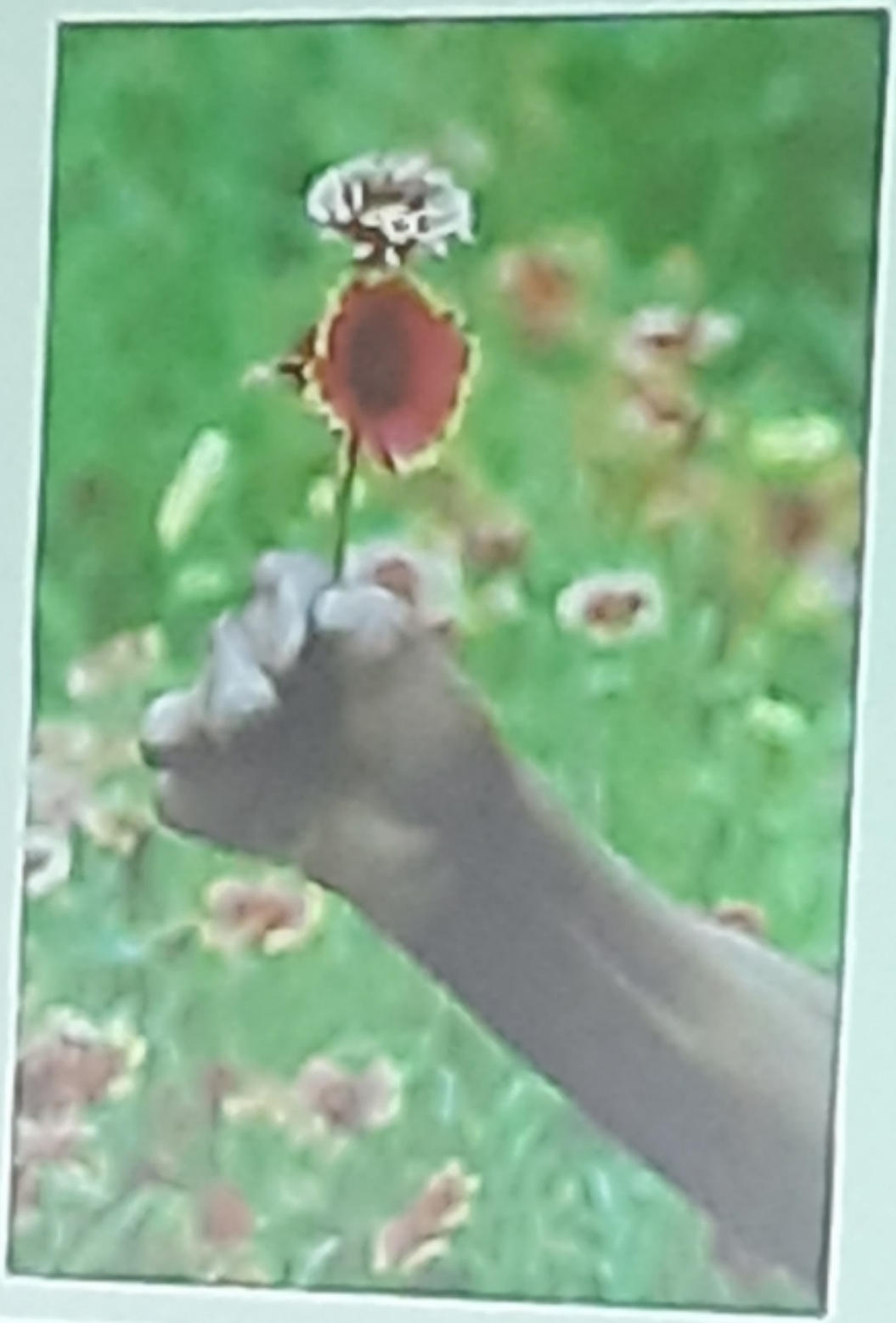
