Mycobacterium genus

- Aerobe
- Acid-fast rods
- High lipid content (60 %) in the cell wall
- ***M. tuberculosis*** from person to person by respiratory aerosol (humans are the natural reservoirs)
- ***M . bovis*** ingesting contaminated milk (reservoirs are cattle)
- ***M. leprae*** prolonged contact (reservoirs are only humans)
- ***Atypical mycobacteria*** by inhalation from the soil (there is no transmission from human to human!)

MYCOBACTERIUM TUBERCULOSIS

PATHOGENESIS

Source: respiratory droplets

Exsudative lesions (acute inflammatory response at the initial phase (site) of the infection)

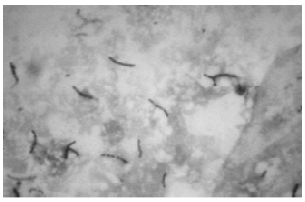
Granulomatous lesions (tubercle) the central area consist of giant cells surrounded by fibrous tissue, later central caseation necrosis and calcification

Pulmonary tuberculosis

Extrapulmonary infection

Diagnosis:

• acid-fast staining (Ziehl-Neelsen staining)
• culturing (LÖWENSTEIN-JENSEN medium)
• BacTec
• PCR



(doubling time 18-20 hours) 6-8 weeks

Treatment

- Multiple-drug therapy for 6-9 month with
  Isoniazid (INH)
  Rifampin
  Pyrazinamide
  Ethambutol
- Resistance to drugs! ⟶ Treatment: ciprofloxacin, amikacin, ethionamide, cycloserine in combination

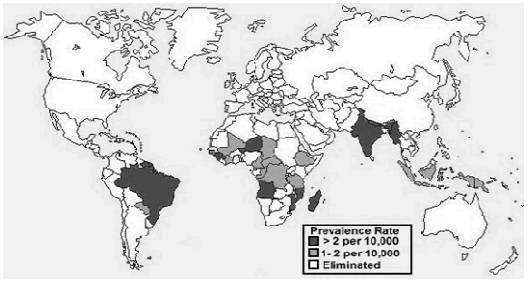
Prevention

- BCG vaccine (bacillus Calmette-Guerin)
  attenuated *M. bovis*
  protects only against the fatal childhood complications of tuberculosis (*e.g. meningitis tuberculosa*)
- Tuberculosis free livestock, pasteurization

Mycobacterium leprae

- Cannot be cultured *in vitro,* grows on footpads of mice or armadillos
- Prolonged contact with patients with lepromatous leprosy
- Replicates intracellularly (skin histiocyte, endothelial cells, Schwann cells
- Two clinical types
  - *Lepromatous*
  - *Tuberculoid*

Geographical distribution of leprosy



Lepromatous leprosy

- Progressive, malignant
- Multiple, erythematous, symmetrical , anaesthetic nodular skin lesions (saddle nose, atrophy of the anterior nasal spine, premaxillary bone recession are common)
- Slow symmetric nerve involvement
- Negative lepromin test
- Cell mediated immunity is deficient

Lepromatous skin lesions

Facies leonine

Tuberculoid leprosy

- Nonprogressive, benign
- Macular skin lesions
- Asymmetric nerve involvement
- Positive lepromin skin test
- Intact cell-mediated immunity

Laboratory diagnosis

Specimen: biopsy from the skin lesions

- acid-fast staining
- PCR

ATYPICAL MYCOBACTERIA

- widespread in the environment
- classified according to their rate of growth and pigment production
- Group I.: photochromogens:
  - *M. kansasii (lung disease), M. marinum (swiming pool granuloma, fish tank granuloma)*
  - *Growth rate: slow, yellow-orange pigment*

Group II.: scotochromogens:

- *M. scrofulacelum: scrofula (granulomatosus cervical adenitis)*
- *grows slowly, produces pigment in dark*

Group III.: nonchromogens:

- *grows slowly, no pigment*
- *M. avium-intracellulare complex: tuberculosis-like pulmonary disease*

Group IV.: rapidly growing:

- *grows rapidly, no pigment*
- *M. fortuitum-chleonei complex: skin, soft tissue infection*