MICROBIOLOGY LAB

Lecture : Lab "4"

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Colony Morphology

- Faculty of Medicine
- Second year 2023-2024
- The Hashemite University
- Dr. Ashraf Khasawneh

Introduction

Colony morphology: a description of structure,size,shape of the bacterial colony

- Provides additional information for the identification of the bacterium.
- A colony is defined as a visible mass of microorganisms all originating from a single mother cell; therefore a colony constitutes a clone of bacteria all genetically alike. تشكل المستعمرة نسخة من جميع البكتيريا متشابهة وراثيا

On solid medium the following characteristics are observed

in order to describe the colony?

i. Shape: circular, irregular, radiate or rhizoid, filamentous
ii. Size: pinpoint, small, medium, large
iii. Elevation: flat, rained, convex, umbonate, dimpled
iv. Margin: entire, wavy, lobate, filiform, curled
v. Surface: smooth, wavy, rough, granular, etc.
vi. Appearance: shiny, dull, opaque
vii. Texture: smooth, rough, wet, dry, moist, mucoid, brittle, viscous.
viii. Color: colorless, pink, black, red, bluish-green.

* Media that we use to grow Bacteria:-
- Blood agar
- chocolate agar
} → Nutrient Media

Nutrient Media

- we called it Nutrient Media Because it has a Nutrients that supply Bacteria for growth.

* What Does this Media contain? Nutrient Agar composition
- peptone, Beef, Sodium chloride (NaCl)

- Another type of Media → MacConkey Agar

Differentiater / Selective Media

- Specific for gram Negative only. (inhibits growth of gram + via bile salt & crystal violet dye).

→ Differentiating Btw types of gram Negative bacteria.

How? → it Differentiates lactos fermenter & non lactose fermenter By changing the color of Media. Pink in lactose fermenter. Pale yellow in non lactose fermenter (colorless).

- Thayer Martin Media (TM) → Modified chocolate Agar
it is selective agar by adding Antibiotics to inhibit growth either Bacteria.

- Mannitol Salt Agar → Selective for Staphylococcus only
Because this media contains ↑ concentration of salt that Staph can tolerate it (only Staph tolerate ↑ con. of salt).

* if the color of agar yellow → staphylococcus aureus. (Mannitol fermentation)
* if it Non Mannitol fermentation → either type of Staph. (Pink)

- Not Just Mannitol fermentation tests, Coagulase Test must be applied. S.aureus → coagulase(+)

Black in color → charcol; white colony → bordetella

- charcol agar for bordetella.

- Sabouraud's agar for fungi.

- SS agar for Sallmonella & shigella.

clinical presentation → Diarrea (a sample from stool.)

↳ قبلما أزرعها سوي SS agar بروح بزرعها على Hektoen enteric Agar / Deoxycholic
وبرجع بزرعها تاني يوم لانه بـ اطلع فيه أكثر من E.coli و Klebsiella, سو بيكبر باول مرة
ما بظهر الـ Sallmonella.

- TCBs Agar (Thiosulfate citrate bile salts agar) → لونها أخضر
↳ for vibrio.

