



# Microbiology

Slide #: 6

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Sheet  Slide

***The Jordan University-Faculty of  
Medicine***

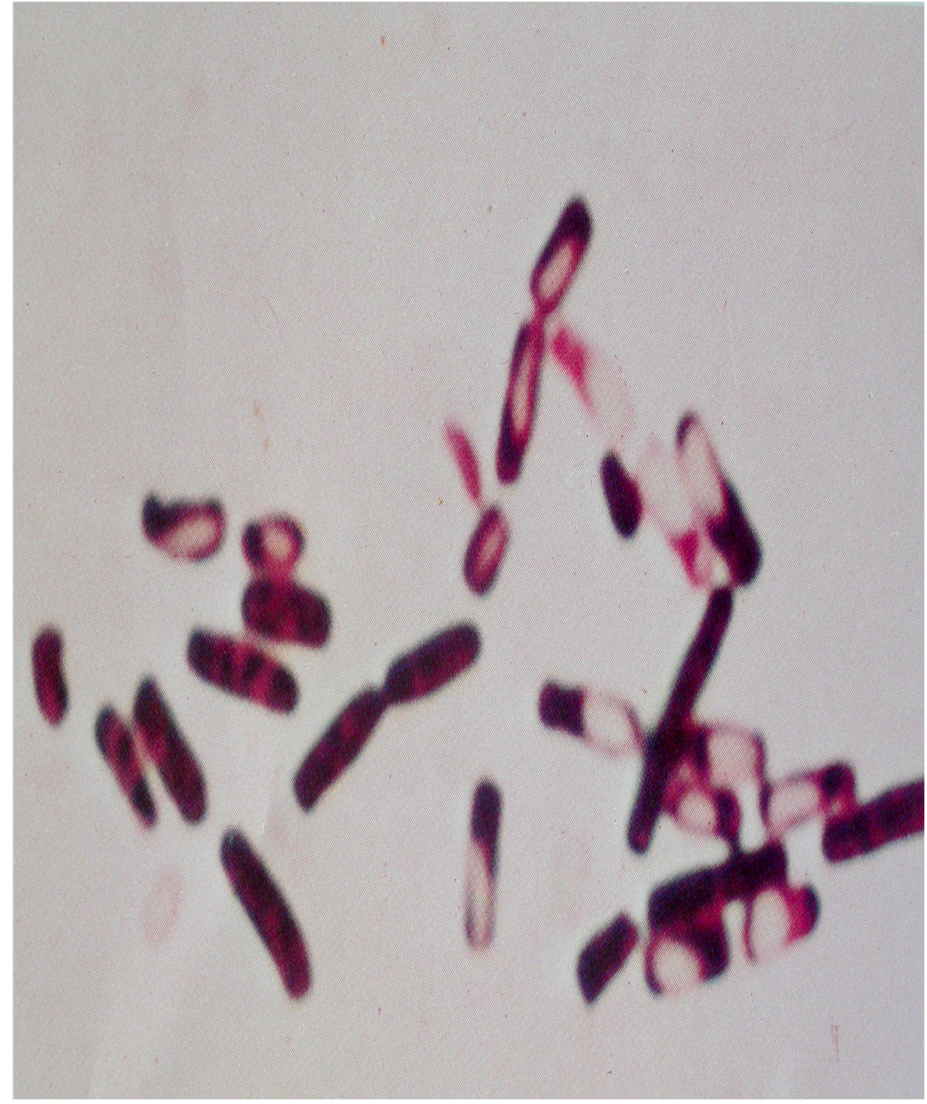
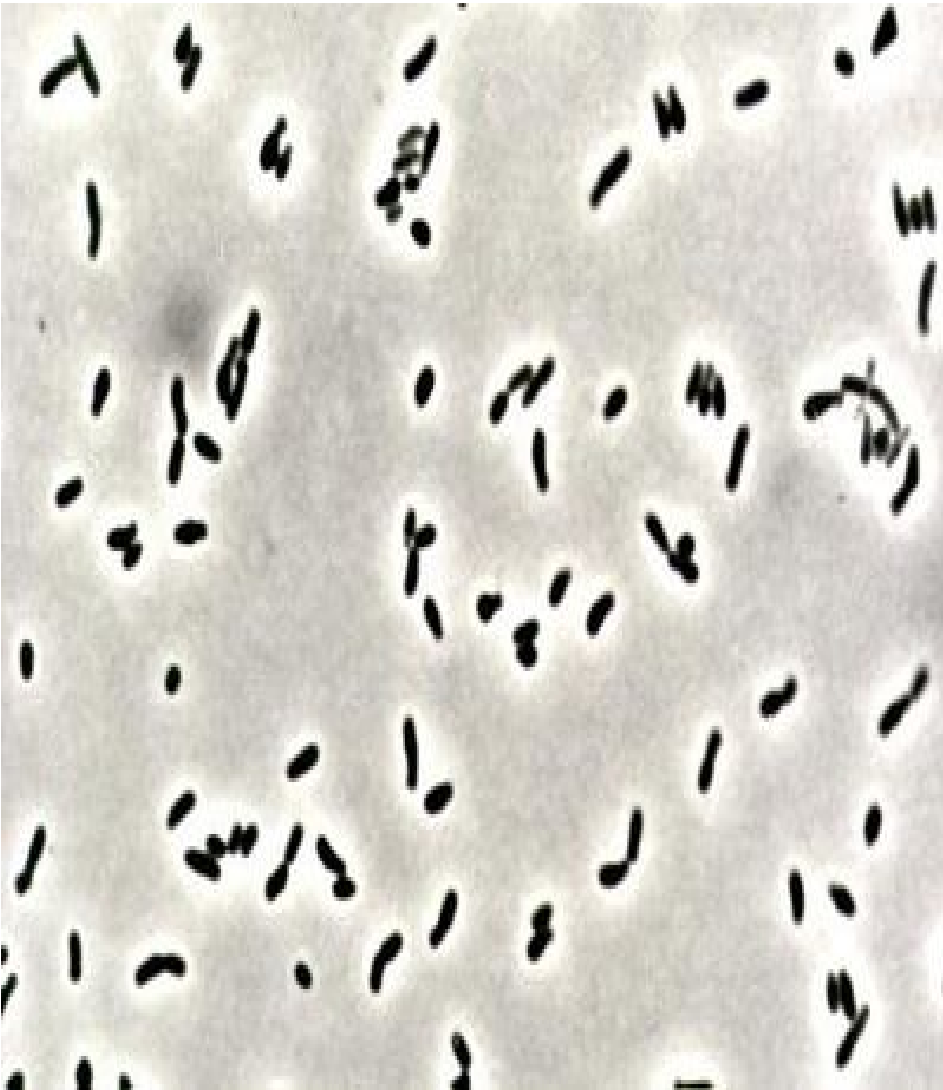
**Gram-Positive Bacilli**

