University of AL-Mustansiriyah
2024 -2023
College of Sciences
Biology Department

Microbiology 2 Lab 3

Morphological characteristics (Colony Morphology)

In addition to the Gram stain, microorganisms are also classified according to colony morphology and cell morphology. Bacterial colonies grow from a single cell and are composed of millions of cells. Each colony has a characteristic size, form or shape, edge, texture, degree of opacity, and color. These characteristics describe the morphology of a single colony and may be useful in the preliminary identification of a bacterial species. Colonies with a markedly different appearance (when grown on the same medium) can be assumed to contain different bacterial species. However, since many species have a similar colony morphology, the reverse (that colonies that look alike are the same species) is not always true. Figure 1 shows some of the terms used to describe colony morphology.

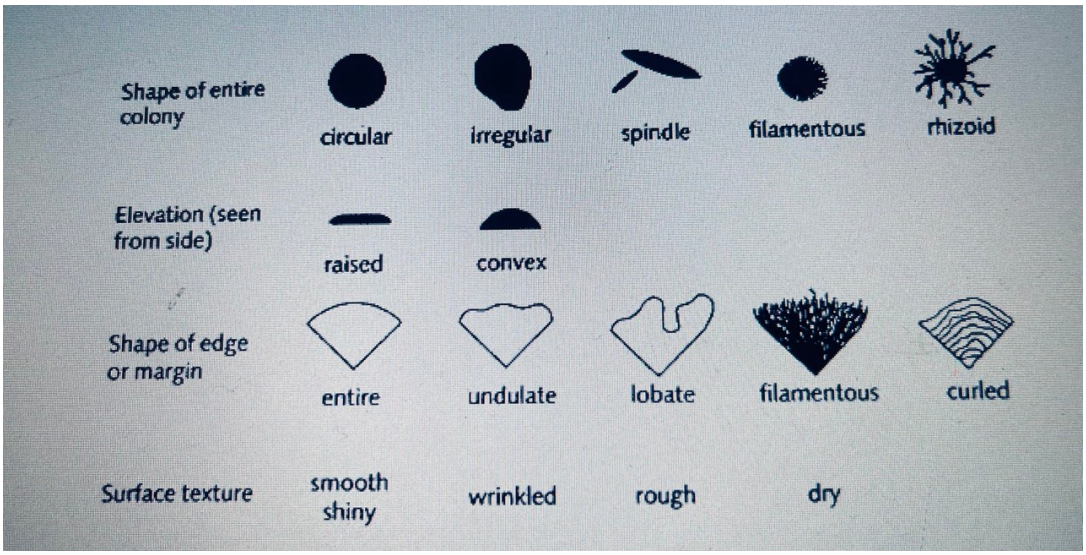

Figure 1

Colony morphology

Once you have examined the unknown bacterial species, you will then compare the characteristics of the unknowns to the characteristics of known bacterial species. These comparisons may allow you to make a preliminary identification of the unknown bacterial species .

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Examine the demonstration agar plates of the six bacterial species found on the side bench. Examine the colony morphology and record your observations in Table 1. Use the terms in Figure 1 to describe colony morphology.

Materials:

Per student:

1-plate 2- media

(1) grease pencil (2) inoculating loops

(3) pair of forceps

(4) beakers

(5) wash bottle of 95% ethanol

(6) Bunsen burner

Table 1

Colony Nummber	Colony Morphology (from agar plates)					
	Size(mm)	Shape	Elevation	Edge	Color	Surface
1						
2						
3						

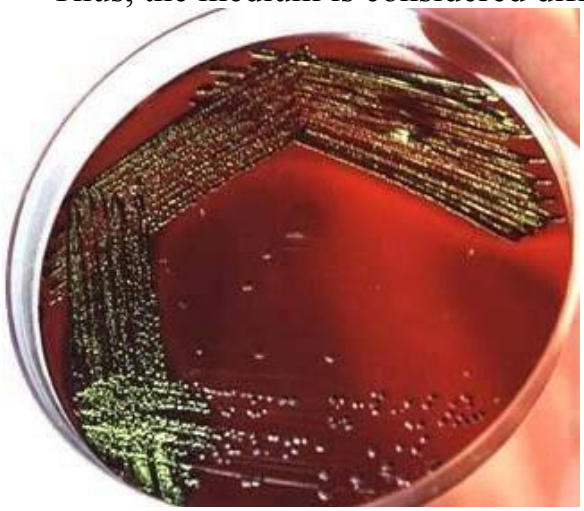
The differential media

Differential media contain compounds that allow groups of microorganisms to be visually distinguished by the appearance of the colony or the surrounding media, usually on the basis of some biochemical difference between the two groups i.e. (contains substances that if used by the organism cause a visible change in the medium or in the colony, examples include:

1. **Eosin Methylene Blue agar (EMB agar)**

Contains the dyes eosin and methylene blue. They inhibit Gram-positive organisms; such a medium is selective for Gram-negative species. Lactose-

fermenting organisms such as *Escherichia coli* appears as large, blue-black colonies, often with a green metallic sheen. *Enterobacter* spp. present as brown to blue-black, mucoid colonies with no sheen. Non-lactose-fermenting colonies such as *Shigella* spp. and *Salmonella* spp., appear transparent and colorless. Thus, the medium is considered differential with respect to lactose fermentation



E. coli on EMB agar

2. MacConkey agar

MacConkey agar is similar to EMB agar in that it is also selective for Gram-negative species and differential with respect to lactose fermentation. MacConkey agar is used for the detection of coliforms and enteric pathogens based on their ability to ferment lactose. Lactose-fermenting bacteria appear red to pink (*Escherichia coli, Enterobacter* and *Klebsiella*) while non-lactose fermenting bacteria appears as colorless or transparent colonies (*Salmonella, Proteus* species, *Yersinia* and *Shigella*).

3. Mannitol salt agar

Selective medium (7.5% NaCl) for staphylococci and differential with respect to mannitol fermentation. Growth of most bacteria other than staphylococci, is inhibited by the high concentration of salt in the medium. Fermentation of mannitol is only seen in the pathogenic species of *Staphylococcus* and is signaled by the production of acidic products leading phenol red in the media to change from a neutral red-orange to bright yellow.

** *Staphylococcus*: fermenting mannitol, medium turns yellow (e.g. *S. aureus*)

** *Staphylococcus*: not fermenting mannitol, medium does not change color (e.g. *S. epidermidis*)