Yellow colony

1. Shape

Circular/Entire

Rhizoid

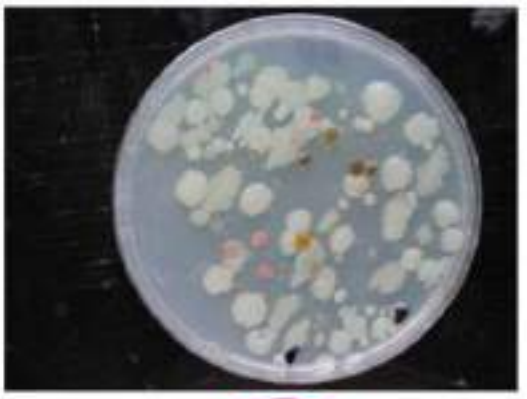
Irregular

Filamentous

2. Size

Pinpoint

gram +



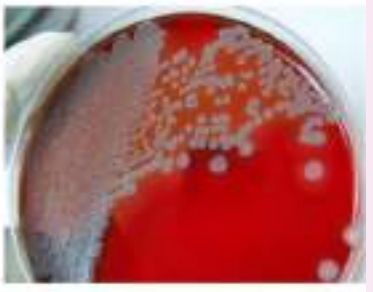
Large

gram −

3. Elevation ~~ Describes the cross sectioned Shape of the colony when viewed from the side

Raised

Convex



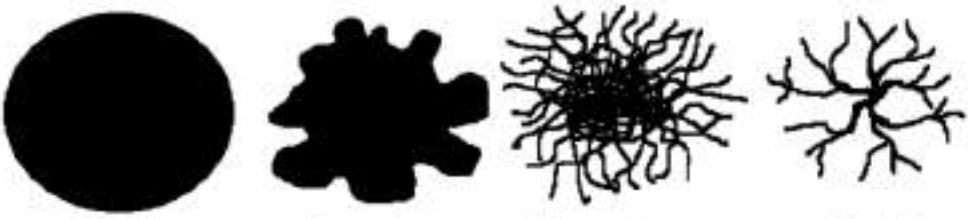
Flat

Umbonate

Dimpled

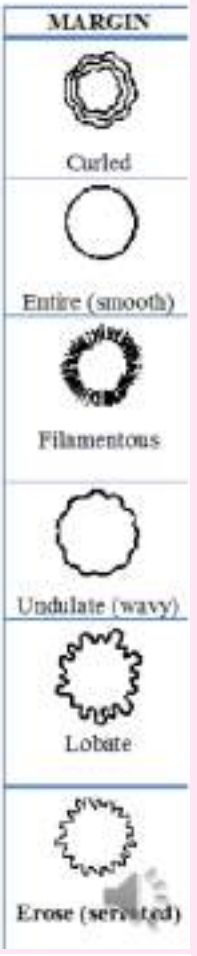
Colony Morphology

Form / Shape



Elevation

4. **Margin**



6. Appearance

Appearance
- Shiny
- Dull
- Opaque

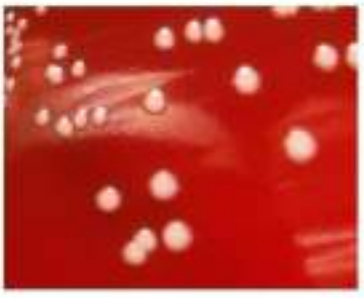
Shiny

Dull

7. Texture

wet oR Dry?

Texture
- Smooth
- Rough
- Wet



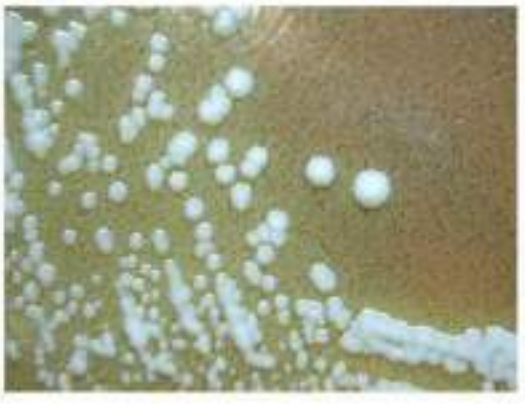
Smooth

Wet

Rough

TEXTURE
Slimy, moist
Matte, brittle
Shiny, viscous
Dry, mucoid
Translucent
Iridescent (changes colour in reflected light)

