

# Lecture 2














## I. Describing bacteria

### A. Colony Morphology

1. Colony morphology is used to describe the \_\_\_\_\_. Remember that a colony arises from a single cell so a colony represents a pure culture.

#### Colony morphology terms

When recording colony morphology, it is important to also record color, optical properties (translucence, sheen) and texture (moist, mucoid, dry). However, remember that color is often influenced by environment.

Shape:	Margin (edge):	Elevation:
 Circular	 Entire (smooth)	 Flat
 Irregular	 Undulate (wavy)	 Raised
 Punctiform (tiny)	 Rhizoid	 Convex
	 Lobate	 Pulvinate
	 Filamentous	 Umbonate

### B. Turbidity and broth growth

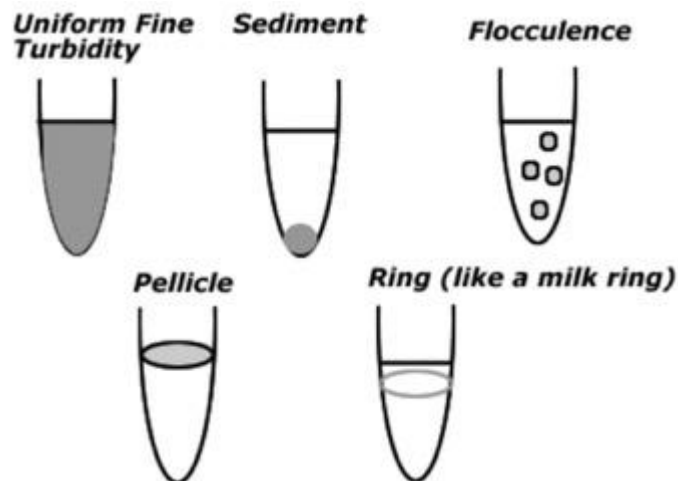
1. Can be used to estimate the \_\_\_\_\_

Turbidity	Bacteria per mL
None	0-10 <sup>6</sup>
Light	10 <sup>7</sup>
Moderate	10 <sup>8</sup>
Heavy	10 <sup>9</sup>

**Turbidity and bacteria count**

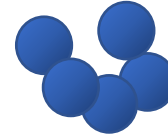
Note: Bacterial populations grown in liquid medium usually do not exceed 3x10<sup>9</sup> bacteria/mL.

2. Some bacterial have distinctive growth patterns in broth.

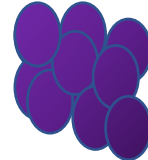
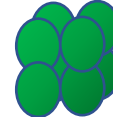
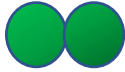


### C. Bacterial Cell Shapes and Arrangement

1. Shape refers to the individual cell shape when viewed under a microscope
2. We will deal mainly with the two most common shapes: \_\_\_\_\_



### Bacterial Cell Arrangements



**Strepto-** chain of cells

**Diplo-**

**Tetrad-**

**Sarcina-**

**Staphylo-** Irregular clusters of cells

### II. Wet mounts

A. In the last lab we viewed samples (\_\_\_\_\_) under the microscope. This is a fast way to view \_\_\_\_\_ that is \_\_\_\_\_. We were able to make true assessments of \_\_\_\_\_. However, these wet mounts are \_\_\_\_\_ and can be a potential \_\_\_\_\_.

### III. \_\_\_\_\_ samples (smear preparations)

#### A. Fixation

1. \_\_\_\_\_ fixation: simultaneously \_\_\_\_\_. This is the \_\_\_\_\_ fixation method.
2. \_\_\_\_\_ fixation: has the same results as the heat fixation. Often used when heat can damage cells structures you are trying to observe. Examples of chemical fixatives are alcohol and formaldehyde.

#### B. Disadvantages of a fixed sample

1. Can't observe specimen \_\_\_\_\_
2. Causes a slight \_\_\_\_\_

#### C. Advantages of a fixed sample

1. \_\_\_\_\_ - can be used for long-term study.
2. The preparations \_\_\_\_\_ (below) to enhance contrast and reveal specialized cell structures (e.g. flagella, endospores, capsules, cell walls etc..)