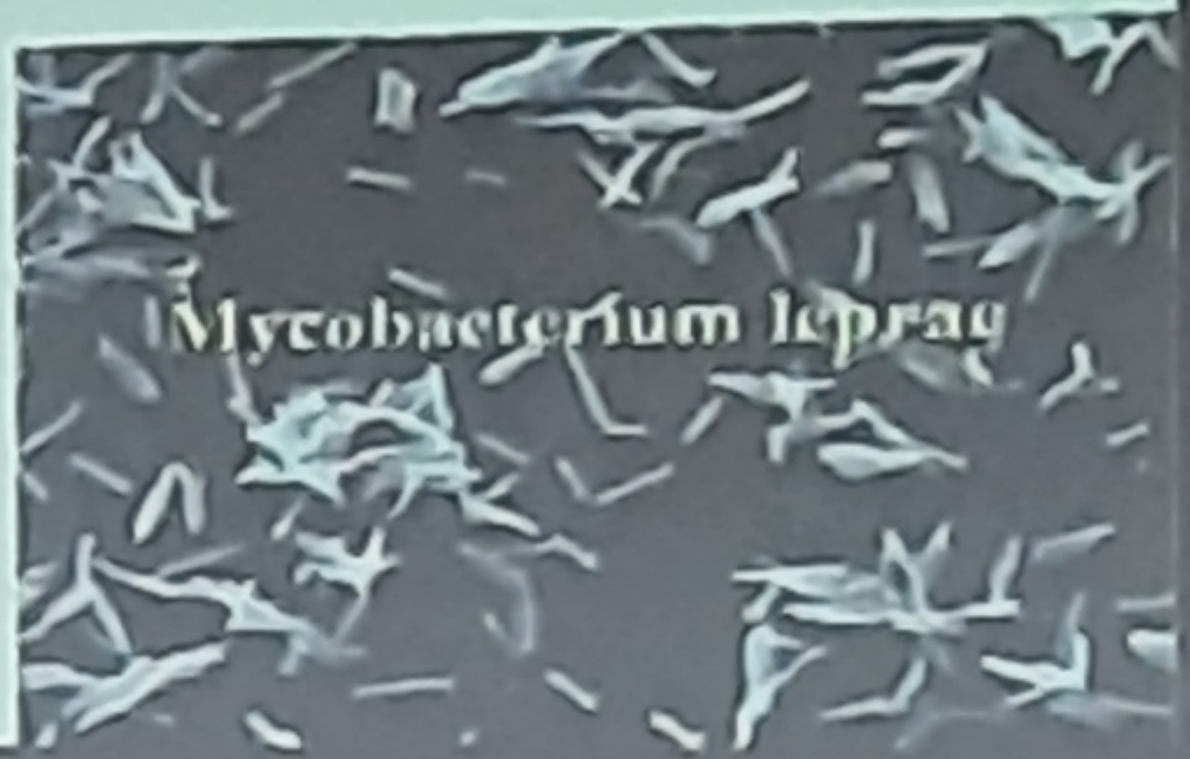
Leprosy