8. Pigmentation



Non-pigmented

Pigmented

(Bluish-green) like pseudomonas

COLOUR
Orange
Red or pink
Black
Brown
Opaque or white
Milky

9. Hemolysis patterns

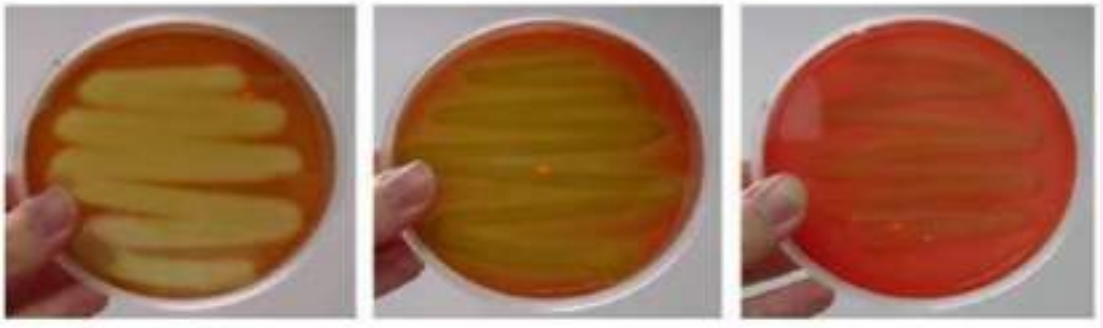
Blood Agar:

Shows three types of hemolysis

α Hemolysis

β Hemolysis

γ Hemolysis



Beta Hemolysis | **Alpha Hemolysis** | **Gamma Hemolysis**

10. Others

Certain bacteria may exhibit some unique characteristics.

- Pseudomonas aeruginosa – smells sweet, grape-like
- Proteus spp. – smell like chocolate cake
- Proteus spp. – swarm across the agar
- Klebsiella spp. may be very wet

Swarming Proteus

Wet Klebsiella

Colony Morphology examples on blood agar

Pseudomonas aeruginosa

- Irregular
- Raised
- Unclear margins
- Moist
- Opaque
- Shiny
- Brownish gray
- 2 mm

- oxidase (+)

Colony Morphology examples on blood agar

Sorbitol MacConkey

Dark pink in color

Escherichia coli

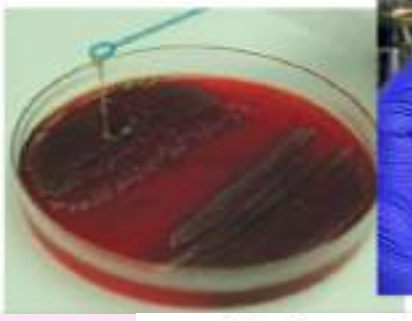
(lactose fermenter)

- Circular
- white
- Raised
- Opaque
- Soft
- Moist
- Regular margins
- Beta hemolysis

Colony Morphology examples on blood agar

(lactose fermenting) **Klebsiella pneumoniae**

- Circular
- Mucoid / wet — due to capsule
- 2-3 mm
- Regular margin
- Grayish white
- Opaque



Colony Morphology examples on blood agar

Salmonella typhi

- Circular
- flat
- 1-2 mm
- Regular margin
- Gray
- Opaque
- Moist

Salmonella on SS Agar

Shigella on SS Agar

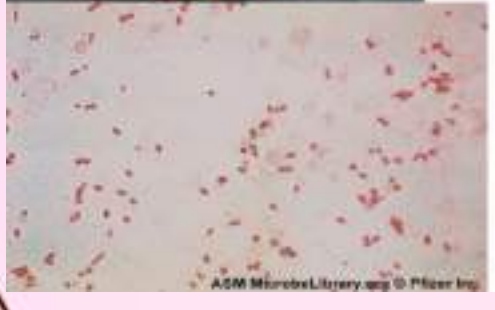
Colony Morphology examples on blood agar

