

## Identifying the shapes of bacteria through microscopic examination

### Preparation of Specimens for Light Microscopy

1. **Smear:** Spread a thin film of material containing microorganisms over slide surface. Allow to air dry.
2. **Fixing:** Process that kills microorganisms and attaches them to a microscope slide. Fixing preserves and minimizes distortion of cells.

Two main methods of fixation:

**Heat fixation:** Pass over Bunsen burner flame several times.

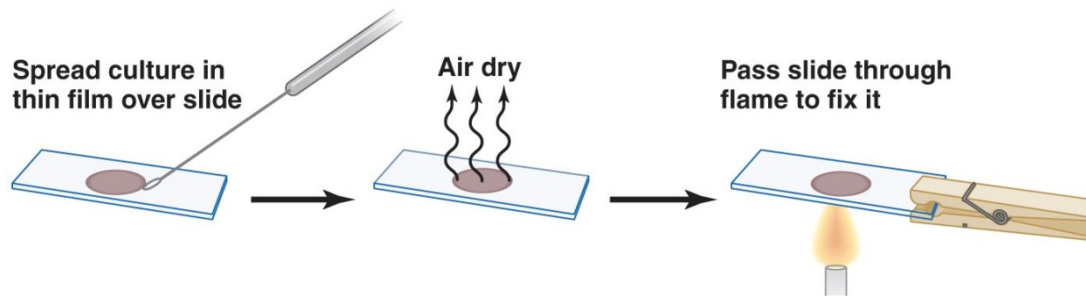
**Chemical fixation:** Cover with methanol for 1 minute.

Increases contrast and resolution by coloring specimens with stains/dyes

Smear of microorganisms (thin film) made prior to staining

Microbiological stains contain chromophore

Acidic dyes stain alkaline structures; more commonly, basic dyes stain acidic structures

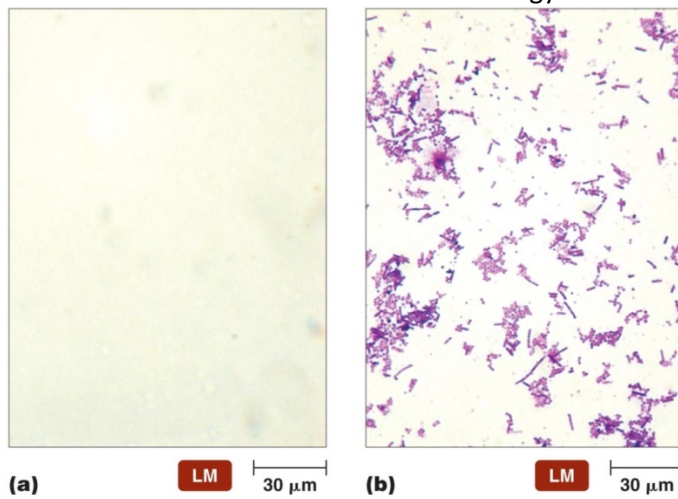


### Simple stains

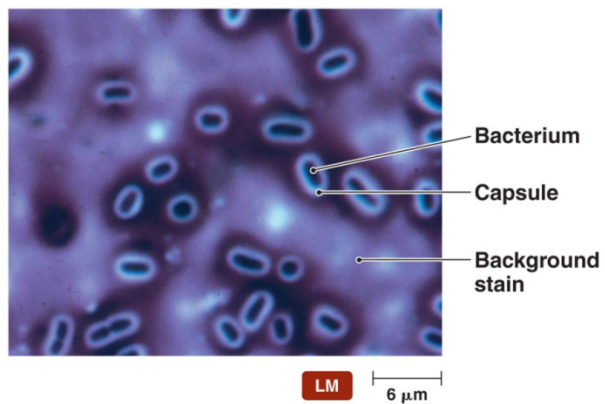
- 1- Differential stains
- 2- Gram stain
- 3- Acid-fast stain
- 4- Endospore stain
- 5- Special stains
- 6- Negative (capsule) stain
- 7- Flagellar stain

Microbiology 2

Lab 4



Negative (capsule) stain



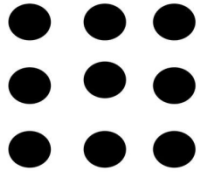
## Shape of Bacteria

On the basis of shape bacteria are classified as

1. Cocci
2. Bacilli
3. Vibrios
4. Spirilla
5. Spirochetes
6. Actinomycetes
7. Mycoplasma

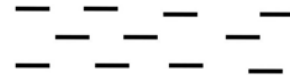
## 1. Cocci

- Cocci are small, spherical or oval cells. In greek 'Kokkos' means berry. Eg: micrococcus



## 2. Bacilli

- They are rod shaped cells. Eg: Bacillus anthracis.
- It is derived from greek word " Bacillus" meaning stick.
- In some of the bacilli the length of cell may be equal to width. Such bacillary forms are known as coccobacilli. Eg: Bracella.



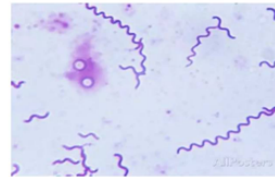
## 3. Vibrios

- They are comma shaped curved rods. Eg: Vibrio comma.



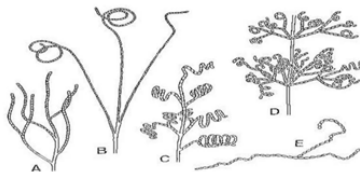
## 4. Spirilla

- They are longer rigid rods with several curves or coils.
- They have a helical shape and rigid body.
- Eg: Spirillum ruprem.



## 6. Actinomycetes

- The characteristic shape is due to the presence of rigid cell wall. Eg: Streptomyces.
- They are branching filamentous bacteria.
- Eg: Streptomyces species.



## 7. Mycoplasma

- They are cell wall deficient bacteria and hence do not possess stable morphology. They occur as round or oval bodies with interlacing filaments.



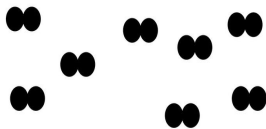
## Arrangement of Bacteria Cells

Cocci appears as several characteristics arrangement or grouping.

1. Diplococci
2. Streptococci
3. Tetrads
4. Staphylococci
5. Sarcinae

### 1. Diplococci

- They split in one plane and remain in pair. Eg: *diplococcus pneumoniae*.



### 2. Streptococci

These cells divide in one plane and remain attached, to form chains. Eg: *streptococcus lactis*.



### 4. Staphylococci

- Cocci cells divide in three planes in an irregular pattern. These cells produce bunches of cocci as in grapes. Eg: *staphylococcus aureus*, *staphylococcus albus*.

