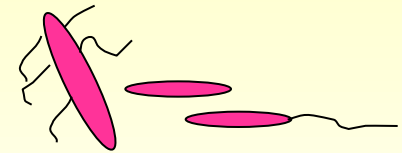


# Enterobacteria



**G**-rods, facultative anaerobe, O (body), H (flagellate), K (fimbrial) antigens, many are comensals in intestine but some are potential pathogens

**Factors of virulence:** Endotoxin, fimbrias, exotoxins

**Lab. detection:** cultivation on **BA/Endo**, chromogennous media, biochemistry (enterotest), antigennous analysis, in addition to intestinal infections we also do ATB susceptibility testing

**Transport:** often fecal-oral

**Therapy:** cefalosporins, fluoroquinolons, aminopenicillins, carbapenems etc.

# Yersinia

## **Y. pestis**

immobile

Causes 3 forms of pest:

1. bubonic pest (hit only regional lymphatic nodes)

Transducer: flea *Xenopsilla cheopis*,

2. pulmonary form - aspiration of the dust by ill-nursing

3. septic form



## **Y. enterocolitica**

apendicitis-like syndrome, growth on **CIN medium in cold, urease+**

# *Salmonella* sp.

## *Salmonella typhi*

septic fever and headache, pink spots on the skin, alive in gallbladder

**Detection:** direct – from blood and urine, agglutination, indirect – Widal reaction proof of antibodies

**Therapy:** fluoroquinolons, chloramphenicol, cholecystectomy in vectors is used

## Primary zoonopathogenous salmonellas (*S. enteritidis* etc...)



**Biochemistry:** production of H<sub>2</sub>S (hydrogen sulfide), disunite mannitol

**Cultivation and detection:** lactosis negative colonies on ENDO, on XLD/MAL/DC - black colonies, agglutination, multiply in selenite broth

**Pathogenicity:** diarrhea

Source: domestic birds, eggs, salad cream, ice...

**Therapy:** ATB are not indicated, we use sauerkraut, yogurt, keep hygiene rules

# Genus *Shigella* (*Sh. flexneri, sonnei, boydii, dysenteriae*)

immobile, causes watery diarrhea with tenesm, blood in stool  
Epidemics from water sources – camps, social care institutions

**Therapy:** fluids

## *Escherichia coli*

Saprophyte in intestine, pathogenic ones are only these, with specific factors of virulence, these are divided into groups:

**EPEC (enteropathogenic)** - diarrhea in children to 2 years, serotypes like O55, O126  
// known as Pharaoh revenge

**ETEC (enterotoxigenous)** – cause travel diarrhea

**EIEC (enteroinvasive)** – bloody diarrhea

**VTEC/EHEC (verotoxigenous, enterohemorrhagic)** – intestinal bleeding, hemolytic-uremic syndrome. Most common serotype O157

Out of intestine can cause urinary tract infections, wound infections etc.

**Diagnostic:** growth on **ENDO** -typical metal shine, **lactose positive**, form **indol**, **pyr** test negative, agglutination is needed in special cases

**Therapy:** susceptible to many antibiotics including ampicillin

## Genus *Enterobacter*

Mobile

resistance to ampi,  
cefalosporins I. and II. gen.

Urease -

## Genus *Klebsiella*

immobile

res. only to ampicillin

urease +

Pathogenicity: similar: urinary infections, pulmonary infections, sepsis, ability to form extended spectrum  $\beta$ -lactamase (ESBL)/ AmpC

Therapy: carbapenems, aminoglycosides

## *Serratia marcescens*

Nosocomial infections, heteroresistance to colistin

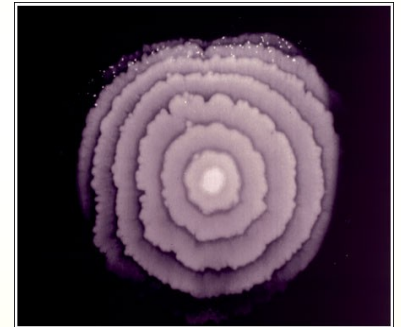
## *Genus Proteus*

**Cultivation:** crawl in waves on medium - Rouss phenomenon

**Biochemistry** active, smell, **urease +**, in addition to *P. mirabilis* form indol

**Pathogenicity:** wound/urinary infections

**Therapy:** primary resistance to nitrofurantoin and colistin



## *Genus Citrobacter*

looks like salmonella, can form **black** colonies on **XLD**, **ONP+** and **PYR test+**

# G- micro-aerophile rods

*Campylobacter jejuni* 

**Microscopy:** G-bent rods

**Cultivation:** spec. medium with carbon  
Grey colonies with metal shine  
cultivation via 42°C 48 hours

**Biochemistry + resistance:**

oxidase, catalase

Resistant to cefalotin

Susceptibility to nalidix acid

**Pathogenicity:** diarrhea

**Therapy:**

without therapy/hard infections - macrolides

*Helicobacter pylori* 

G-curved rods

2 media: Thayer-Martin medium + control medium  
little transparent colonies like haemophilus  
5 day cultivation

oxidase, catalase, urease

**S** to cefalotin

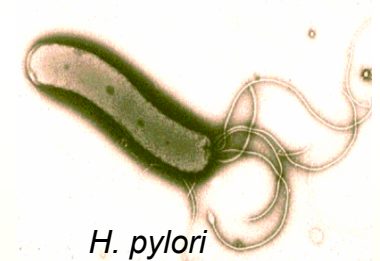
**R** to nalidix acid

gastritis to gastric ulcer

3kombin.

amoxic.+metronidazol+bismut

amoxicillin+claritromycin+omeprazol



# Genus *Vibrio*

Live in water, better grow in presence of NaCl (halophilic) + grow also in alkaline pH, susceptible to vibriostatic compound, after drop of deoxycholate sodium form string (string test), oxidase

## *V. cholerae*



**Microscopy:** G- curved rods, with flagellum

Due to O antigen we distinguish 155 serotypes. Most common are O1 (El Tor and classic type), O139, non O1/O139 - NAG (nonagglutinable) vibria

**Pathogenicity:** diarrhea looking like rice soup, vomiting

**Therapy:** rehydration + chloramphenicol

**Diagnostic:** cultivation on TCŽS agar - green colonies, membrane in alkaline pepton water, detection of serotype with help of the agglutination

## **Other vibria**

Cause diarrhea, wound infections

## **Rod *Aeromonas***

negative string test

Not susceptible to vibriostatic compound

Cause diarrhea, on TCŽS form yellow colonies