Prof. Dr. Asem Shehabi and Dr. Suzan  
Matar

# Corynebacteria Group

- Gram-positive Pleomorphic Bacilli.. Diptheroides.. Aerobic, Normal Flora.. Respiratory, Urinary tract, Skin.. Mostly nonpathogenic in healthy conditions.
- Corynebacterium diphtheriae: Highly infectious & Human pathogen .. Spread by droplets by carriers/ Clinical cases , Mostly children.. Severe sore throat .. Inflammation Throat-Pharynx-Larynx.. Diphtheria Toxin.. Necrosis Liver, heart. Toxin gene carried on bacteriophage.. Lysogenic strains.. High Fatality without antibiotics treatment.
- Prevention: Diphtheria Toxoid (Triple Vaccine, DTP) . Three doses 2-4-6 age months children.
- Lab Diagnosis: Albert's stain direct smear & Throat culture.. Tellurite Blood Medium.. Toxin test to confirm *C.diphtheria* toxic isolates.. Early antibiotic treatment.

# Corynebacteria-Bacillus species



# Spore Forming Bacilli

- **Gram+ve Spore-forming small/Large Bacilli ..**  
Aerobic/Anaerobic.. Survive long period in dryness.. Resist boiling temperature..Common in nature.. Soil, Dust, Vegetations, Human /Animal Intestines, Feces & Water.. Mostly Saprophytes..Putrefaction of organic compounds.. Few Pathogenic species causing disease in humans/Animals. Rapid growth 24-48h
- **Aerobic Bacilli Group:**
- **Bacillus cereus**: Easily contaminated Food ( Rice, Meat, Fish, Dairy products).. **Heat-stable Enterotoxin**.. Food-poisoning: Incubation Period.. 1-24 Hrs, Vomiting & Diarrhea, No Fever..No Need for Antibiotic..Very rare invasive infections.

