

Salmonella and Shigella

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Salmonella



Produce significant infections in humans

❖ ***Typhoid and Other Enteric Fevers***
(s. typhi, s. paratyphi)



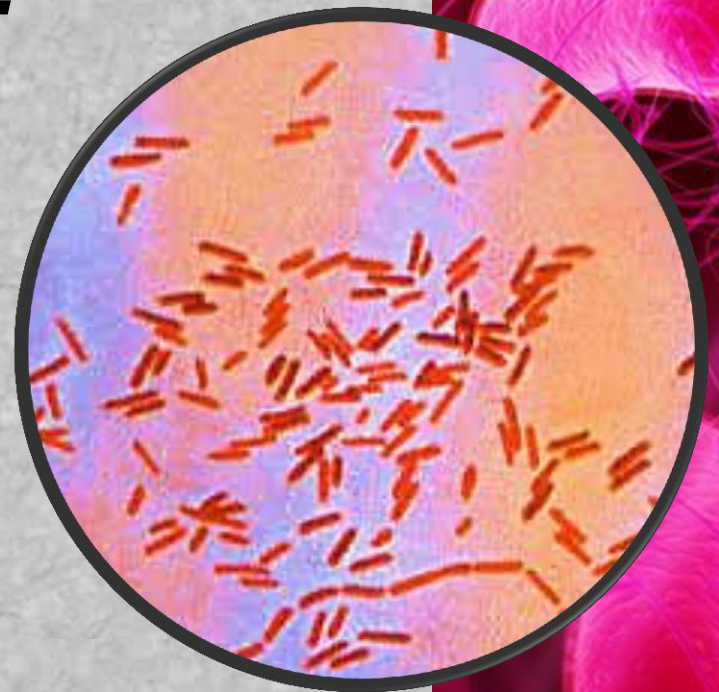
❖ ***Acute gastroenteritis or food poisoning***
(s. typhimarium)

❖ ***Bacteremia***



Microscopically appearance

- *Gram-negative bacilli.*
- *Most species are motile.*
- *Non-spore forming.*
- *Non-capsulated.*



Cultural characters

- *Aerobic and facultatively anaerobic.*
- *On ordinary media.*
- ✓ *MacConkey's agar: the colonies are pale, 2-4 mm, moist, circular, smooth, dome shaped with entire edge.*
- *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.*



Specimens for culture

- *Blood culture taken repeatedly, it positive in the first week.*
- *Urine culture positive in the second week.*
- *Stool culture positive from second to third week*

Biochemical Tests

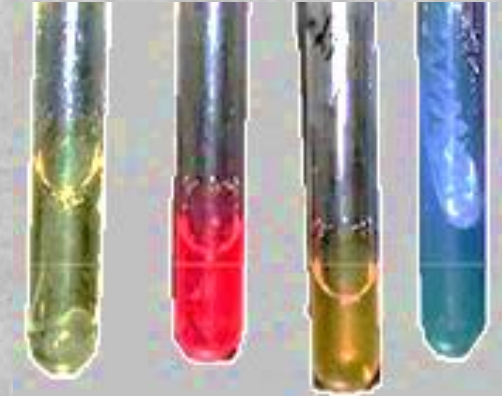
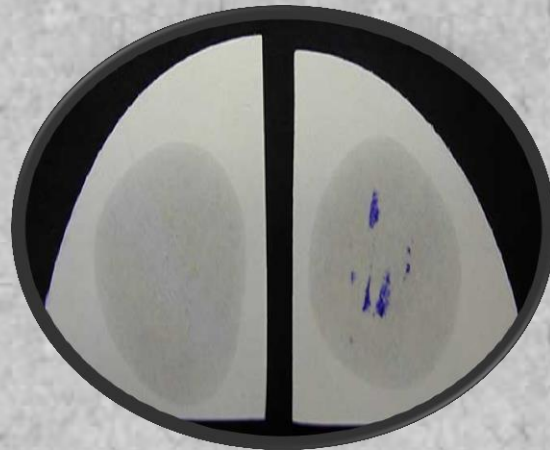
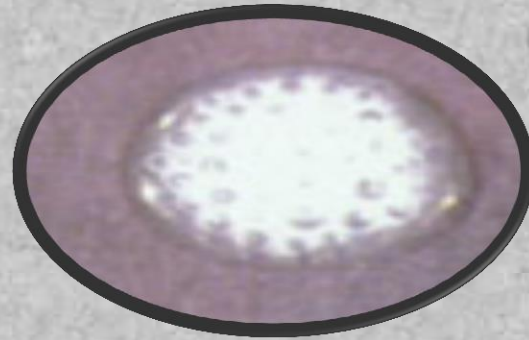
➤ *IMVC (- + - +).*

