

Enteric Bacteria

Prof. Dr. Asem Shehabi

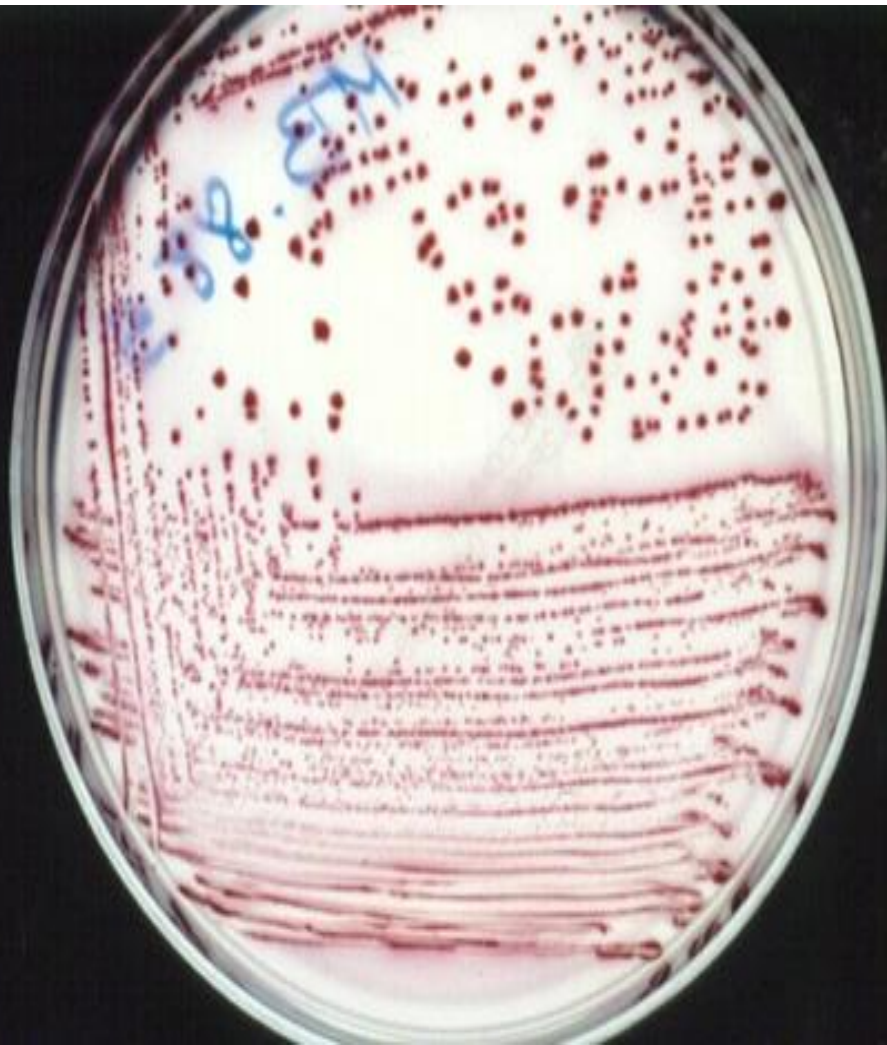
Faculty of Medicine

University of Jordan

Enteric Bacteria

- **General Characteristics**: Gram-ve Bacilli, Facultative Anaerobes, Intestinal Normal Flora.. Humans, Animals, Birds.. Common Waste water, Natural Water, Soil, Vegetation.
- **Opportunistic Pathogens/Obligate Pathogens**.. Enterotoxins, Endotoxins, Capsule, Flagella.
- **Coliform Group**:
 1. **Escherichia coli**: Urinary Tract Infect (40-70%)..Single Organism, Septicemia, Meningitis, Wounds.
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

