

MYCOBACTERIA

MYCOBACTERIA

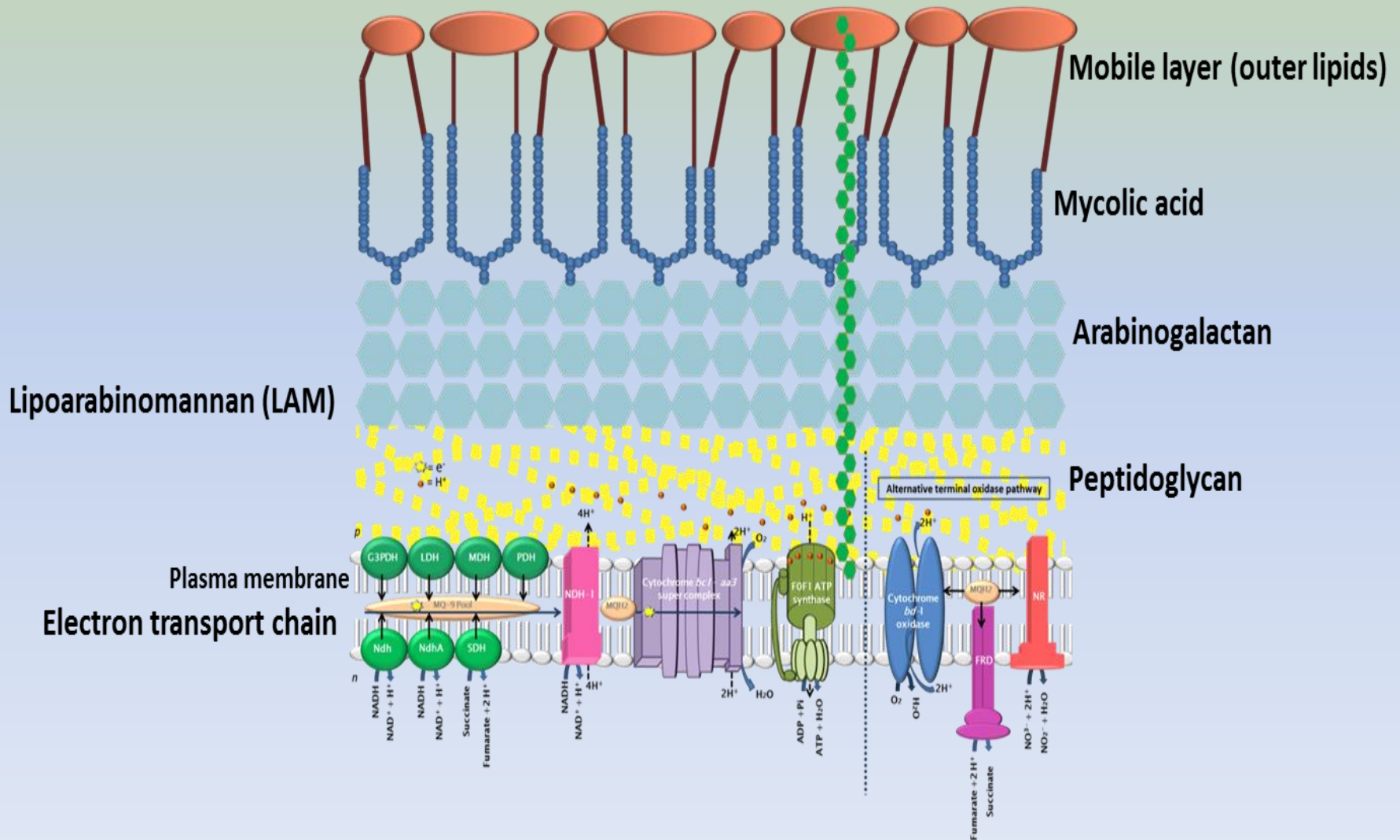
What are Mycobacteria?