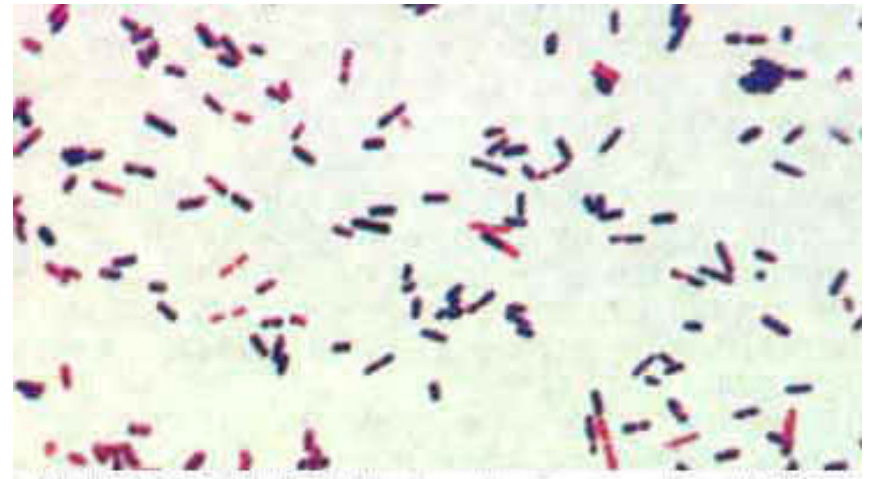
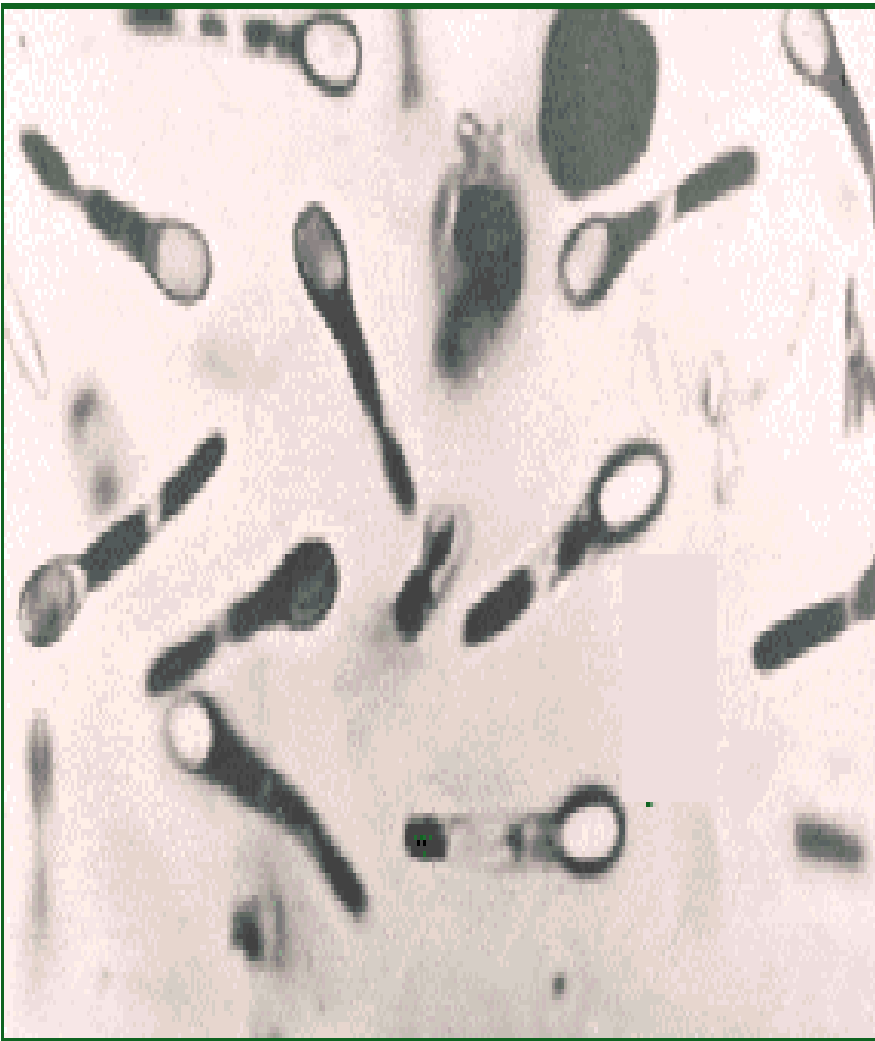
# Aerobic Bacilli

- *B. subtilis*: Opportunistic Pathogen.. Wound infect , Sepsis.. Mostly infants, Immunocompromised patients.
- *B. anthracis*: Common cause of intestinal fatal disease in animals..less humans.. Polypeptide capsule.. Other potent virulence factors.. Human Cutaneous Anthrax- chronic Lesions. **Treatment**: Surgery & antibiotics
- Inhalation *B. anthracis* spores causes **hemorrhagic Pneumonia & Septicemia**, High mortality , Biological War Agent.
- **Lab Diagnosis**: Culture Specimens, Skin Ulcer.. Rare Blood / Sputum .. Culture on Blood & Chocolate Agar.