➤ *Catalase positive.*

➤ *oxidase negative.*

➤ *Urease negative.*

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



Widal Test

- ❖ *Widal Test is an agglutination test which detects the presence of serum antibodies (H and O) in patients serum with typhoid and paratyphoid fever.*
- ❖ *Salmonella antibody starts appearing in serum at the end of first week. In acute typhoid fever, O antibody can be detected 6–8 days after the onset of fever and H antibody after 10–12 days.*

Widal Test



Slide method

Susceptibility to antibiotic

Historically, recommended regimens for the treatment of typhoid fever included ampicillin, trimethoprim, or chloramphenicol.

Resently, Ciprofloxacin, Azithromycin , and Ceftriaxone antibiotics are preferred

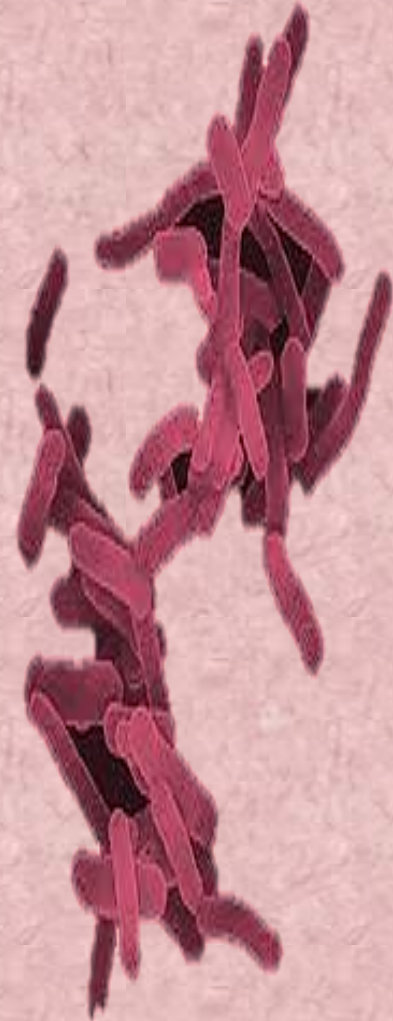
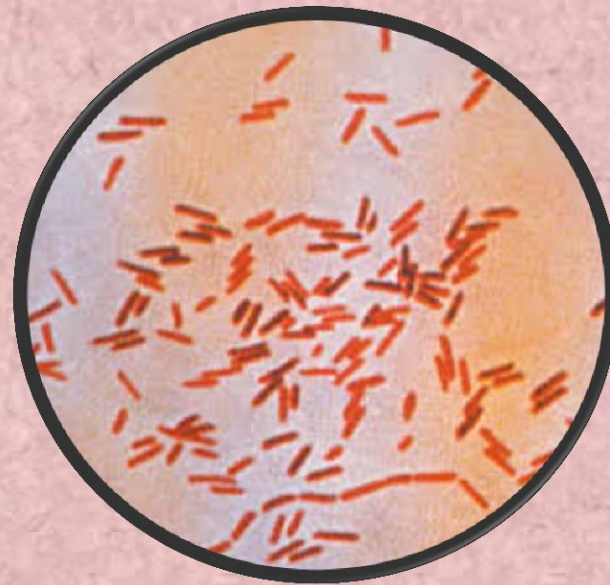
Shigella