- Obligate aerobes
- Intracellular pathogens

Mycobacterium differ from other routinely isolated

Bacteria:

MYCOBACTERIA



MYCOBACTERIA

Classification of Mycobacteria

1. Tubercle bacilli

- a) Human – MTB
- b) Bovine – *M. bovis*
- c) Murine – *M. microti*
- d) Avian – *M. avium*
- e) Cold blooded – *M. marinum*

2. Lepra bacilli

- a) Human – *M. leprae*
- b) Rat – *M. leprae murium*

3. Mycobacteria causing skin ulcers

- a) *M. ulcerans*
- b) *M. fortuitum*

4. Atypical Mycobacteria (Runyon Groups)

- a) Photochromogens
- b) Scotochromogens
- c) Nonphotochromogens
- d) Rapid growers

5. Johne's bacillus

M. paratuberculosis

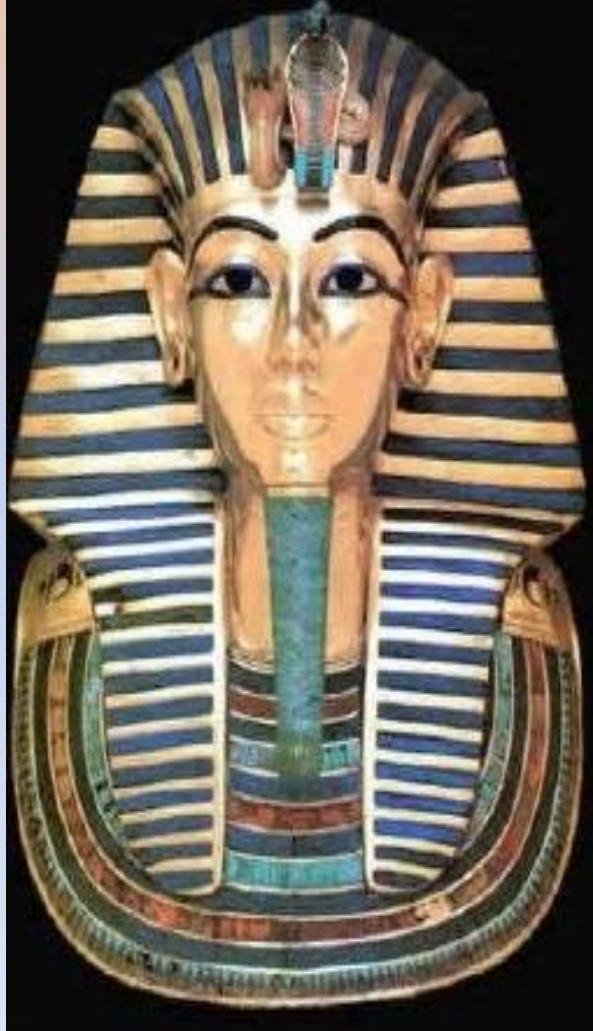
6. Saprophytic mycobacteria

- a) *M. butyricum*
- b) *M. phlei*
- c) *M. stercoalis*
- d) *M. smegmatis*
- e) Others

***Mycobacterium tuberculosis* complex**

M. TUBERCULOSIS

M. TUBERCULOSIS



Facts About TUBERCULOSIS



2 MILLION PEOPLE

die from TB each
year internationally

TB infections are the

2nd GREATEST KILLER

worldwide



Left untreated an individual
with TB can infect on average

10-15

people every
year.



VANCOUVER
SOUTH FRASER
RICHMOND &
THE NORTH
INTERIOR

have higher
rates of TB than
the provincial
average

\$8 MILLION

amount TB Vets has provided to BC healthcare
centres to purchase life-saving equipment.

www.tbvets.org

Drug
resistant
strains of TB
are becoming
an increasing
worry, in 2011
there were
310,000 cases
of Multidrug-
resistant TB
worldwide.



next to

HIV/AIDS

\$2.6+ MILLION

amount of money TB Vets has
given to support TB and
respiratory disease
research in B.C.



keys returned to owners thanks to
the TB Vets KeyTag program.

