Enteric Bacteria

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Enteric Bacteria


- **Opportunistic Pathogens/Obligate Pathogens**: Enterotoxins, Endotoxins, Capsule, Flagella.

- **Coliform Group**:

  **Diarrheagenic E coli Strains**: Enteropathogenic (Infants), Enterotoxigenic (Heat-Labile/Stable Enterotoxin). Watery diarrhea Children/Adults. Travelers. Contamination Water/Vegetables / Fresh Food. Self-limited
E. coli Culture — Red color on MacConkey agar indicates Lactose positive & Gram-stain
Coli-form Bacteria

2. **Klebsiella-Enterobacter species**: UTI, Septicemia, Wounds.. Rare Meningitis.. Common Hospitalized patients. *K. pneumoniae*.. Nosocomial infections..Pneumonia

3. **Proteus-Providencia species**: UTI, Septicemia, Wounds.. Common Hospitalized patients.

4. **Pseudomonas aeruginosa & Pseudomonas group**. Several Enzymes & Toxins.. Common Water Environment, Vegetations, Disinfection Solutions, Wounds, Burn.. Blue Green Pus, External Otitis Media, Septicemia, Pneumonia, UTI, Nosocomial Infect, Mutlidrug Resistance..

**Diagnosis**: MacCokeny -Blood Agar.. CLED, Biochemical Tests.
E.coli-Flagella-Fimbriae-Pili
Klebsiella pneumonia-Capsule
Salmonella group

- Gram-ve bacilli.. Facultative Anaerobes.. Lactose-negative, Endotoxin/LPS.. common in Nature.. Humans, Animals, Birds.. O/H- Antigens..Specific antibodies

- **Salmonellosis:**

- **1-Gastroenteritis /Food-poisoning Salmonella:** *S. enterica/ enteritidis*. 2000 Serotypes.. Common Birds, Farm Chickens, Pets.. Contamination.. Food-poisoning.. Chicken Meat-Eggs, Water.. Fecal-Oral Infection.. Incub. 8-24 h.. Mild-Severe Diarrhea, Vomiting, Fever.. Self-Limiting.. Adults Rarely Septicemia-Meningitis Infant/young Children.. Immun-deficient Patients
V. cholerae – Salmonella/ Flagella
Hekton—Enteric agar for Isolation of Salmonella (E.coli-Salmonella growth)
Typhoidal Salmonella

- Lab Diagnosis: Culture Feces, Food.. S-S Agar, Hekton-enteric agar. Prevention.. Control Sanitation & hygiene..

2- Typhoidal Salmonella: Human Enteric Fever.. Salmonella enterica /typhi & paratyhi A, B, C.. Invasive, only human,Fecal-Oral, Human Healthy Carriers.. Water-Food.. Incub. 1-3 Weeks.. high Fever, Diarrhea, Septicemia, Meningitis, hepatospenomegaly, Intestinal Perforation.. Healthy Carriers.. Gallbladder.. Intestine.. Short/Life Long

- Lab Diagnosis: Culture Feces, blood, Urine, CSF, Selective Media.. Serological **Widel Test** for detection of specific antibodies against O & H antigens ( Titer > 160)
Antibiotic, Human vaccine available.
Shigella group

- **4- Shigella species**.. Endo/Enterotoxins.. Lactose-negative, Susceptible to Dryness, Acid, Low-High Tempt. Fecal-Oral infection.. Water, fresh Vegetations, Few serotypes.. Incub. 1-2 Days.. Common *S. Sonnei, Sh.boydii* .. Purulent-Bloody-Diarrhea..not invasive

- **S.dysenteriae**.. Enterotoxin /Neurocytotoxin...., Necrosis, Fever, Severe Purulent-Bloody-Diarrhea Abdominal Cramps, CNS.. Rare Septicemia.

- **Lab Diagnosis:** Feces Culture.. S-S Agar, Hecton —Enteric Agar.. Recommended Antimicrobials Treatment .. **Control Sanitation & hygiene.**
Vibrio cholerae

• Gram-ve Vibrios.. Aerobic Growth.. Alkaline Medium (pH >8-9).. Water.. Fresh Food.. Reservoir human & water. Endemic In India/Bangladesh.. Epidemic Disease, Causeing human Outbreaks.