Proteus species

- Irregular margin
- Unclear colonies
- Swarming appearance

+ Motile

Colony Morphology examples on blood agar



Acinetobacter

gram −

- Shiny
- Circular
- Raised
- Clear
- Moist
- Small 1mm

Colony Morphology examples on blood agar

Listeria

- Tiny
- Circular
- Regular
- Opaque
- Smooth surface
- Glistening
- 1mm

Colony Morphology examples on blood agar

Corynebacterium diphtheriae

- 0.5 mm
- Whitish gray
- Glistening
- Raised
- Circular
- No hemolysis

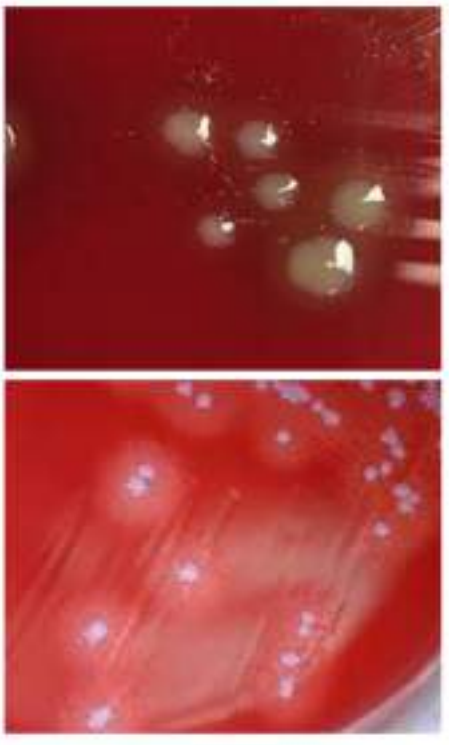
Colony Morphology examples on blood agar

Shigella sonnei

- 1-2 mm
- Circular
- Moist
- Entire margin

Colony Morphology examples on blood agar

Haemophilus influenzae



- Circular
- Convex
- Transparent
- colorless
- Moist
- Small
- Satellite

Colony Morphology examples on blood agar

Staphylococcus aureus

- Golden yellow
- Beta hemolysis
- Circular
- 1 mm
- raised
- Entire margins
- Opaque
- Small
- Glistening

Colony Morphology examples on blood agar

Staphylococcus epidermidis

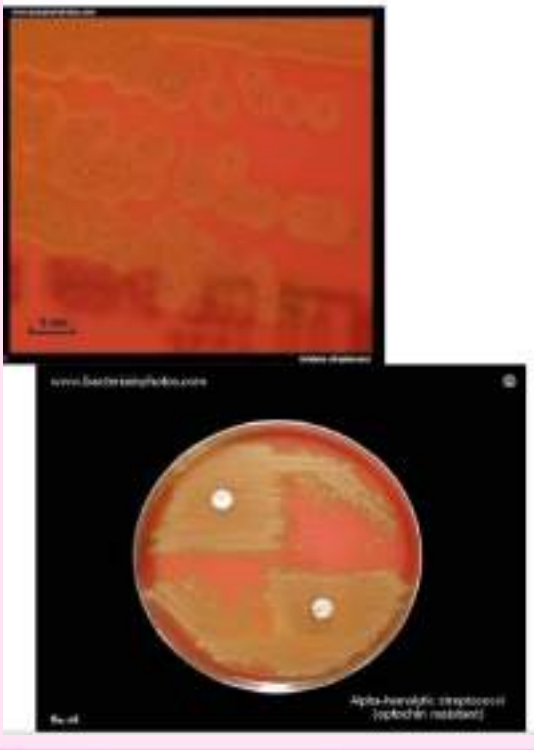
- Gray whitish color
- Beta hemolysis
- Convex
- Opaque
- 0.5 mm
- Wet

Colony Morphology examples on blood agar

Enterococcus faecalis

- Raised
- 1 mm
- Gray
- Circular
- Regular margins
- Gamma-hemolysis

Colony Morphology examples on blood agar



Viridans streptococci

- Circular
- Regular margins
- 0.2-0.3 mm
- Alpha-hemolysis

Colony Morphology examples on blood agar

Streptococcus pyogenes

- Dry
- Opaque
- Regular margins
- Circular
- 0.5 mm
- Gray
- Beta-hemolysis

Colony morphology examples on blood agar

Streptococcus pneumoniae

- Irregular margins
- Raised
- Unclear margins
- Moist
- Opaque
- Shiny
- 2 mm
- Alpha-hemolysis

هذا التفريغ صدقة عن روح

"هبة خالد الوريكات"

وبقية شهداء العلم في حادثة التكنو

اللهم ارحمهم واغفر لهم وتقبلهم من الشهداء الصالحين

نسألكم الدعاء لهم والفاتحة