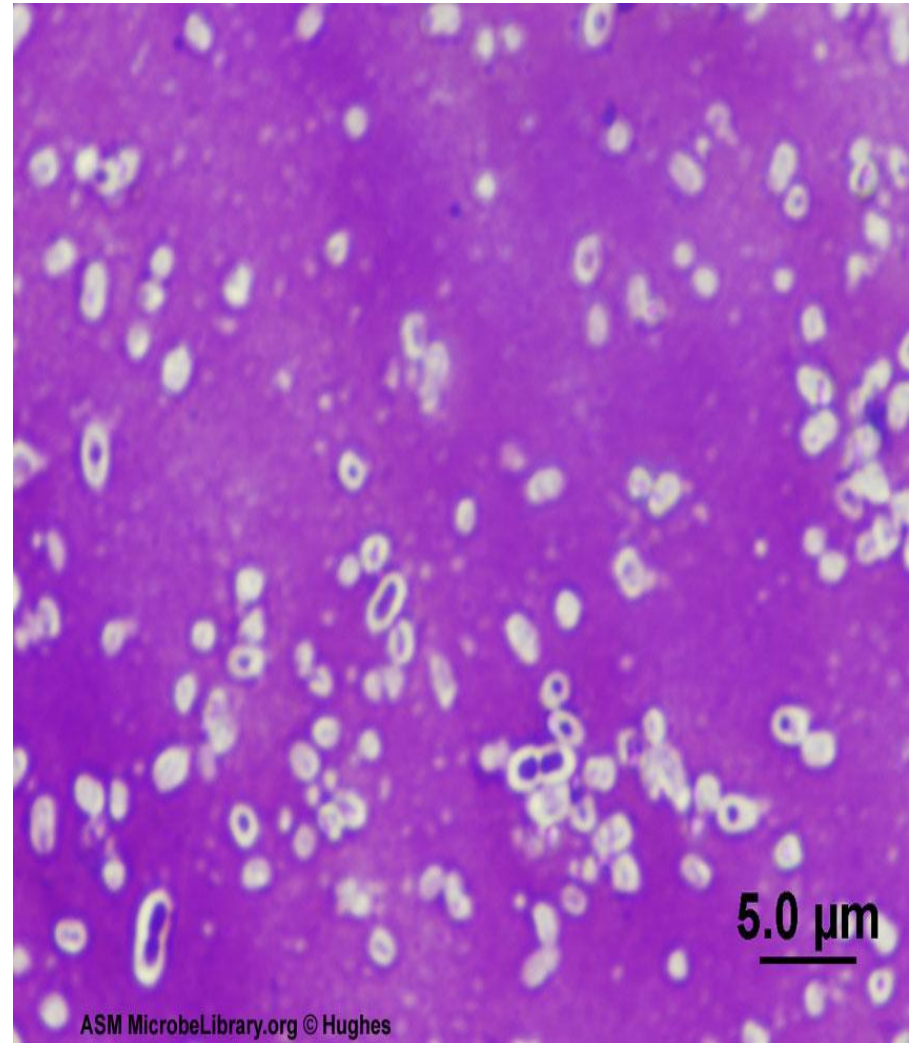


Coli-form Bacteria

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 pneumoniae-Capsule



Salmonella group

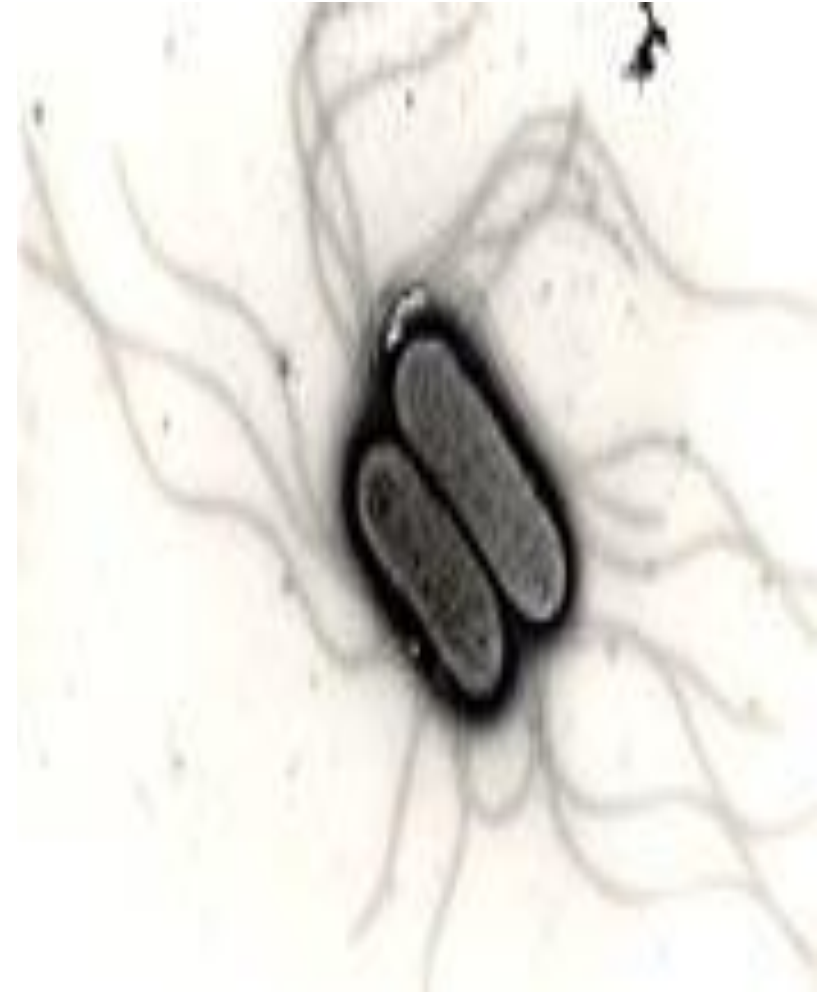
- Gram-ve bacilli.. Facultative Anaerobes.. Lactose-negative, Endotoxin/LPS.. common in Nature.. Humans, Animals, Birds.. O/H- Antigens.. Specific antibodies

