# Corynebacterium & Listeria

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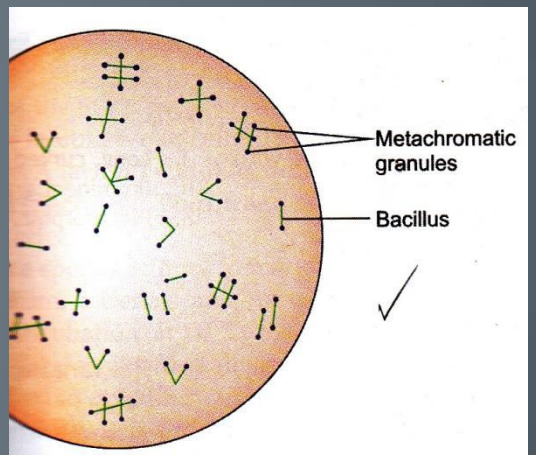
# Corynebacterium

# Morphology

- Club shaped Gram positive rods
- L-V formation (Chinese letters)
- Beaded appearance containing highly polymerised Polyphoshate
- Granules stained metachromatically
- Aerobic, facultative anaerobe.
- Non sporing, non capsulated.




Corynebacterium diphtheriae showing metachro-
granules and Chinese letter arrangement.

# Types of Bacteria

- Corynebacterium Diphtheriae
- Corynebacterium Ulcerans
- Corynebacterium Haemolyticum
- Corynebacterium Ovis
- Corynebacterium Pyogenes
- Corynebacterium Xerosis
- Corynebacterium Hofmani
- JK Group

# Mode of Transmission

- Humans are natural host of C. diphtheriae (toxigenic and non toxigenic)
- Resides in the upper respiratory track and skin.
- Transmitted by air-born droplets
- Poor skin hygiene and indigent persons are the victims.

# Normal Habitat

- Soil, plants and animals
- In humans, commensal dipheroids form part of the skin flora, upper respiratory tract, urinary tract and conjunctiva.

# Bio Types of C.diphtheriae

- Based on the severity of infections, there are 3 bio types
  - Gravis
  - Mitis
  - Intermedius

# Pathogenesis

- Powerful exotoxin is produced.
- Organism get attached to the throat epithelium.
- Diphtheria toxin inhibits protein synthesis by ADP ribosylation of elongation factor 2.
- Temperate bacteriophage
- The toxin causes local inflammation in the throat with fibrinous exudate that forms tough, adherent grey pseudomembrane.

# Clinical Features

- Thick, grey-white adherent pseudomembrane over tonsils and throat.
- Fever, sore throat, cervical lymphoadenopathy.

# Complications

- Extension of pseudomembrane into Larynx and trachea causing air-way obstruction and death.
- Myocarditis with arrhythmias and circulatory collapse.
- Nerve weakness and paralysis of cranial nerves.
- Paralysis of muscles of soft pallet and pharynx leading to regurgitation of fluids through nose.
- Peripheral neuritis affecting the muscles of extremities.

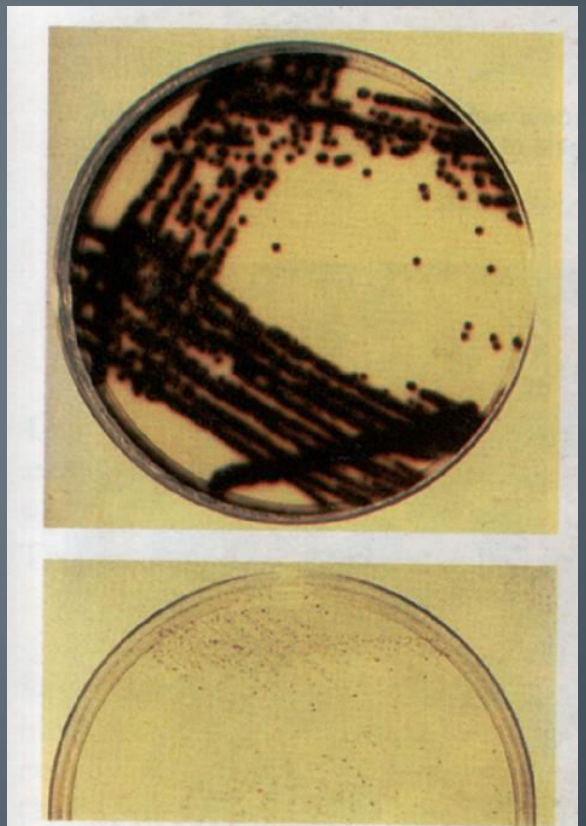
# Lab Diagnosis

- Purely clinical diagnosis
- Isolation of the organism
- Toxin production demonstration
- Schick's Test

# Culture

- Does not grow on ordinary media
- Special media
  - Lofflers medium
  - Tellurite medium
- Typically grey-black color of Tellurium in the colony is diagnostic.
- Gram stain shows tappered pleomorphic rods
- Methylene blue stained shows metachromatic granules.