450,000



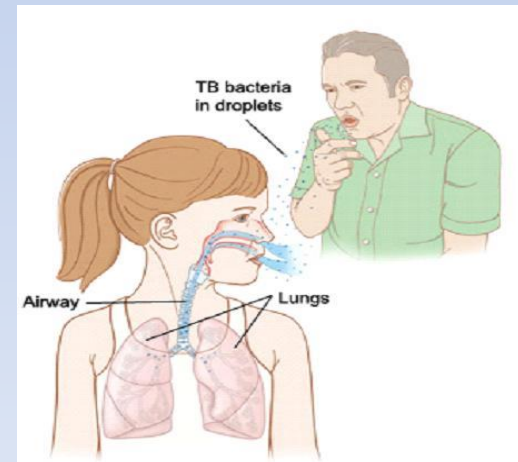
M. TUBERCULOSIS

- Tuberculosis (TB) is a global pandemic, killing someone approximately every 25 seconds — nearly 1.4 million in 2010 alone
- The WHO estimates that two billion people — one third of the world's population — are infected with *Mycobacterium tuberculosis* (*M.tb*), the bacillus that causes the disease



M. TUBERCULOSIS

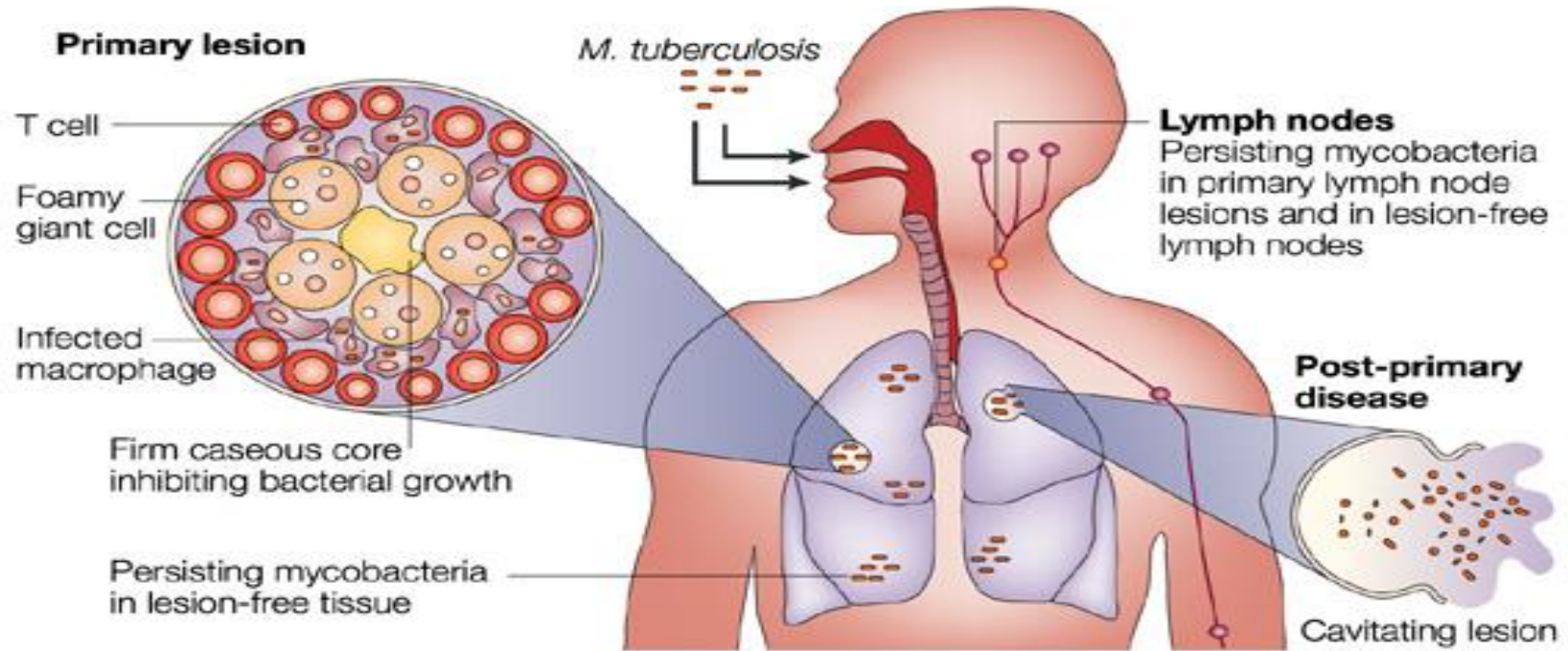
- **Transmission**
- **Predisposing Factors**
- **Facts of Infection**