- 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-difficiant 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 & paratyphi A, B, C.. Invasive, only human, Fecal-Oral, Human Healthy Carriers.. Water-Food.. Incub. 1-3 Weeks.. high Fever, Diarrhea, Septicemia, Meningitis, hepatosplenomegaly, 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.

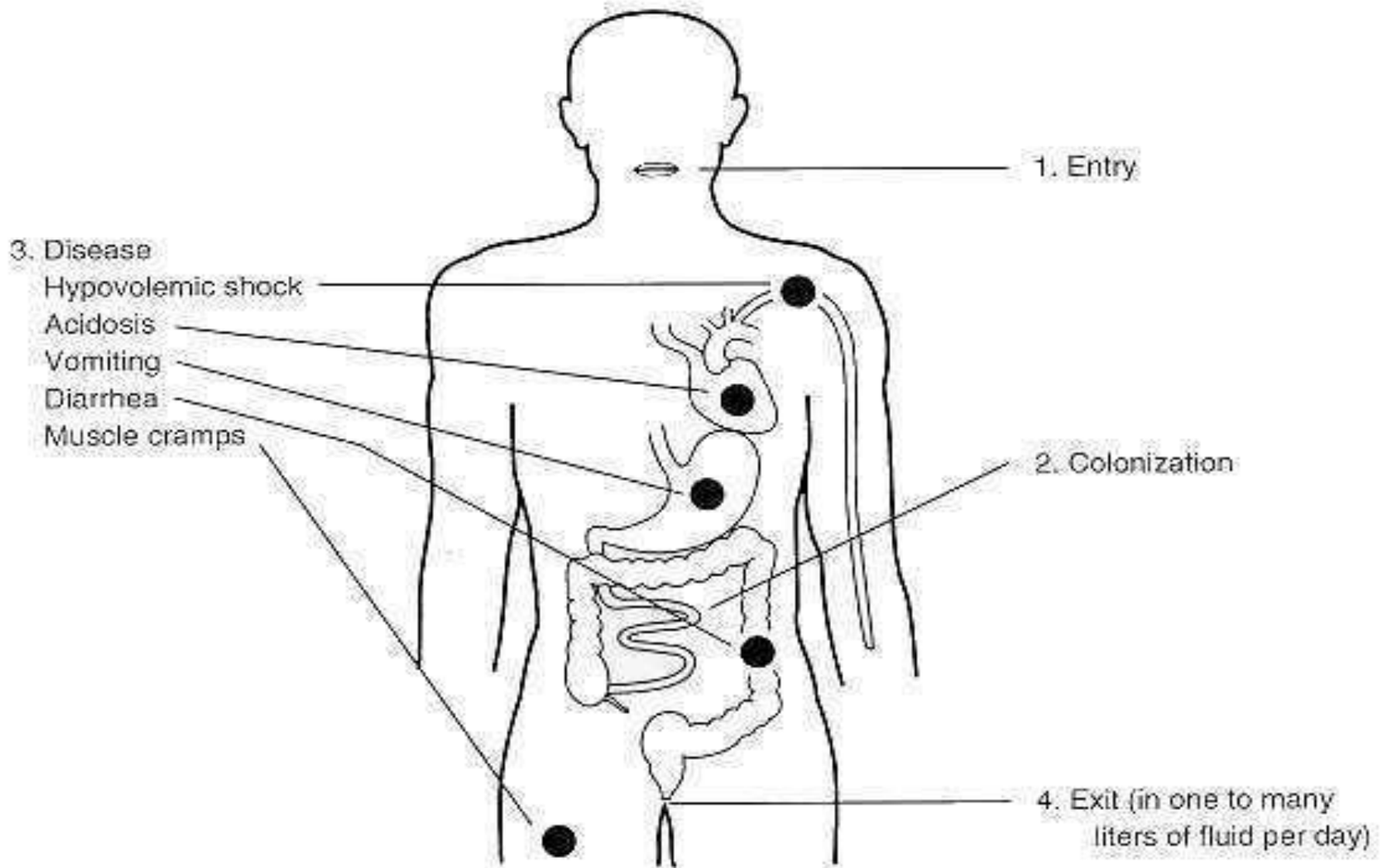
Shigella group