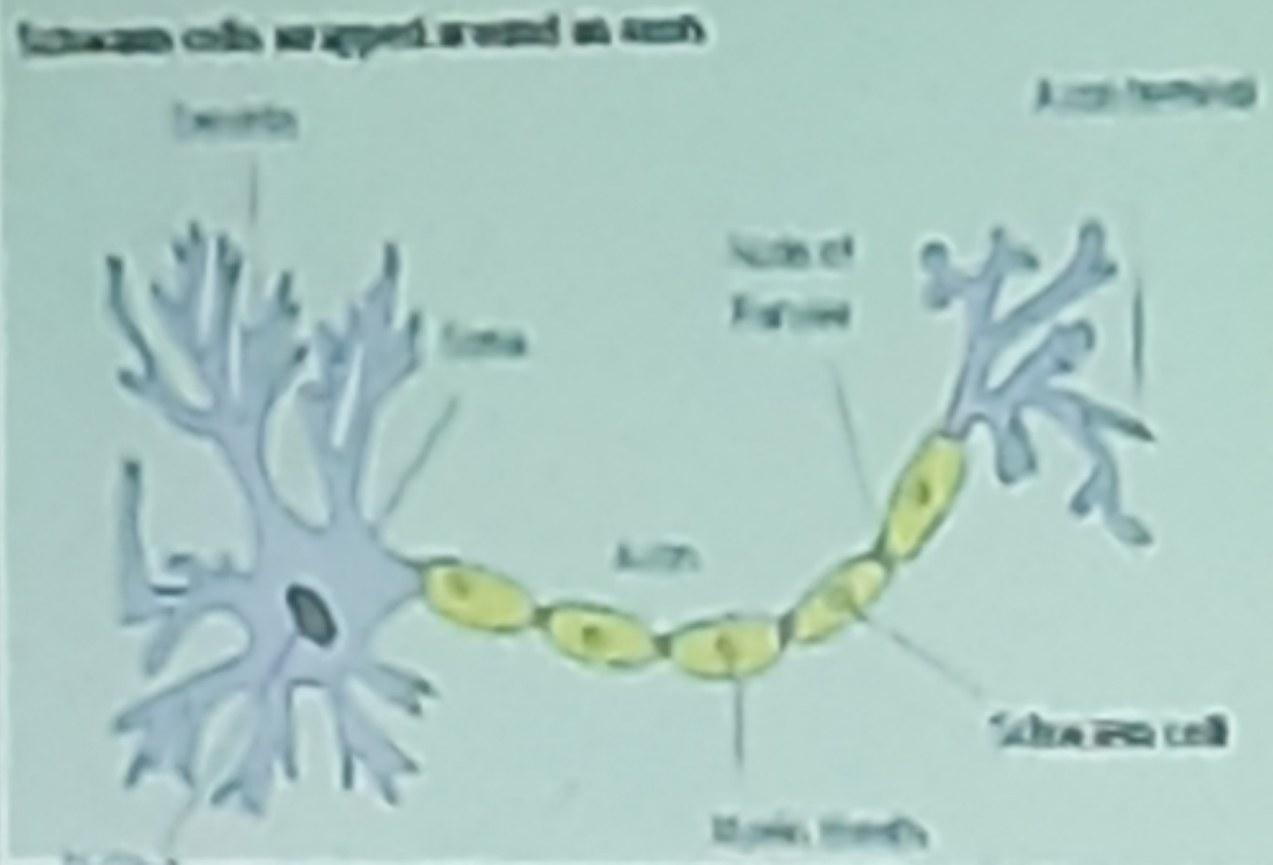
M.leprae

- Reservoir – infected humans; Low infectivity
- Transmission: Skin-to-skin contact
- Grows best in cooler part of the body - the skin, peripheral nerves, anterior chamber of the eye, upper respiratory tract, and testes
- Incubation period – years or decades



Pathogenesis

- Leprosy is a chronic granulomatous disease that usually involves skin, peripheral nerves and nasal mucosa.
- Incubation period is long and varies from 3-15 years.
- Prolonged close contact with infective patient is necessary for transmission of the disease.
- The principal target cell of lepra bacilli are Schwann cell and the resulting nerve damage causes manifestation of leprosy, which include anesthesia and muscle paralysis.
- A non-specific or indeterminate skin lesion is the first sign of disease.



Ridley & Jopling's classification

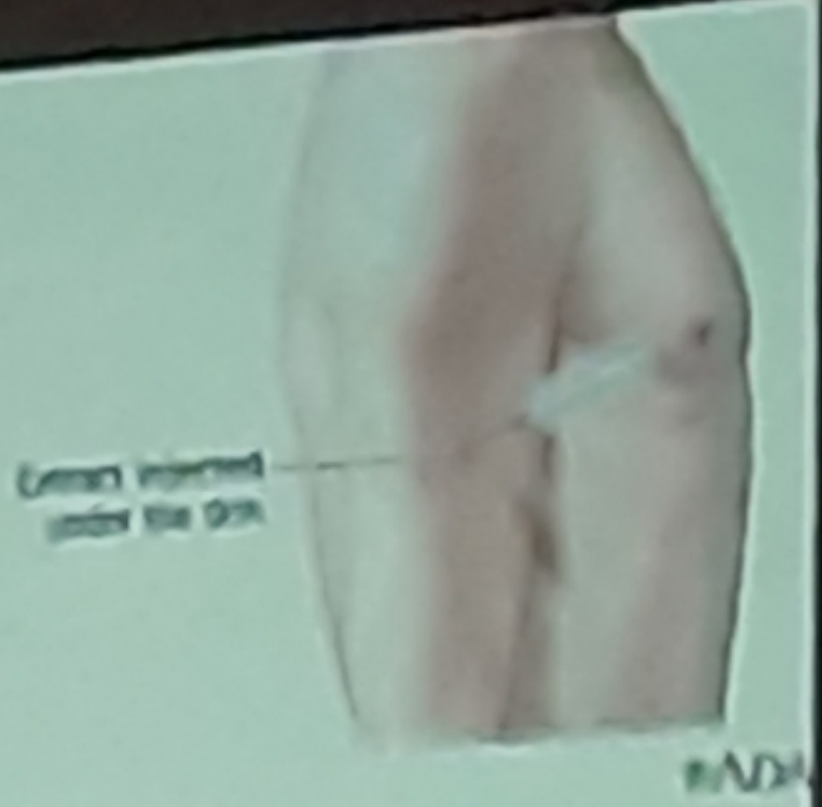
- Tuberculoid tuberculoid (TT)
- Borderline tuberculoid (BT)

} Tuberculoid

- **Borderline borderline (BB)**
- Borderline lepromatous (BL)
- Lepromatous lepromatous (LL)