M. TUBERCULOSIS

Pathology and Pathogenesis of Tuberculosis

Pulmonary TB (Primary infection):



M. TUBERCULOSIS

Cont... Primary infection:

- **immune competent**
- A dormant state

Latent infection

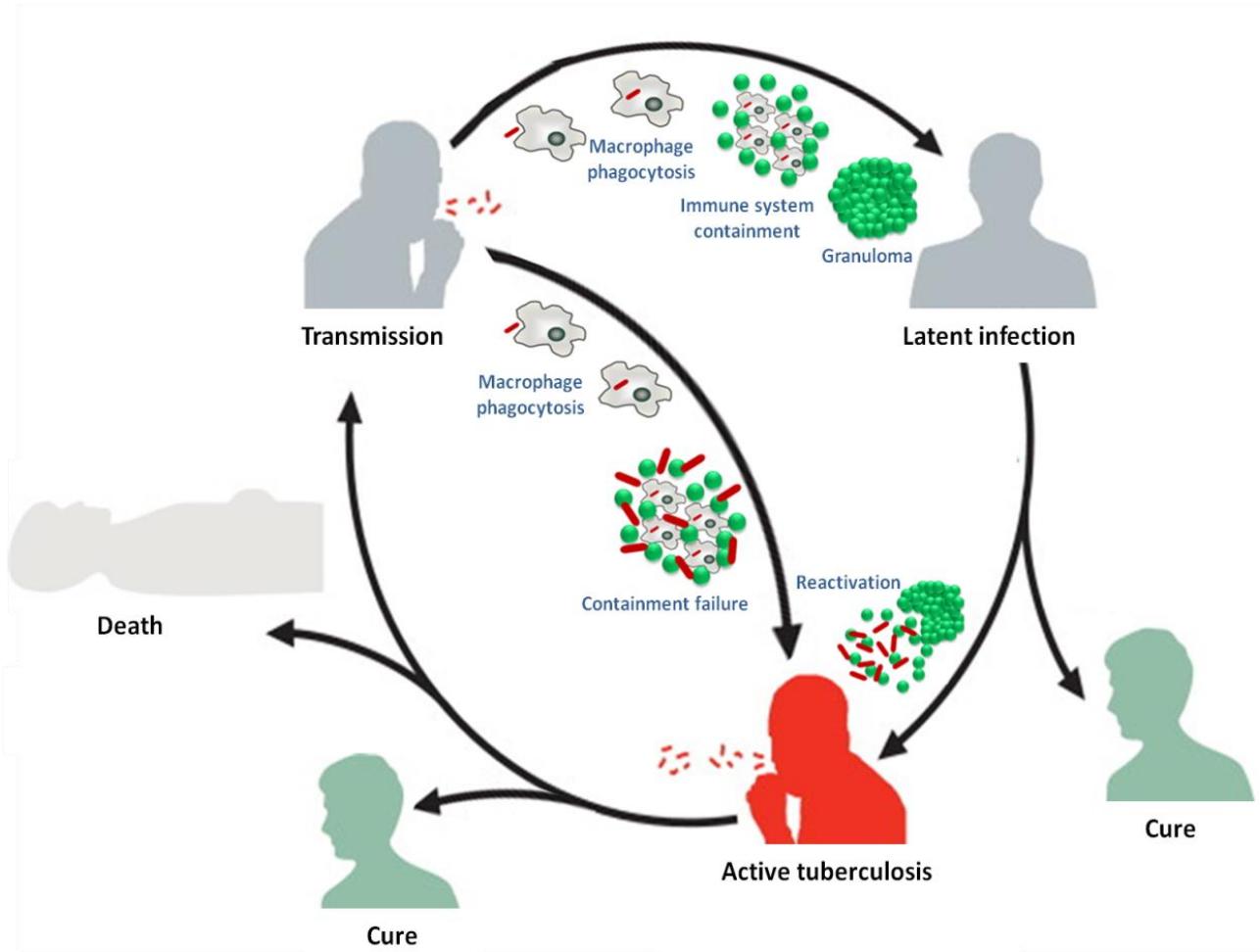
- **Immunodeficiency**

Active TB

(symptoms + contagious)