- 4- *Shigella species*.. Endo/Enterotoxins.. Lactose-negative, Susceptible to Dryness, Acid, Low-High Temp. 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.**

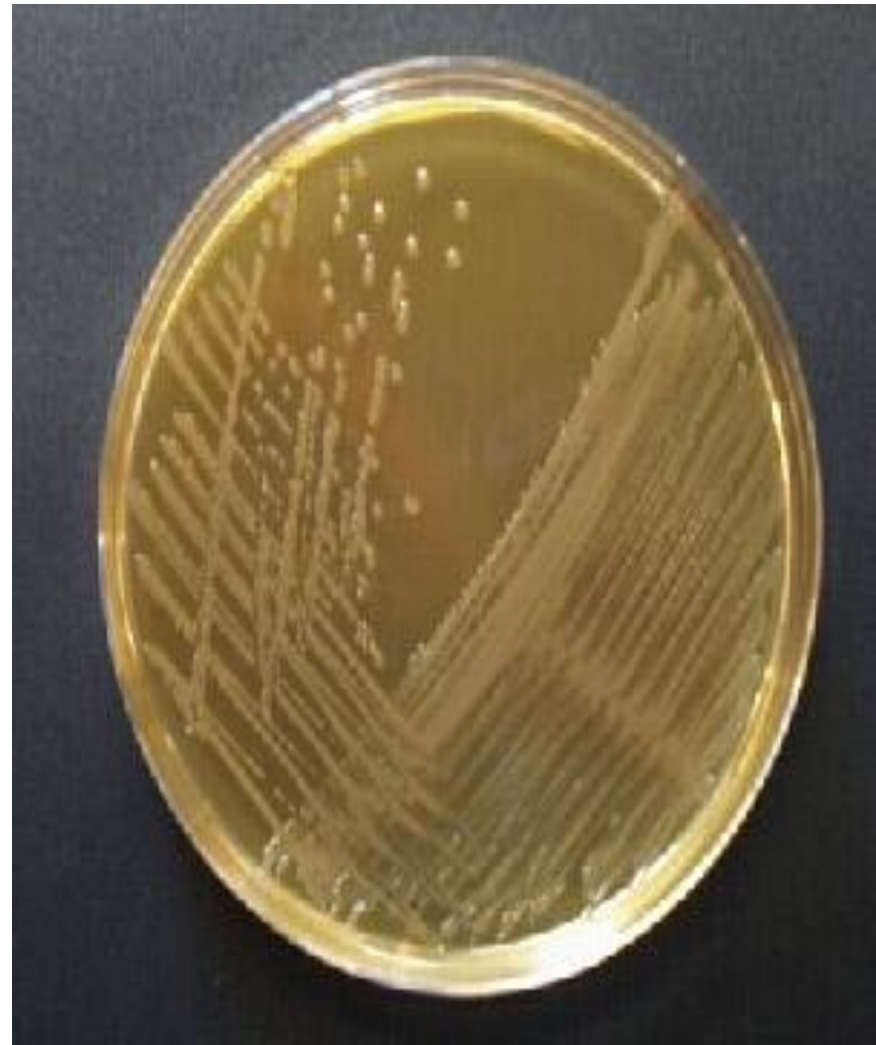
Vibrio cholerae

- Gram-ve Vibrios.. Aerobic Growth.. Alkaline Medium (pH >8-9).. Water.. Fresh Food.. **Reservoir human & water.** Endemic In India/Bangladesh.. Epidemic Disease, Causing 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 Health Measurements.. Human Vaccine.

