Corynebacterium diphtheriae.

- They are gram-positive,
- catalase-positive,
- non-spore forming,
- nonmotile,
- rod-shaped (club-shape) bacteria that are straight or slightly curved.
- Metachromatic granules are usually present representing stored phosphate regions. The bacteria group together in a characteristic way, "V", "palisades", or "Chinese letters".
- They are aerobic or facultatively anaerobic.
- The most notable human infection is **diphtheria**, caused by *C. diphtheriae*. It is an acute and contagious infection characterized by pseudo membranes of dead epithelial cells, white blood cells, red blood cells, and fibrin that form around the tonsils and back of the throat.

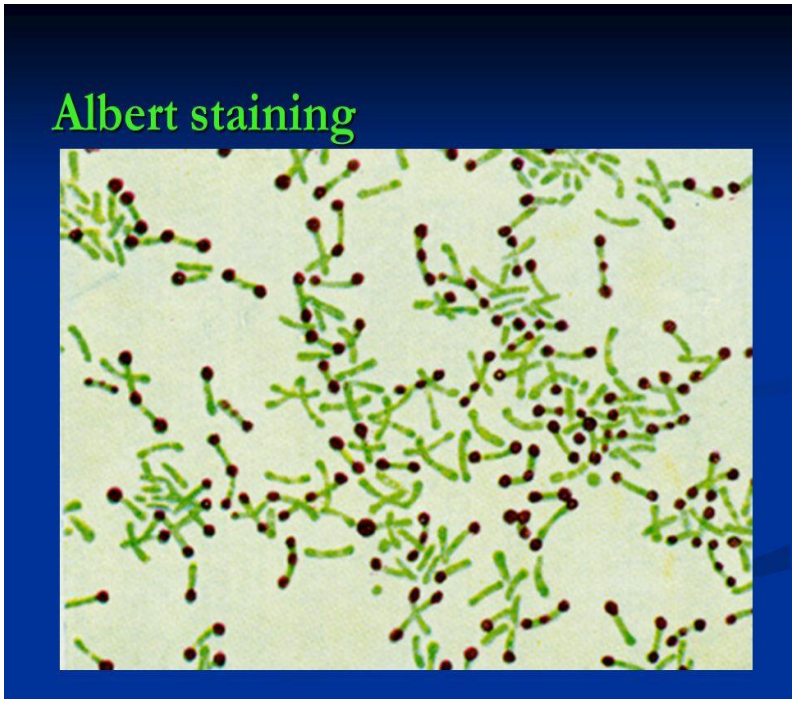
Diagnosis

Sterile cotton-tipped applicators are used to swab the pharyngeal tonsils or their beds. Since diphtheritic lesions are often covered with a pseudomembrane, the surface of the lesion may have to be carefully exposed before swabbing with the applicator.

Smear

- **In gram stain**

- **In albert stain**



Culture

For primary isolation, a variety of media may be used:

Loeffler agar: Growth of *Cornyebacterium* species on Loeffler Medium appear as minute, and cream-colored colonies with slightly raised centers.

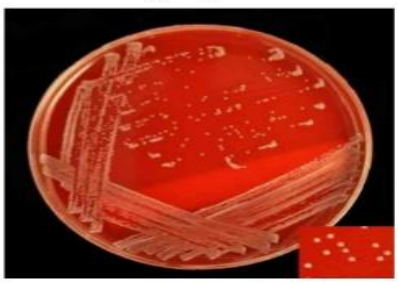
Cornyebacterium species reveal metachromatic granules and appearance suggestive of Chinese-letter formation in methylene blue stain.

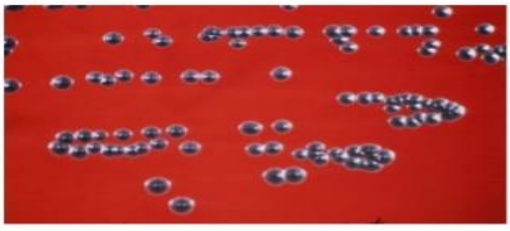
Proteolysis is indicated by the appearance of colonies surrounded by a small crater of liquefied medium or liquefaction of the slant with the production of a putrid odor.

Tellurite Blood Agar is a selective medium used for isolation and cultivation of Corynebacterium species. Potassium tellurite acts as a selective agent and has inhibitory activity against most gram-positive and gram-negative bacteria except Corynebacterium species. *C.diphtheriae* reduces potassium tellurite to tellurium and thereby produce gray-black colored colonies.

Corynebacterium diphtheriae

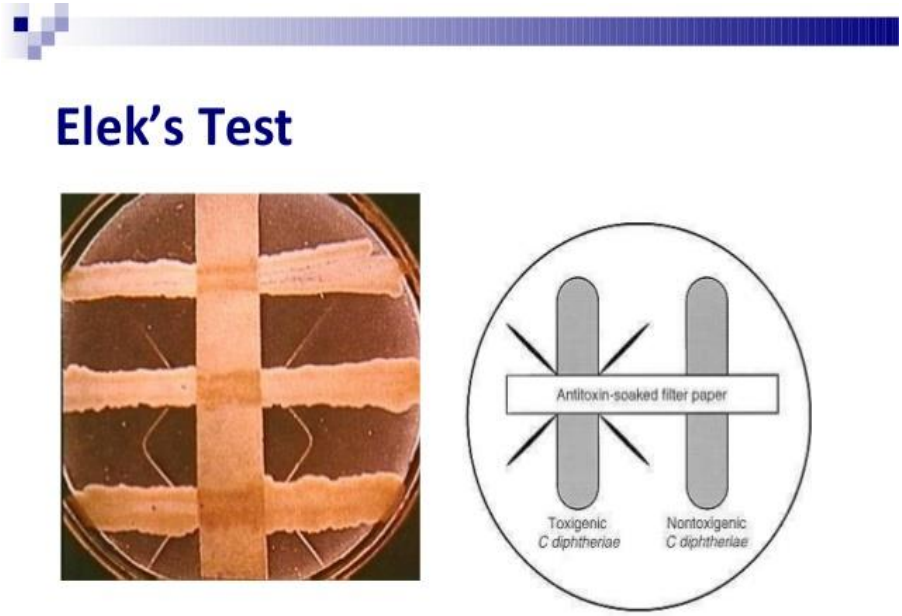
- Blood agar+potassium tellurite, tellurite is reduced intracellularly which gives the black/gray coloured appearance.





Elek test

Sterile filter paper impregnated with diphtheria antitoxin is imbedded in agar culture medium. Isolates of *C diphtheriae* are then streaked across the plate at an angle of 90° to the antitoxin strip. Toxigenic *C diphtheriae* is detected because secreted toxin diffuses from the area of growth and reacts with antitoxin to form lines of precipitin.



PCR

For detection of diphtheriae toxin gene (*tox*)