• V. cholerae-01: Type V. cholerae El-Tor.. Only Human.. Fecal-Oral Infection.. Raw Sea/ Fresh Foods, Small Intestine Infect. Cholera-enterotoxin, Incub. 8-48 h.. Severe Water Diarrhea-Dehydration.. Shock.. Death..

• Lab Diagnosis: Feces Culture.. Selective TCBS agar.

• Treatment: Replacement Fluids & Electrolytes.. Antibiotic.. Public Heath Measurements.. Human Vaccine.
Cholera

1. Entry

3. Disease
   - Hypovolemic shock
   - Acidosis
   - Vomiting
   - Diarrhea
   - Muscle cramps

2. Colonization

4. Exit (in one to many liters of fluid per day)
TCBS agar for isolation of V.cholerae/Salmonella–Shigella agar (Lactose-negative)
Brucella species

- **Brucellosis/Malta Fever**: Gram-ve coccobacilli.. Intracellular, Endotoxins.. Primarily pathogens of Animals (causing Zoonosis), Localized Infection in animal reproductive Organs,Sepsis, Abortions.
- **Br. abortus** (Cattel), **Br. melitensis** (Goats/Sheep).
- **Human Brucellosis/Malt Fever**: Mostly Br. melitensis.. Rare Other species in Jordan.
- **Transmitted to Humans**: Unpasteurized Milk/Milk Products.. Cheese, Direct Animal Contact.. Few Cells Enter Through GI, Skin Abrasions, Eye, Inhalation/Droplets.. Intracellular ..Lymphatic System.. Septicemia, Meningitis, Chronic disease..long life
Brucella-2

- **Clinical Features:** Incub. 1-6 Weeks.. Intermittent fever, headaches, fatigue, joint and bone pain, GI Symptoms, Sweats, Back Pains, Acute- Subacute-Chronic Infections.

- **Common Complications**.. Arthritis, Meningitis-CNS, Osteomyelitis, Localized Lesions in any body part.

- **Lab Diagnosis:** Culture Blood, CSF, Bone marrow (Chronic Infection)..<br>   Brucella agglutination Test..<br>   Specific Antibodies

- **Treatment:** 6-8 Weeks with Antimicrobial drugs

- **Prevention:** Control Brucella in Animals by slaughtering infected animals, Vaccination, Pasteurization Milk/ Milk Products
Campylobacter Species

- *C. jejuni* is Gram-negative slender, curved, motile rod, Grow Microaerophilic.. Optimal growth 42 C.
- This bacterium became important enteric pathogen since 1976..widely spread in small animals.. Birds
- It is primarily an animal pathogen causing abortion and enteritis in sheep and cattle.
- *C. jejuni* infection causes mild-moderate diarrhea, Children.. watery or sticky, contain blood, fecal leukocytes Other symptoms often present are fever, abdominal pain, nausea, headache and muscle pain.
- The illness usually occurs 2-5 days after ingestion of the contaminated Chicken Meat, Milk, food water.
- Diagnosis: Stool culture .. Selective Capylobacter Media including 3 antibiotics.
Helicobacter Species

- **Helicobacter pylori** is a spiral shaped bacterium that lives in the mucus lining Pyloric interim-stomach and duodenum. Cytotoxin, Only pathogenic in human.

- The stomach is protected from its own gastric juice by a thick layer of mucus that covers the stomach lining.

- The bacteria are found worldwide, where up to 10% of children - 80% of adults can have evidence of an *H. pylori* infection - usually without having any clinical signs or symptoms.

- Transmission route. Close personal contact, less other sources.
Helicobacter

Gastric Ulcer

Blood Vessel

Ulcera

Duodenal Ulcer

Lining
Helicobacter Species-2

- **Common symptoms**: gastritis or peptic ulcer / Stomach, duodenal ulcers disease, burning Abdomen, Pain, Nausea, Vomiting.
- Persistence of ulcers .. development of Stomach Cancer and Lymphoma.
- **H. pylori** can be successfully eradicated (95%) using a combination of certain antibiotics and medicines that suppress stomach acid production. Common Re-occurrence within few weeks-months.
- Diagnosis: Urea Breath Test, Culture Stomach Biopsy, Selective Medium, 42C, Specific **H. pylori antibodies** not significant alone.