

جامعة الانبار

كلية: الصيدلة

قسم: العلوم المختبرية السريرية

اسم المادة باللغة العربية: الاحياء المجهرية

اسم المادة باللغة الإنكليزية: **microbiology**

المرحلة: الثانية

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عنوان المحاضرة باللغة العربية: بكتريا السل

عنوان المحاضرة باللغة الإنكليزية: **Salmonella and Shigella**

Salmonella and Shigella

Salmonella

- Produce significant infections in humans
- Acute gastroenteritis or food poisoning (s. typhimarium)
- Typhoid and Other Enteric Fevers (s. typhi, s. paratyphi)
- Bacteremia

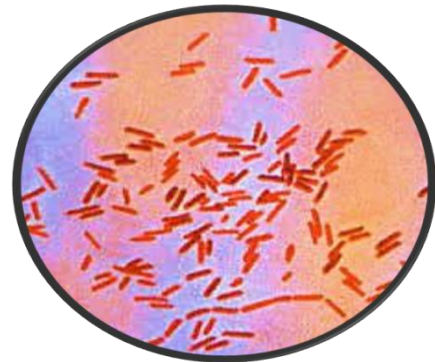
Microscopically appearance

Gram-negative bacilli.

Most species are motile.

Non-spore forming.

Non-capsulated.



Cultural characters

- Aerobic and facultatively anaerobic.
- They grow readily on all ordinary media.
- ✓ MacConkey's agar: the colonies are 2-4 mm, moist, circular, smooth, dome shaped with entire edge. The colonies are pale since lactose is not fermented.

- On selective media.
- ✓ Bismuth sulphite agar: colonies are black with metallic sheen appearance (like rabbit eye) due to H₂S production by this bacteria.
- ✓ Salmonella-Shigella agar (SSA): Colonies are colourless (non-lactose fermenter) with black centers.

Biochemical Tests

.(+ - + -) IMVC

.Catalase positive

.oxidase negative

.Urease negative

. Ferment many types of sugars (glucose, manitol, maltose, and saguaros) except lactose.

Shigella

Closely related to the *Escherichia*

All species cause bacillary dysentery

Shigella species have been grouped according to differences in somatic (O) antigens

(*S. dysenteriae* (Group A

(*S. flexneri* (Group B

(*S. boydii* (Group C

(*S. sonnei* (Group D

Microscopically appearance

.Gram-negative bacilli

.Non motile

.Non-spore forming

.Non-capsulated



Cultural characters

- Aerobic and facultatively anaerobic.
- grows on all ordinary media :
 - ✓ MacConkey's agar: the colonies are pale (colourless) non-lactose fermenter with the exception of *Shigella sonnei*, which is late lactose fermenter.
- On selective media:
 - ✓ S.S. agar: the colonies are pale (colourless).

- ✓ Xylose-Lysin Deoxy cholate agar (XLD): red colonies (the best medium for *Shigella* isolation).

Biochemical Tests

- .IMVC (d + - -).
- .Catalase positive
- .oxidase negative
- .Urease negative
- . All ferment manitol except *Sh. dysenteriae*

Triple Sugar Iron (TSI) test

TSI medium (differential medium) contains

-Three different types of sugars

- Glucose (1 part)
- Lactose (10 part)
- Sucrose (10 part)

-Phenol red (acidic: Yellow)

-Iron as FeSO_4

Principle

To determine the ability of an organism to ferment one or more from three sugar (Glucose, Lactose and Sucrose) found in medium, with or without the production of gas, along with the determination of possible hydrogen sulphide (H_2S) production .

Method

- ✓ Inoculate TSI medium with an organism by inoculating needle by stabbing the butt and streaking the slant.
- ✓ Incubate at 37°C for 24 hours.

Results

Slant Color	Butt Color	H ₂ S	Result	Example
Red	Red	Negative	Alk / Alk / - (no sugars fermentation/ no H ₂ S production)	<u>Pseudomonas</u>
Yellow	Yellow	Negative	Acid / Acid / - (three sugars are fermented)	<u>E. Coli</u> <u>Klebsiella</u>
Red	Yellow	Positive black in butt	Alk / Acid / + (glucose fermented with H ₂ S)	<u>Salmonella</u> <u>Proteus</u>
Red	Yellow	Negative	Alk / Acid / - (glucose fermented without H ₂ S)	<u>Shigella</u>



**Alk/Alk/-
Pseudomonas**



**Alk/Acid/-
Shigella**



**Alk/Acid/+
Salmonella
Proteus**



**Acid/Acid/-
Gas production
E. Coli**



**Acid/Acid/-
Klebsiella**

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