

Medically Important Bacteria

Lacking Cell Walls

Flexible

Rigid

Simple Uni-cellular

Filamentous

Mycobacteria

- *Mycobacterium abscessus*
- *Mycobacterium avium-intracellulare*
- *Mycobacterium bovis*
- *Mycobacterium chelonae*
- *Mycobacterium fortuitum*
- *Mycobacterium kansasii*
- *Mycobacterium leprae* **S**
- *Mycobacterium marinum*
- *Mycobacterium scrofulaceum*
- *Mycobacterium tuberculosis* **S**
- *Mycobacterium ulcerans*

Actinomycetes

- *Actinomyces israelii*
- *Nocardia asteroides*
- *Nocardia brasiliensis*

Atypical bacteria

MYCOBACTERIA
ACTINOMYCETES

Mycobacteria



- Acid-fast bacilli; neither gram-positive nor gram negative.
- Ziehl-Neelsen stain is used to identify mycobacteria.
- Clinically important species are; *Mycobacterium tuberculosis*; and *Mycobacterium leprae*.
- **Tuberculosis** is caused by *Mycobacterium tuberculosis*.
- **Leprosy** is caused by *Mycobacterium leprae*.

Mycobacterium tuberculosis:



- Acid-fast alcohol fast bacilli.
- Ziehl–Neelsen stain is the special stain but recently fluorescent microscopy is commonly used.
- Obligate aerobes;(lungs and kidneys)!!
- Resistant to dehydration→ survive in dried sputum.

Pathogenicity



- Main reservoir is human.
- Do not produce toxins; but multiply inside macrophages.
- Causes tuberculosis; chronic, slowly progressive infection, usually of the lungs; eventually, many other organs and tissues may be affected.
- The infection can remain dormant causing no illness → latent TB or cause TB disease.

- Usually attack lungs and transmitted through droplets produced by smear-positive people.





- 90% of Mycobacterium tuberculosis infections are asymptomatic.
- Clinical findings include fever, fatigue, night sweats, and weight loss.
- Pulmonary tuberculosis causes cough ; sputum → haemoptysis (coughing of blood).



- If the droplets from lung lesion is swallowed; it can cause gastrointestinal tuberculosis.
- GI tuberculosis characterized by abdominal pain and diarrhea.
- In renal tuberculosis, dysuria, hematuria, and flank pain occur.

Diagnosis:



- Acid-fast staining.
- Mantoux Tuberculin Skin Test / Tuberculin Skin Test (TST)/ Tuberculin Test.
- Measures Delayed Type Hypersensitivity (DTH) reaction to tuberculo-protein.
- Results obtained within 48-72 hr.



Mycobacterium leprae



- Acid-fast.
- Fail to grow in artificial media.
- Grow very slowly so treatment should continue for long time (year).
- Optimal temperature 30°C; that`s why in human it grows in skin and superficial nerves.
- Causes leprosy (Hansen`s disease).



- Leprosy; chronic disease of peripheral nerve and superficial tissue, particularly nasal mucosa.
- Render the nerve thickened and anesthetic.
- May cause disfiguring.
- Two clinical forms present; Tuberculoid leprosy, lepromatous leprosy.

Feature	Tuberculoid Leprosy	Lepromatous Leprosy
Type of lesion	One or few lesions with little tissue destruction.	Many lesions with marked tissue destruction.
Number of acid-fast bacilli	Few	Many
Likelihood of transmitting leprosy	Low	High

Actinomycetes



- *Actinomyces* are Gram-positive bacilli that grow slowly (4–10 days) under microaerophilic or strictly anaerobic conditions.
- Most human actinomycosis is caused by *Actinomyces israelii*.

Actinomyces israelii



- It causes eroding abscesses following trauma to the mucous membranes of the mouth or GI tract.
- The infection is named according to the area of the body through which the abscess erodes:

1-cervicofacial actinomycosis,

2-abdominal actinomycosis,

3- thoracic actinomycosis.