IV. Staining

A. The composition of a stain

1. Solvent
2. A solute contains \_\_\_\_\_, which are highly conjugated and give the dye its \_\_\_\_\_.

i. \_\_\_\_\_

\_\_\_\_\_ dyes

a. Contain \_\_\_\_\_ charged groups, which bind to \_\_\_\_\_

b. Direct dyes are the \_\_\_\_\_

\_\_\_\_\_ and examples include methylene blue, basic fuchsin, crystal violet, safranin and malachite green.

c. Applied to bacterial smears that have been \_\_\_\_\_.

ii. \_\_\_\_\_

\_\_\_\_\_ dyes

a. Possess \_\_\_\_\_ such as carboxyls (-COO-) and hydroxyls (-OH-).

b. Can be used to determine

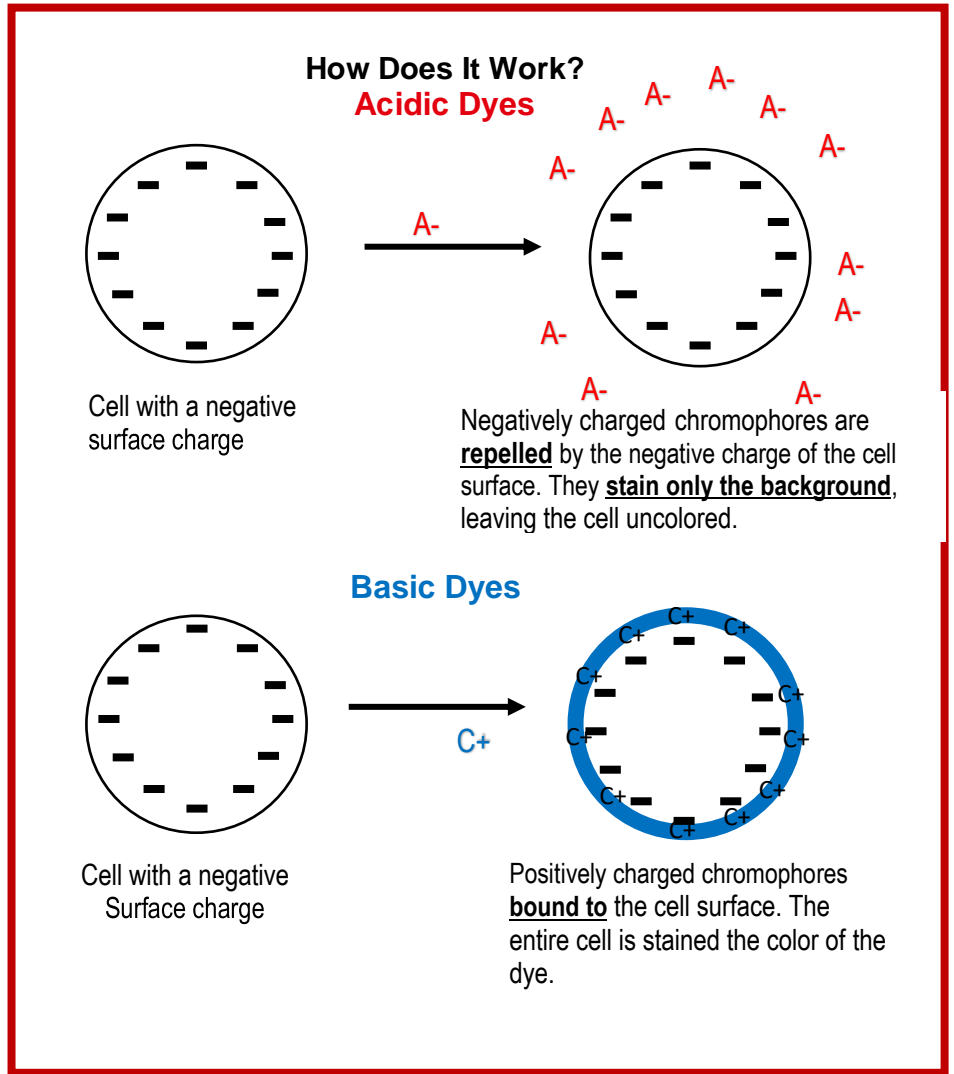
morphology and cellular arrangement in bacteria that are \_\_\_\_\_ to withstand heat-fixing.

A. Staining categories

1. \_\_\_\_\_ (today)
  - i. Uses a \_\_\_\_\_ (acidic or basic) and all organisms stain the \_\_\_\_\_.
  - ii. Is a \_\_\_\_\_ method to determine cell size, shape and arrangement.
2. \_\_\_\_\_
  - i. Divides bacteria into \_\_\_\_\_ based on staining properties.
  - ii. Is \_\_\_\_\_ but the color of staining gives information \_\_\_\_\_ in addition to size, shape and arrangement.

V. Some processes used in the identification of bacterial unknowns:

- A. \_\_\_\_\_ (staining)
- B. \_\_\_\_\_ (e.g. type of colony and time it takes to grow) and \_\_\_\_\_ (e.g. carbohydrate fermentation and production of virulence factors)
- C. Results can be coupled with a \_\_\_\_\_.



## New tools you will encounter in this lab course:

