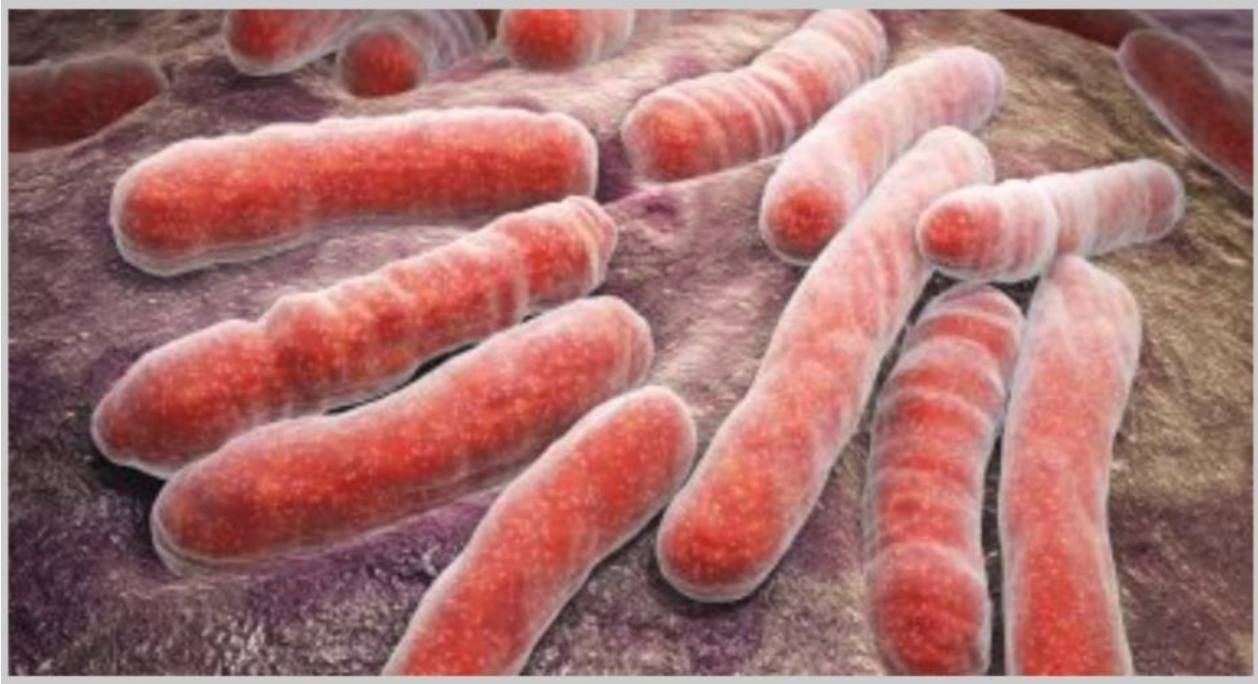


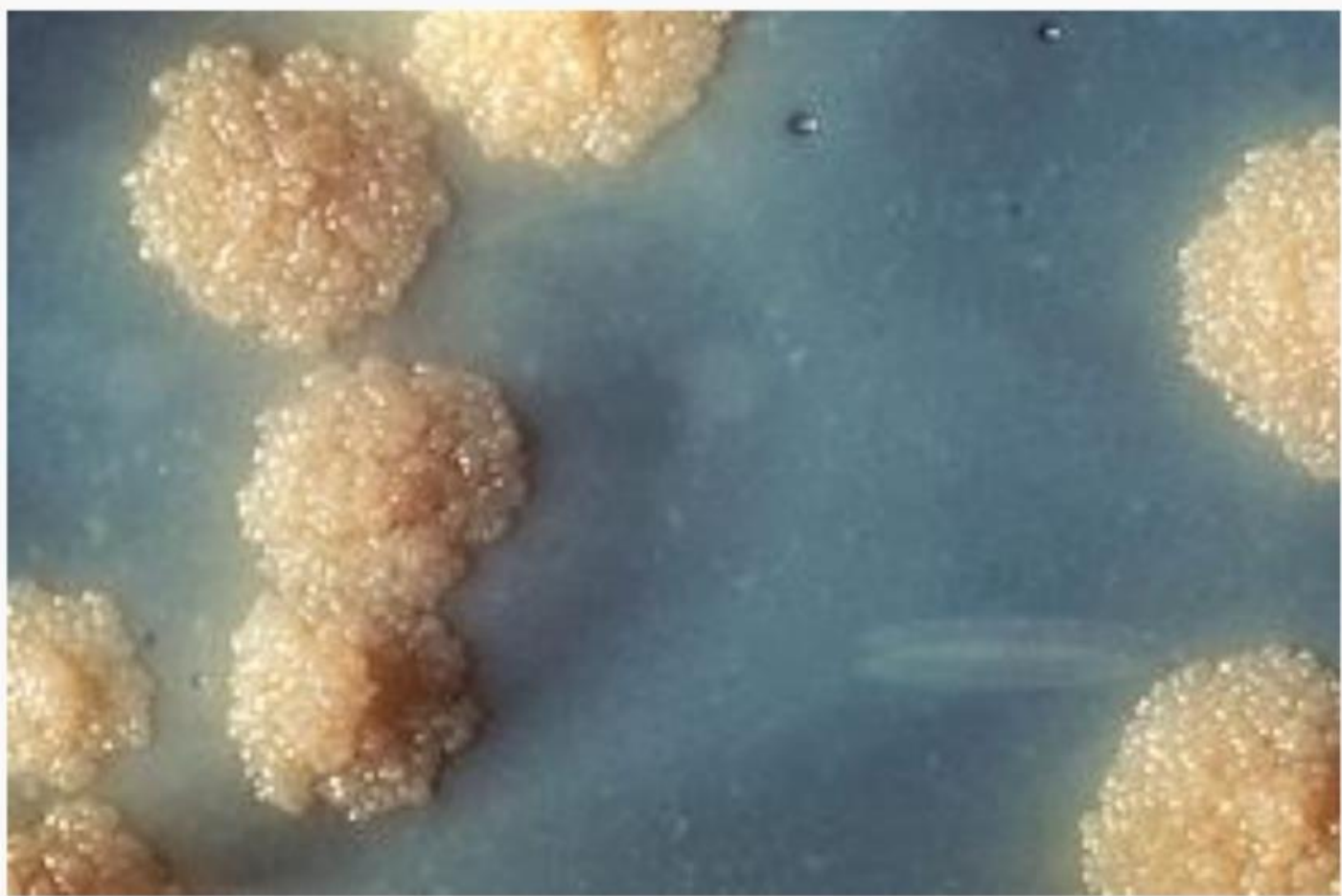
# Mycobacterium tuberculosis



# Morphology

- Tubercle bacilli are slender, straight or slightly curved rods with rounded ends .In sputum and other clinical specimens they may occur singly or in small clumps .They are non-motile, non-spore forming non-capsulated and acid fast .

- The Ziehl-Neelsen acid fast stain is useful in staining organisms from cultures or from clinical material. With this stain, the tubercle bacilli stain bright red, while the tissue cells and other organisms are stained blue. Tubercle bacilli are Gram positive but it is difficult to stain them with the Gram stain. This is because of the failure of the dye to penetrate the cell wall.



# Culture characteristics

- *Mycobacterium tuberculosis* is an obligate aerobe .Optimum temperature for growth is 37°C and optimum pH is 7.0. Tubercle bacilli can grow on a wide range of enriched culture media **but Lowenstein-Jensen** (LJ) medium is most widely used .Glycerol add 0.75% these concentration inhibition *M.bovis* .



*Mycobacterium tuberculosis*

