

GRAM NEG. BACILLI

- ENTEROBACTERIA

- These are Enterobacteria
- Inhabit colon and Female genital tract.

ANTIGENS: O = LPS K = Capsule H = Peritrichous Flagella

* ~~EA~~ They may have Enterotoxin (LPS), Enterotoxin and/or Exotoxin

* VIRULENCE - via Pathogenicity Island on chromosome encoding pathogenic proteins
- Can have Type III secretion has needle structure to secrete right into a cell's cytoplasm.

E. COLI * most common enterobacteria

PILI → Type I (common) Pili binds to D-mannose on epithelial cells

Specialized Pili = P-pili binds to UROEPITHELIAL cells + Erythrocytes that have Gal-Gal moiety.

* TOXINS: ① α-hemolysin - a cytotoxin, ② Shiga toxin - AB toxin prevents protein elongation (cell death) ③ LABILE TOXIN (LT) - an AB toxin - causes Electrolyte + Fluid secretion into Bowel lumen ④ Stable Toxin (ST) - same as LT.

INFECTIONS UPEC - uropathogenic E. coli - uses P-PILI to create UTI - source is Perineal Flora (Wiping back to front)

ETEC - (enterotoxigenic) - traveller's diarrhea - LT/ST causing Fluid excess - leading cause of death in < 2yr olds in developing countries Watery

EPEC - (Enteropathogenic) - Attachment + Effacing - small intestine = Watery diarrhea.

EIEC - (Enteroinvasive) - Shiga toxin / Bloody DIARRHEA

* EHEC - (Enterohemorrhagic) - Shiga toxin + A/E lesion - Bloody Diarrhea O157: H7
- can create circulating Shiga Toxin (bacteremia / life threatening).

EAEC - (Enterocytotoxic) - forms Biofilm on Intestine Watery Diarrhea.

* SHIGELLA → No Flagella (no H antigen) → SHIGELLOSIS = dysentery (diarrhea + ^{Blood + Pus} RBC + WBC)

- Fecal-oral spread, Doesn't take much to infect (< 200 dosage).

- can pass through stomach (acid resistant)

- Inject Invasion Plasmid Antigens (IPA's) into cells = cytoskeleton rearrangement for endocytosis, apoptosis,

- No A/E lesion

SALMONELLA - salmonellosis → Gastroenteritis - from contaminated poultry - abdominal pain, nausea, vomiting, diarrhea 3-4 days
→ Typhoid Fever - Fecal-oral → invade + Kill M-cells + Macrophages, can cause bacteremia.

* YERSINIA: Y. Pestis = Plague, Y. pseudotuberculosis, Y. enterocolitica.

- cause Gastroenteritis mild to severe symptoms. Invades M-cells (INVASIN, YOP'S)

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VIBRIO Cholerae - motile curved rods w/ single polar flagellum.

- Cholera toxin - AB toxin - No invasion, mucosa unaffected but causes the small intestine to lose liters of fluid. - Most dramatic watery diarrhea.
- Source = contaminated water + sea food

CAMPYLOBACTER jejuni - motile curved rods w/ polar flagella.

- most common cause of GI infection in developed countries
- Slow growing. Abdominal pain, diarrhea (watery or dysenteric)
- Contaminated food, animal contact
- ~~Very resistant to antibiotics~~

Pseudomonas aeruginosa - aerobic, motile w/ single flagella, produces colorful pigments

- very resistant to antibiotics, produce alginate slime layer, Exotoxins
- Elastase - attacks elastin in lung + blood vessels = hemorrhagic destruction
- usually seen in immune compromised or debilitated (burns, Cystic Fibrosis)
- CF pt's have defect in lung cilia - tougher to clear the pneumonia.

HELICOBACTER pylori - H pylori implicated in ulcer in stomach - persists for decades.

- curved rod w/ polar flagella, slow growing, microaerophilic
- generates ammonia to ↑ pH, other toxins (Vac A) cause cell death/ulceration.

HAEMOPHILUS Influenzae - smallest bacteria, needs blood products to grow

- normal nasopharyngeal flora, capsulated strains virulent
- can create purulent meningitis in babies, pneumonia, epiglottitis.
- No Exotoxins, Vaccine against Hib (most virulent) reduces disease

BORDETELLA Pertusis = whooping cough - virulence factor is pertussis toxin

LEGIONELLA pneumoniae - cooling system aerosol distribution, facultative intracellular pathogen

- multiplies in alveolar macrophages
- Legionellosis = Legionella inhaled - destructive pneumonia w/ fever, chills, cough etc.

1980's - get vaccine after 2 yrs
1990's - get vaccine at 2 mo.