M. TUBERCULOSIS

Life cycle of *M. tuberculosis*



M. TUBERCULOSIS

Main symptoms of Pulmonary tuberculosis

Central

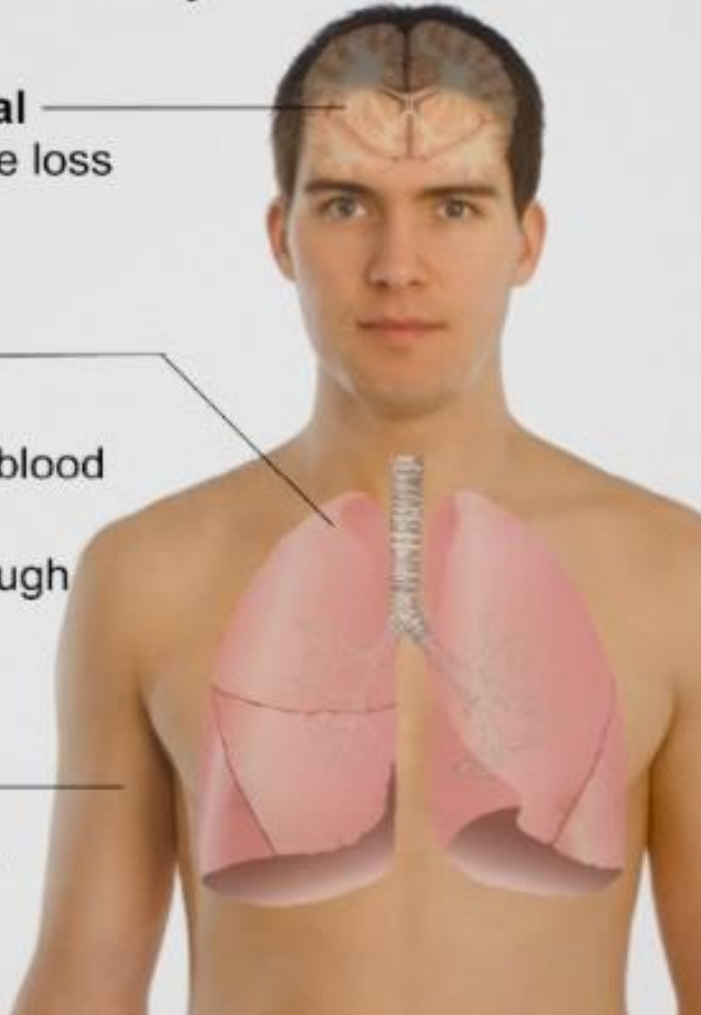
- appetite loss
- fatigue

Lungs

- chest pain
- coughing up blood