# Tinsdale Medium

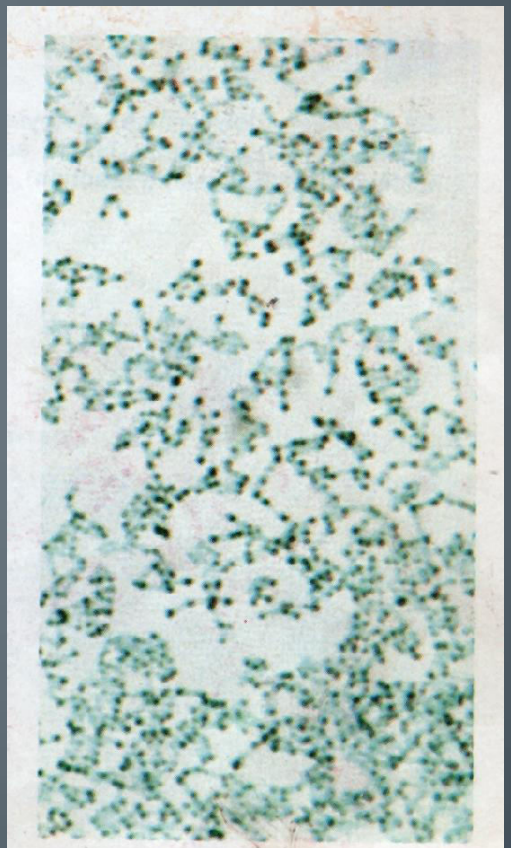


47 Modified Tinsdale medium cultures. *Upper, Corynebacterium diphtheriae* colonies surrounded by zones of brown discoloration. *Lower,* colonies of non-pathogenic diphtheroids.

# Corynebacterium diphtheriae

**48** Gram positive (easily decolorized) pleomorphic rods of *Corynebacterium diphtheriae* joined together at various angles, as seen with the 100× oil objective.

