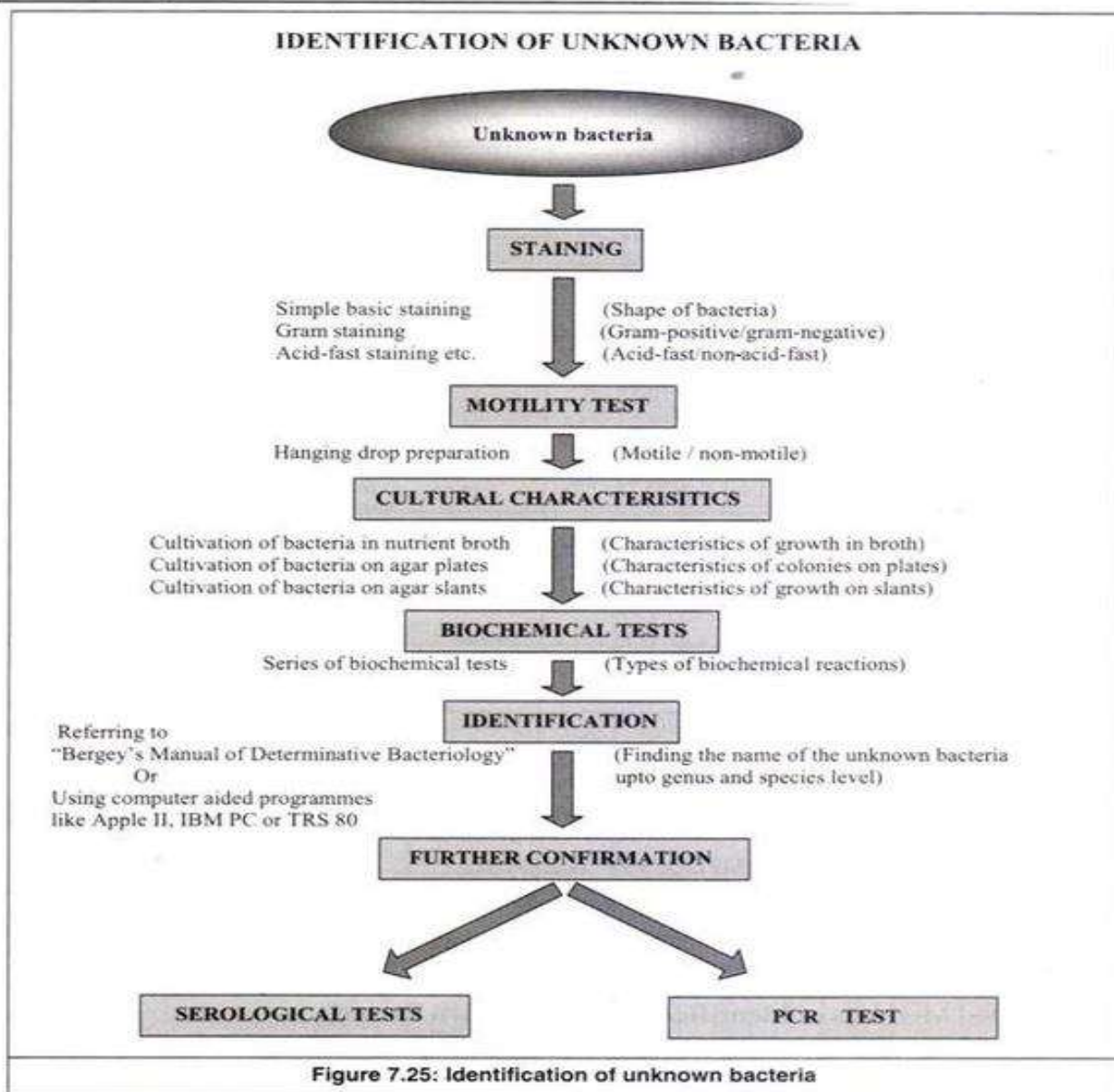
Taxonomy is the science of the biological classification of organisms with the goal of showing evolutionary relationships among organisms , consists of three parts: **Classification, Nomenclature and Identification.**

Bacteria are classified and identified to distinguish among strains and to group them by criteria of interest to microbiologist and other scientists.

Identification

It is the practical use of classification criteria to distinguish certain organisms from others.

Identification simply involves the comparison of an 'unknown' object (e.g., a newly isolated bacterium)



The staining

► Preparation of a smear and heat fixing

1. Using a sterilized inoculating loop, transfer loop-full of liquid suspension containing bacteria to a clean slide or transfer an isolated colony from a culture plate to a slide with a water drop.
2. Disperse the bacteria on the loop in the drop of water on the slide and spread the drop. It should be a thin, even smear.

3. Allow the smear to dry thoroughly.

4. Heat-fix the smear cautiously by passing the underside of the slide through the burner flame two or three times. It fixes the cell in the slide. Do not overheat the slide as it will distort the bacterial cells.

Bacterial staining

Bacteria are colorless or semi-transparent microorganisms, so it is difficult to see them in unstained preparations. For this reason, bacterial staining is one of the necessary processes so that it can be distinguished from the medium in which it is located. Dyes are chemical substances consisting of two parts, one of which is organic, which is responsible for dyeing (i.e. giving the bacteria cells the color of the dye) and is called a chromophore, and the the second part is a complementary inorganic that may be a negative or positive ion such as methylene blue dye, which consists of a positive organic part and an inorganic part It is the negative chlorine ion.

Types of Stains

1- Basic stains (+): react with acidic (-) parts of the cell ex. crystal violet, safranin, methylene blue, stains that get inside the cell.

2- Acidic stains (-): are repelled by the negatively charged cell surface Ex. India ink , Stains the background, not the cells.

Staining allows for:

◦ Observing bacterial morphology and arrangements ◦ other critical information such as cell wall structure

1. Simple staining

A simple stain makes use of a single dye and reveals basic cell shapes and cell arrangements. Methylene blue, safranin, carbolfuchsin, and crystal violet are commonly used simple stains.

Diagnostic microbiology laboratory generally does not perform simple staining method (using one stain). Differential staining such as **Gram Staining** and **AFB Staining** are commonly used to identify and differentiate the bacterial isolates. Simple staining can be useful in some circumstances such as (To differentiate bacteria from yeast cells: When endo-cervical swab or high vaginal swab culture is done in blood agar both *Staphylococcus spp.* And yeast cells may give similar looking colonies in blood agar).