- *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)*



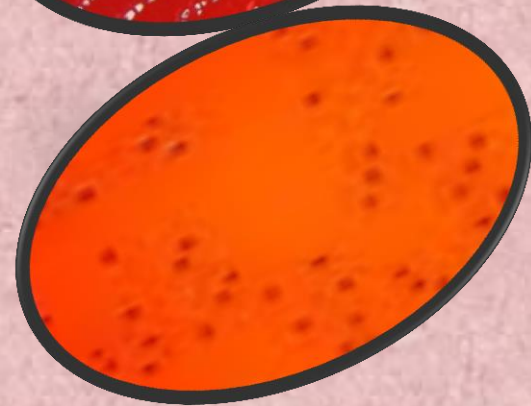
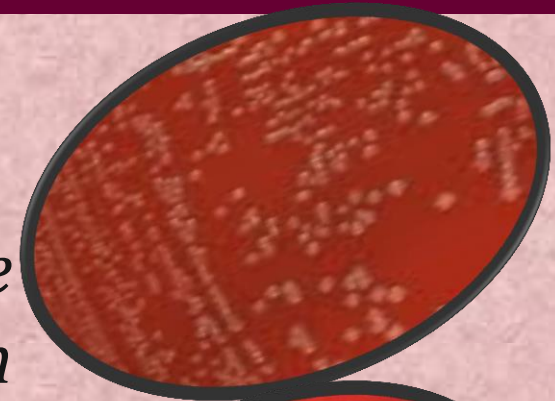
Microscopically appearance

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



Biochemical Tests

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



Susceptibility to antibiotic

- *Shigella-associated diarrhea, antibiotics shorten the length of infection, but they are usually avoided in mild cases because many Shigella strains are becoming resistant to common antibiotics.*
- *Generally, severe dysentery can be treated with ampicillin, or ciprofloxacin.*

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 $FeSO_4$*



Triple Sugar Iron (TSI) test

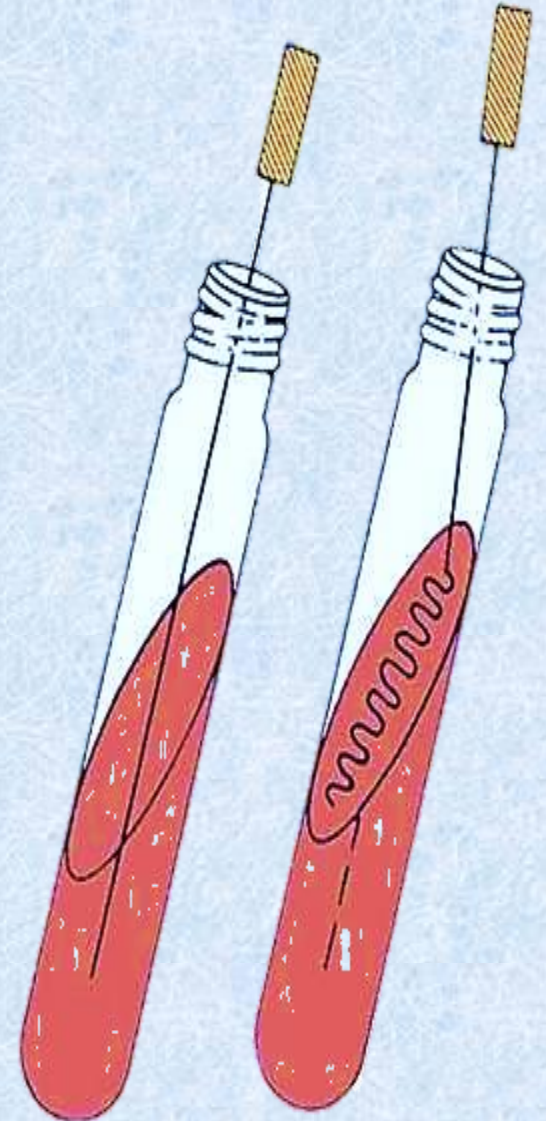
■ *Principle*

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



Result

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



Thank you

for listening



Hope you enjoy it