# LJ medium

- *M. tuberculosis* grow well on LJ medium It produces visible growth on LJ glycerol medium , incubated at 37°C in about 2 weeks because the average of generation time of tubercle bacilli is about 14-15 hours, prolonged incubation is, therefore necessary , although on primary isolation from clinical material , colonies , may take up to 8 weeks to appear .

- It grows as rough, tough and buff colonies- rough due to dry, irregular growth, tough due to difficulty in lifting the colony from the surface, and buff due to the pale yellow color.



# Glycerol broth

- In glycerol broth, the hydrophobic properties of the organisms cell surface result in a whitish wrinkled pellicle and granular deposit.

# Biochemical reaction

- 1.Niacin accumulation
- *M. tuberculosis* accumulates niacin as a water-soluble by product in the culture media .
- 2.Neutral red test
- This test detect the ability of a strain to bind neutral red in an alkaline buffer solution.Positive tests are obtained with *M. tuberculosis*, *M.bovis* and *M.ulcerans* .
- 3. Catalase activity : *M. tuberculosis* is weakly catalase-positive .

- 4. Susceptibility to pyrazinamide: *M. tuberculosis* is sensitive to 50 µg/ml pyrazinamide.
- 5. Amidase test : *M. tuberculosis* produce nicotinamidase and pyrazinamide.
- 6. Nitrate reduction test: *M. tuberculosis* produce enzyme nitroreductase. Therefore it reduces nitrate to nitrite.



# مرض السل