# Clostridia-1

- **2- Anaerobic Clostridia Group**: Spore forming bacilli.. Exo-Enterotoxins.. Heat-Stable /Labile .. Exo-& Endogenous Infection.. High Fatality without Treatment.
- **Clostridium tetani**: Tetanus highly fatal disease .. Without treatment .. Localized infection/-Surface-Deep Tissue injury ..Release potent neurotoxin binds to the neurons CNS (**Tetanus toxin / tetanospasmin**), produced by vegetative cells grow in necrotic tissues under anaerobic conditions.
- ***Cl.tetani*** multiplies locally and symptoms appear remote from the infection site.. Toxin causes spasm in face & jaw ..Overall body muscle spasm ..Respiratory & heart failure..Rapid death
- Treatment: Surgical Debridement.. Antibiotics.. Tetanus Vaccine.
- Lab Diagnosis: Aspirated specimens from damaged Tissues.. Direct Gram-stain.. Culture on Anaerobic-blood & chocolate agar

# Clostridium tetani- *Cl.perfringens*

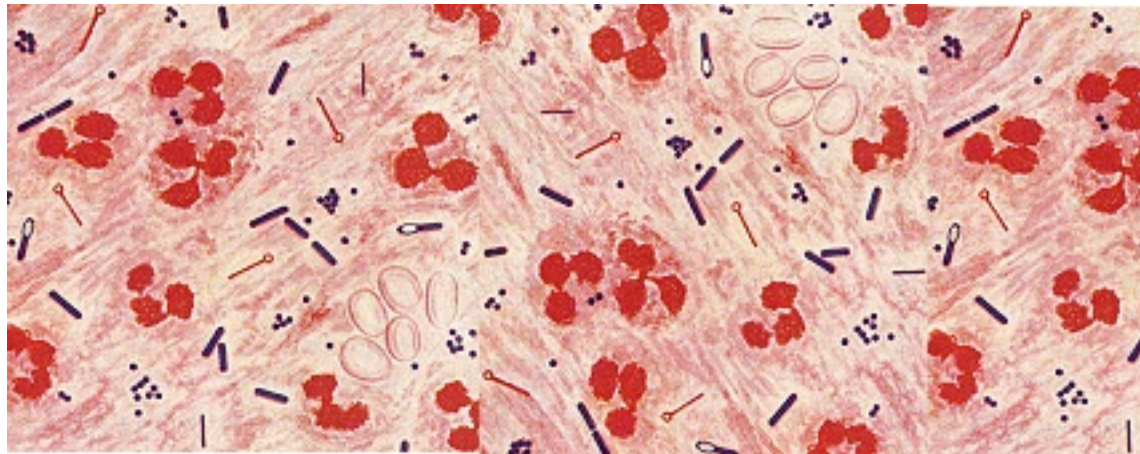




# Clostridia-2

- **Clostridium perfringens & Others Species:** Toxigenic & Invasive .. Endo or Exo Infections..May be infect intestines.. Release various Toxins & Enzymes /virulence factors .. Collagenase, Hyaluronidase
- Infection due to contamination deep wounds..multiplication in damaged tissue causing Gasgangrene – Myonecrosis - Cellulitis.. Septicemia
- **Treatment: Surgical Debridement/ Amputation & Antibiotics**.. No Preventative Vaccine
- A common cause of Food-Poisoning.. food (meat) or intestine.. Enterotoxin . Incub 6-24 Hrs, Intense watery diarrhea abdominal cramps.. No Fever
- **Lab Diagnosis:** Culture specimens.. Aspirated fluid Wound/Blood .. Gram-stain , PCR detect toxins.

# Wound Infection with Mixed Clostridia & Other Bacteria



# Clostridia-3

- *C. botulinum* : Food-borne botulism is **intoxication** .. Ingestion of foods contain preformed toxin.. Heat-stable exotoxins..destroyed at 20min /100C.
- Contamination Canned food.. Meat, Fish, Beans.
- Botulism: Clinical symptoms begin 8-36 hours after toxin ingestion with weakness, dizziness, dryness mouth, Nausea, Neurologic features.. blurred vision, inability to swallow, difficulty in speech, weakness of skeletal muscles and Respiratory paralysis.. Inhibition the release of the neurotransmitter acetylcholine.. No Fever..Now rare cases.
- Diagnosis & treatment: Clinical features.. Difficult to detect toxin/bacteria.. Antitoxin serum treatment, Support therapy..High fatality.

# Clostridia-4

- *Clostridium difficile*: Part flora human intestines, 20 % carriers .. Endo-infection/ Common Nosocomial infection.. Following long antibiotic usage
- Produces two toxins: Toxin A is enterotoxin .. causes fluid accumulation in the Intestines .. Toxin B is an extremely lethal (cytopathic) toxin.
- Pseudomembranous Colitis.. Bloody Diarrhea.. Antibiotic associated diarrhea.. After treatment with Amoxicillin, Lincomycin-Clindymicin, Cephalosporines) Fatal.. Stop usage offending antibiotic.. Replace by Metronidazole or vancomycin
- Lab Diagnosis: Identification of Toxins in Stool specimen by immunological test.. Less Culture