Enterobacteriaceae
- Klebsiella (II)
- Salmonella, Shigella (III, IV)
- Proteus & Yersinia (V)
- Citrobacter (VI)
- (VII)

www.FirstRanker.com

① Escherichia coli (E.coli).

* mostly Commensals except Diarrheogenic & Uropathogenic Coli.

(i) Diarrheogenic coli
- EIEC
- EPEC
- ETEC.
- EHEC
- EAEC.

a) EPEC – Enteropathogenic EC.

Virulence factors:

(i) Toxins : – Nil – (NON TOXIGENIC but pathogenic)

(ii) Bundle forming pili.

(iii) LEE – Locus of Erythrocyte Effacement Factor.

Clinical manifestations:

Diarrhoea in "CHILDREN"

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b) ETEC – EnteroToxicgenic EC.

Virulence factors:

Toxins.

LABILE TOXIN
* ↑ in cAMP.
(Similar to cholera toxin)

STABLE TOXIN
* ↑ in cGMP

Clinical manifestatn: Traveller's Diarrhoea

EAEC - Entero Aggregative EC.

Clinical manifestatn : TRAVELLER's Diarrhoea

Toxin : EAST - 1 Toxin.

d) EIEC (Entero Invasive EC)

Clinical : ~~Dsy~~ Dysentry (blood). → Why? invasion of tissue → blood.

Virulence factors: VMA (Virulence Marker Ag.).

↓

Responsive for ~~virus~~ INVASIVENESS of EIEC.

Toxin Demonstratn :

Sereny's Test

inoculatn of sample into Rabbit's eye

↓

Conjunctivitis.

↓

⊕ ve

Why EIEC is 111ar to Shigella ?

* both produce VMA → both Toxins can be demo. by Sereny's Test

↓

both causes invasion

↓

both results in DYSENTRY

HE: (Enterohemorrhagic EC).

* Many sero types ... but m/c pathogenic

serotype is [O157 : H7]

- O157 → Cellwall Ag. (O-Ag)
- H7 → flagellar Ag. (H-Ag).

## Clinical Manif:

(i) Dysentry

(ii) HUS - not usually but m/c cause of HUS is O157 : H7.

## Virulence factors:

Toxin: Verocyto Toxin

- ⊖ Ribosomes
- ⊖ protein synthesis

(⊖ - inhibit
HUS - Hemolytic Uremic syndrome)

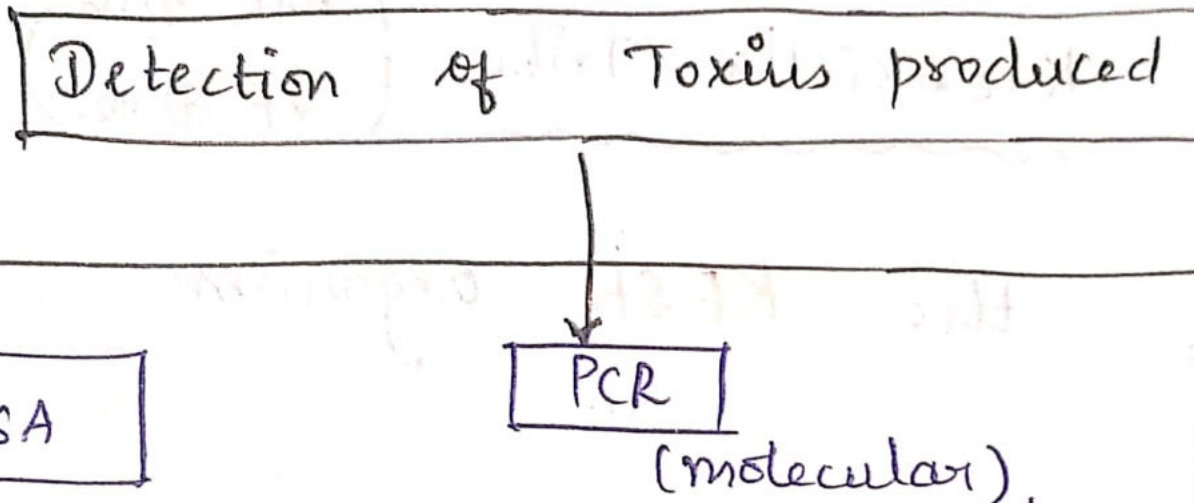
→ Similar to Shiga Toxin which also Causes HUS

## selective Media for O157 : H7

Sorbitol Mckoney Agar

- pink coloured colonies. → indicates → Sorbitol Fermentatn. → all E.coli except EHEC (O157 : H7).
- pale .... → Non fermentor of Sorbitol → (O157 : H7)

"EHEC is the only Sorbitol Non fermentor"




* immunological method
* m/c. used.

GNB: Enterobacteriaceae Tribe (MR ⊕ve, VP ⊕ve)

* consists of the KESH organisms.

| Klebsiella | Enterobacter | Serratia | Hafnia |
|---|---|---|---|
| VP+ve | VP+ve | VP+ve | VP+ve. |
| LF | LF | NLF | NLF |
| Non motile | Motile | Motile | Motile. |

Note:

Among all the GN bacteria there are only ③ LF (Lactose Fermentors). → pink color colonies

- E.coli
- Klebsiella
- Enterobacter

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Diseases caused by klebsiella

① pneumonia.