- productive,
prolonged cough

Skin

- night sweats,
- pallor



M. TUBERCULOSIS

Main sites of Extra-pulmonary TB

Central nervous system
- Meningitis

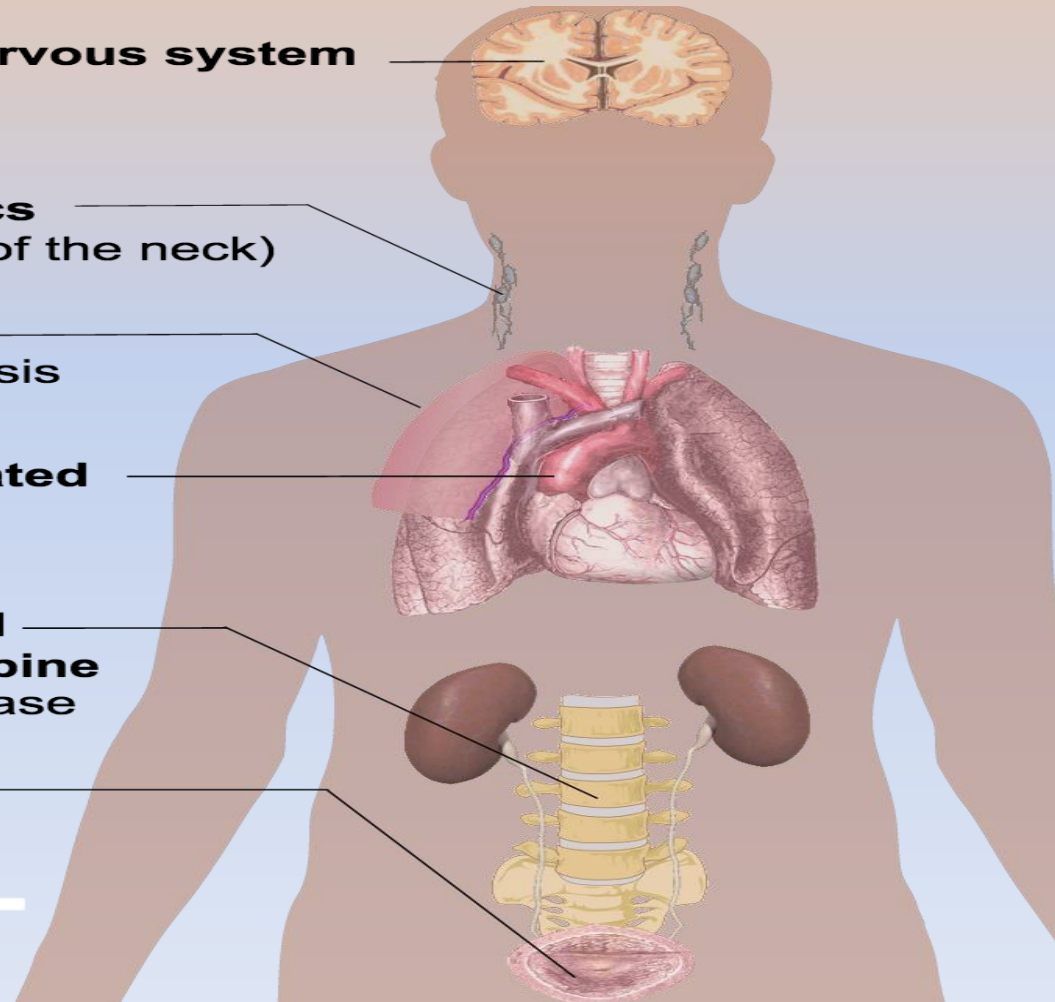
Lymphatics
- Scrofula (of the neck)

