

## General info:

M. tuberculosis and M. bovis are responsible for TB. Mycobacterium cell wall has a high lipid content (mycolic acid). They are non-spore forming and are obligate aerobes. Atypical mycobacterium (e.g. M. avium complex) are opportunistic, have no P2P transmission but are more chronic.

## Virulence factors

The mycolic acid content leads to resistance to antibiotics, osmotic lysis and acid/alkali. The cord factor is responsible for the organism growing in a snake-like pattern. The repetitive protein Erp & PknG inhibits the phagolysosome fusion step.

## Pathogenesis

The pathogen survives and replicates in the phagosome of the macrophage, which causes a type IV hypersensitivity reaction, leading to a granuloma formation, mostly in the middle zone of the right lung (Ghon focus). Caseating necrosis takes place. Lymphangitis and lymphadenitis can also occur. This primary lesion can heal, become latent (Simon Foci) or progress into secondary tuberculosis. Secondary tuberculosis: occurs mainly in immunocompromised people. TB can spread locally to upper lobes of the lungs or can be expectorated after cavitations form (Open TB).

## Management/Treatment

The pathogen is highly resistant to dryness, chemicals and antibiotics. They are killed by sunlight (UV), phenol and heat. Isoniazid and rifampicin are the top 2 AB for treatment. MDR TB are resistant to both isoniazid and rifampicin. XDR TB are also resistant to fluoroquinolones and one second-line injectable drug. The vaccine is a living attenuated vaccine from the bovine strain, given as a single dose to all children in the 1st month of life.

## Laboratory diagnosis

Ziehl-Neelsen stain is used: The bacteria resist decolorisation via acid and retain the red colour (acid-fast)  
The Kinyoun stain can be used in cold environments.  
They grow on egg-based media i.e. Lowenstein-Jensen and Dorset's egg medium (8 weeks).  
Middlebrooks medium (3 weeks)  
Can be stained by fluorochrome.

## Tuberculin skin test

48-72 hours after subcutaneously injecting the tuberculin, the size of the papule (not the erythema) is measured.  $\geq 15\text{mm}$  is a positive test regardless.  $\geq 10\text{mm}$  is positive if the patient lives in an endemic area, is a healthcare worker, diabetic or an unvaccinated child.  $\geq 5\text{mm}$  is positive if the patient is HIV +ve, previous history of TB or in close contact with TB patients.