② Meningitis

③ UTI.

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ID - Identify / Identificatn

Rx - Treat / Treatment.

GNB Salmonella:

② types

| Typhoidal Salmonella | Non Typhoidal Salmonella |
|---|---|
| * Causes Typhoid fever | * causes gastroenteritis & other inf. |
| eg: S. typhi. S. para typhi A S. para typhi B. | eg: S. typhimurium |

## What is carrier state of Typhoid ?

* After recovery some pt. acts as carrier of S. typhi
* Although after recovery Ab persists & Ag disappears In some pts Ag persists even after recovery
  ↓
  These pt. release S. typhi in their secretions
  ↓
  Thus acting as a source of Transmission
* Thats why carriers should be ID & Rx properly

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## Types of Carriers:

Site of shedding of Bacilli.
- i) Urinary carriers
- ii) Stool carriers.

Time of shedding
- i) Convolescent → shed upto ③months
- ii) Temporary → upto ①year
- iii) Chronic. → > ①yr.

(i) Culture :

③ Selective Media

* XLD agar - (Xylose Lysine Deoxycholate)
* DCA agar - (Deoxycholate Citrate Agar)
* SSA - (Salmonella Shigella Agar)

} Selective for both Salmonella & Shigella

Selective medium only for Salmonella
⇓
WILSON BLAIR media

We can diff. b/n Salmonella & Shigella by
i) Colour of Colonies.
ii) Biochem Rxns.

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Note: Some Non motile salmonella are
i) S. Galenorum. ] No flagella (H-Ag).
ii) S. wilborum

All the pathogenic Salmonella mentioned before are Motile

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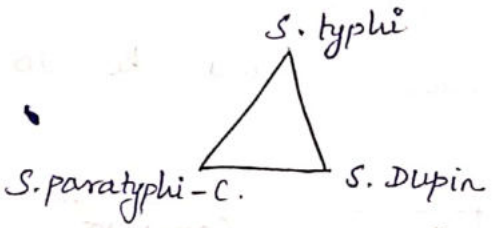
only ③ capsulated Salmonella

Capsule - Vi Ag

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Cross Reactive Ab's

* These Ab's are Non specific ie) Ab against that Ag can attack the Hlac Ag of other Spe.

* For eg: Ab. against O-Ag of Sal. Paratyphi A, B.

Immunological test (Next page - Widal's Agglutination Test)



## Ag. of Salmonella typhi

### 'O' - Ag

* Cell wall Ag. (All salmonella).
* less immunogenic
  ↓ so
  few Abs. produced by Host
  & Cross reactive.

### 'H' - Ag

flagellar Ag (All motile sal.).

* Highly ...
  ↓ so
  More Abs
  &
  Non cross reactive

### 'Vi' - Ag

Capsular Ag. (only Capsulated sal.).

* less ...
  ↓ so
  few Abs
  &
  disappears quickly (persists in Carrier state).

**Note:** ∵ Abs against 'Vi'-Ag disapp. quickly after recovery

↓

It indicates that Vi-Ag must have also disappeared.

↓

But these Abs are present in Carriers

↓

Which is indicative of presence of Vi-Ag
So, ~~their~~ Abs can be used as a Screening Test (Not Confirmatory) for Carriers of Typhi.

WIDAL AGGLUTINATION TEST:

Take ④ Test Tubes & fill it with pt's sample.

| | | | | |
|---|---|---|---|---|
| i) | ⊕ sample | ⊕ TO - Ag. (T- typhi, O→O-Ag) | ⊕ve in Sal. typhi<br>⊕ve in Sal-para A<br>⊕ve in Sal-para B. | Why? Cross reactive |
| ii) | ⊕ sample | ⊕ TH - Ag. | ⊕ve only in Sal. typhi<br>⊖ve in para | Why? Non cross react. |
| iii) | ⊕ sample | ⊕ AH - Ag. | ⊕ve only in para typhi (A). | " |
| iv) | ⊕ sample | ⊕ BH - Ag. | ⊕ve only in para typhi (B). | " |

⊗ DIAGNOSE THE CARRIERS: (individually infected)

* After recovery, ask the pt. to come for follow-up.
* Check stool & urine for shedding of Bacteria

DIAGNOSING CARRIERS IN Community (Epidemiologically)

Step ① a) Sewer's Swab Test.

* we can't check individually thats why we take a Swab from the sewage & culture it, if salmonella grows then there are carriers in locality

↓

Step ②: Now we enter the community & start screening for typhoid.

## b) Screening Test (Vi-Ab Test)

* After recovery Vi-Ab disappea
present there is a High cha
that the individual is a carrier

↓

Step 3 if an individual is screened fo
then he/she should be confi

## c) Confirmatory Test - Urine/stool cu

↓

Demonstratn of Ag in stool/u
Carrier sheds the Ag in stool