Pleura
- Tuberculosis
pleurisy

Disseminated
- Miliary
tuberculosis

**Bones and
joints of spine**
- Pott's disease

**Genito-
urinary**
- Urogenital
tuberculosis



M. TUBERCULOSIS

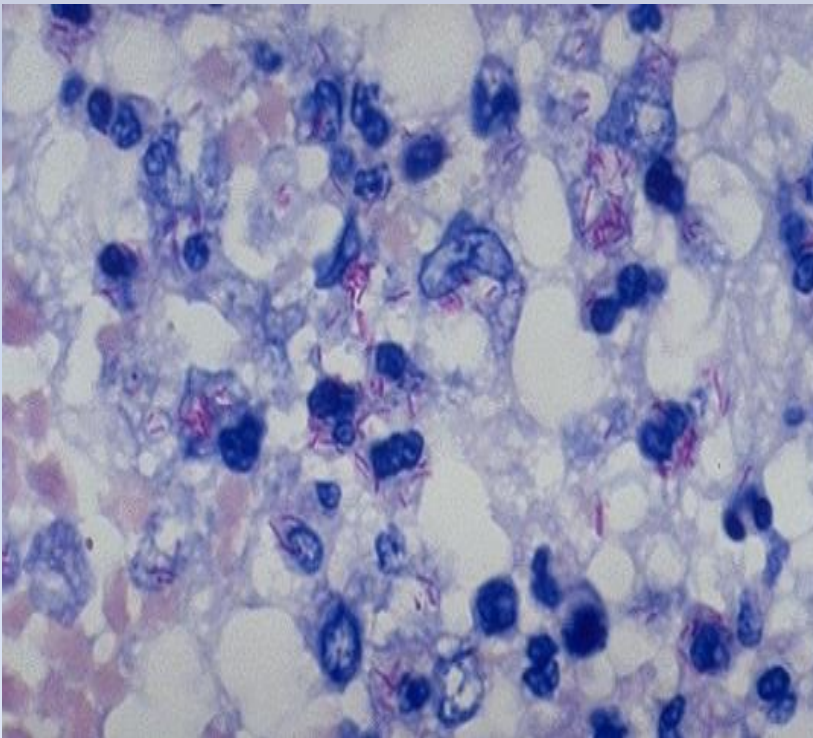
Diagnosis of TB

- **Type of specimens**
- **Sputum Collection**
- **Diagnosis:**
 - Z-N stain
 - Fluorochrome stain using fluorescence microscopy
 - Culture
 - Catalase peroxidase test
 - X-ray
 - PCR
 - BACTEC 460 (rapid radiometric culture system)

M. TUBERCULOSIS

Diagnosis:

Cultural characteristics of Mtb



M. TUBERCULOSIS

Tuberculin Test Interpretation:

Limitations:

- **False positive reactions**
- **False negative reactions**

M. TUBERCULOSIS

Treatment

Directly observed therapy (DOTS) (directly observed treatment, short- course)

✓ **First line drugs**

✓ **Second line drugs**

Multidrug-resistant tuberculosis (MDR-TB)

Extensively drug-resistant tuberculosis (XDR-TB)

M. TUBERCULOSIS

Control

Vaccination

M. LEPRAE

M. LEPRAE

- Leprosy
- A chronic infectious disease caused by *M. leprae*
- It is a disease of Historical importance
- Carrier
- Transmission



M. LEPRAE

- **Description**
- **Cultivation**
- **Resistance**

M. LEPRAE

Leprosy

Classification (Madrid)

1. Hyper-reactive *tuberculoid* (TT) leprosy
2. Anergic *Lepromatous* leprosy (LL)
3. Intermediate forms
 - Borderline tuberculoid (BT)
 - Mid-boderline (BB)
 - Borderline lepromatous (BL)

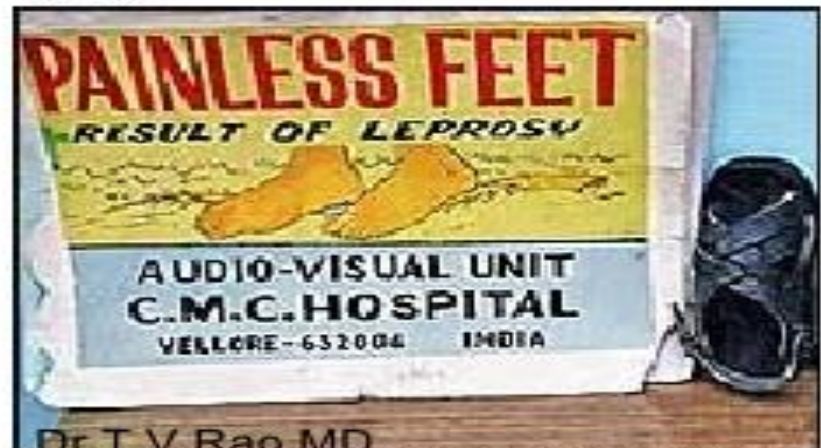
M. LEPRAE



<http://microbes.historique.net/images/lep3.jpg>



bp2.blogger.com/.../s320/lepomatous_leprosy.jpg



<http://www.leprosymission.org/web/pages/leprosy/leprosy.html>

M. LEPRAE

Laboratory diagnosis

- Acid-fast stains
- Histology of biopsy material

Treatment

ATYPICAL MYCOBACTERIA

ATYPICAL MYCOBACTERIA

- **Classification (Runyon Criteria) of NTM/MOTT**
 1. Photochromogens
 2. Scotochromogens
 3. Nonphotochromogens
 4. Rapid growers

ATYPICAL MYCOBACTERIA

- Infects birds
- cold blooded animals, worm blooded animals
- Present in environment
- Opportunistic pathogens
- *M. phlei*, *M. smegmatis* – present in Smegma