Cholera



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).. Brucella agglutination Test.. Specific Antibodies
- **Treatment:** 6-8 Weeks with Antimicrobial drugs
- **Prevention:** Control Brucella in Animals by slaughtering infected animals, Vaccination, Pasteurization Milk/ Milk Products

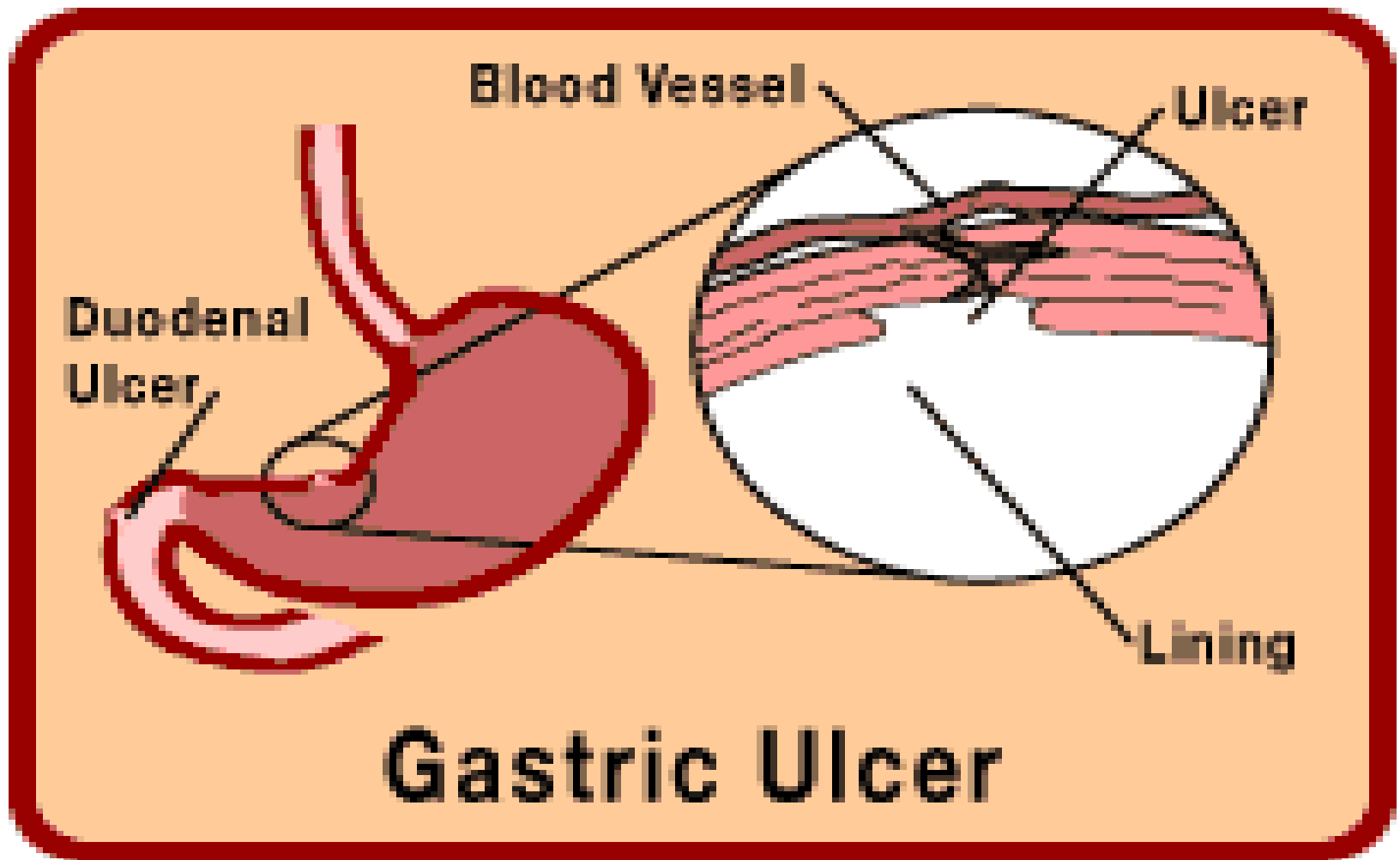
Campylobacter Species

- *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



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 BreathTest, Culture Stomach Biopsy.. Selective Medium.. 42C, Specific *H. pylori antibodies* not significant alone.