# Albert Stain



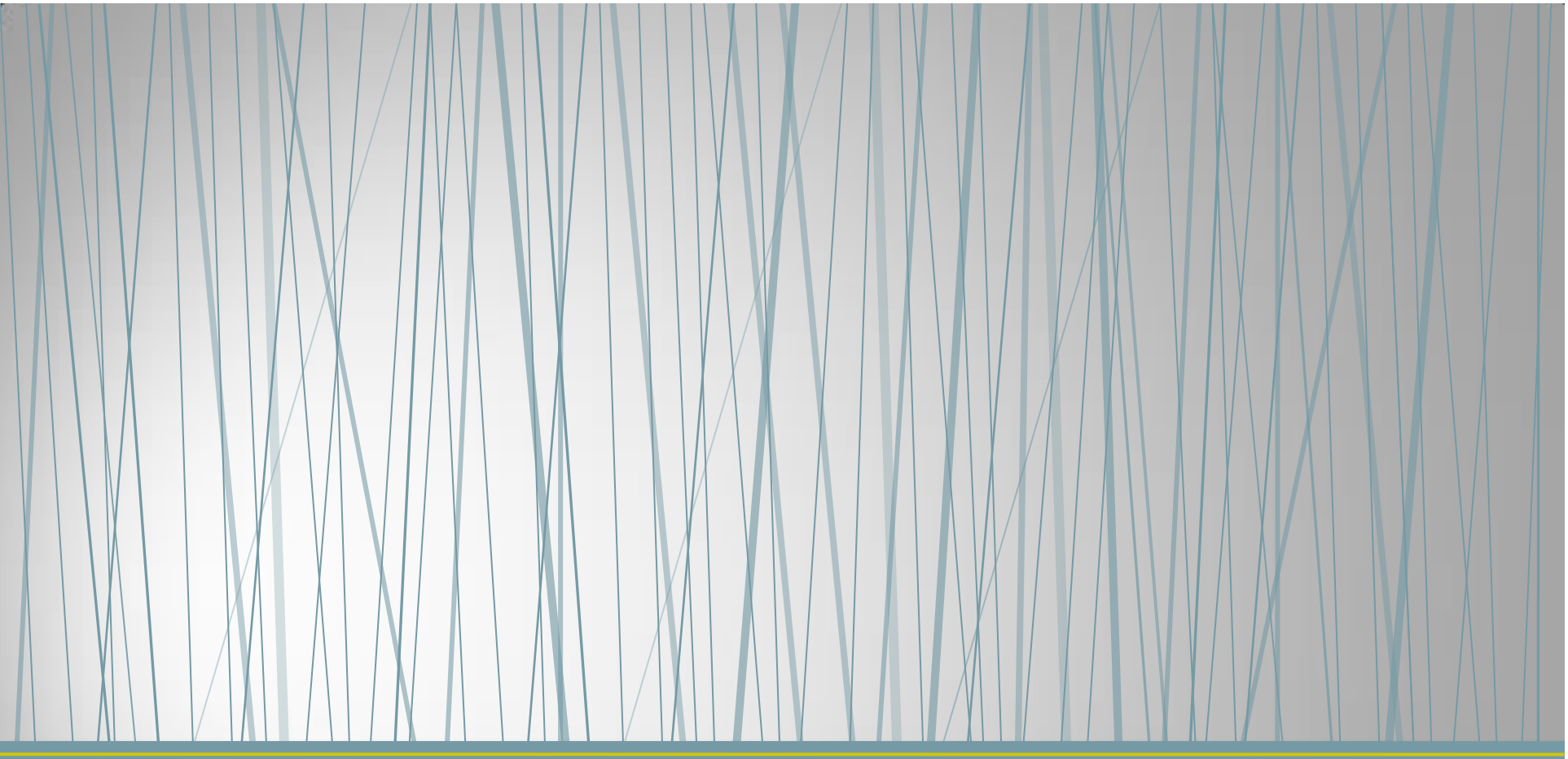
**49** Albert stained smear of *Corynebacterium diphtheriae* rods showing dark-staining volutin granules, as seen with the 100× oil immersion objective.

# Treatment

- Anti-toxin – neutralizes the unbound toxin in the blood.
- Hypersensitivity test
- Penicillin G, erythromycin

# Vaccination

- Diphtheria toxoid – 3 doses (2,4,6 years)
- Booster dose after every 10 years



# Listeria monocytogenes

# Characteristics

- Small gram positive rods arranged in v and L arrangement.
- Motile with tumbling movements.
- Growth on blood agar plate produces narrow zone of B-hemolysis.
- Growth at low temperature e.g. cold storage and refrigerator.
- Causes meningitis and sepsis in new born, pregnant women and immunocompromised adults.
- Occasionally it causes outbreaks of gastroenteritis.

# Pathogenesis

- Can produce diseases in
  - Fetus
  - Pregnant women and immunocompromised adults.
- Organism has world wide distribution and is present in animals, soil and plants.
- Human get infected by ingestion of unpasteurized milk, uncooked meat and raw vegetables.

- Contacts with pets and their feces can also be an important source.
- After ingestion the bacteria reach the colon and later colonize the female genital tract. Fetus can get infected after rupture of membranes while passing through the birth canal.
- Invasion of the body is mediated by internalin protein (produced by listeria) and E. cadherin on the surface of human cells.

- The organism produces listeriolysin on entering the cell which allows it to escape from phagosome and escape its destruction.
- Listeria is intracellular bacteria and cell mediated immunity plays major role is host defense
- Suppression of cell mediated immunity predispose to listera infections.

# Clinical findings

- Infection during pregnancy can result in abortion, pre mature delivery or sepsis
- New born infected can have acute meningitis after 1 – 4 weeks
- Infected mother can be asymptomatic or have flue like symptoms. Immunocompromised adults can have sepsis or meningitis,
- Gastroenteritis can present as watery diarrhea, fever, headache, myalgia and little vomiting.

- Outbreaks can occur by eating contaminated dairy products, uncooked meat, ready to eat food like Cole-slaw etc.

# Lab diagnosis

- Gram stain
- Culture
- Motility
- Sugar fermentation test

# Treatment

- Septran
- Ampicillin and gentamycin

# Prevention

- Limiting the exposure of pregnant women and immunocompromised patients to potential dangerous sources like farmhouses, unpasteurized milk products and raw vegetables.