} Lepromatous

Tuberculoid leprosy



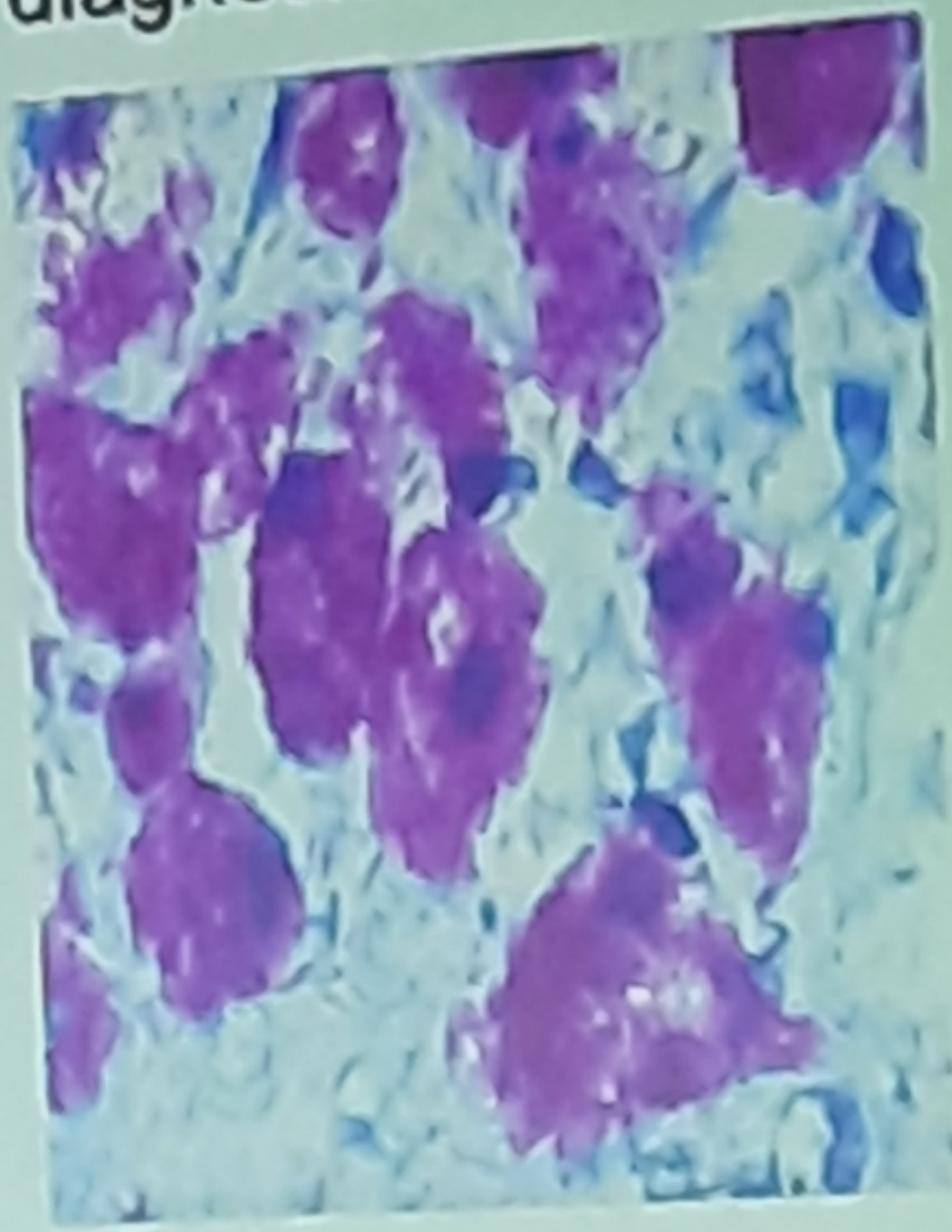
- Relatively few or no bacilli because of adequate cell mediated immunity
  - One or a few hypopigmented macules or plaques - sharply demarcated and hypesthetic
  - Devoid of normal skin organs (sweat glands and hair follicles) - are dry, scaly
  - Nerves may be destroyed with loss of sensation and perspiration (Arthur's phenomenon)
  - **Lepromin test positive**

Lepromatous leprosy

- Lesions have large numbers of bacilli even on skin that appears normal – poor CMI
  - Symmetrically distributed skin nodules with poorly defined margins
  - Nerve damage leads to loss of digits
  - Late manifestations include loss of eyebrows (initially the lateral margins only) and eyelashes, and dry scaling skin, particularly on the feet
  - Lepromin test negative

Mycobacterium leprae
- Laboratory diagnosis -

- <u>Collection of specimens</u>:
  - skin lesion biopsy, skin scrapping
  - Nasal exudate
- <u>Microscopy</u>:
  - Ziehl-Neelsen stained smear: acid fast bacilli accumulated in intracellular, encapsulated globular masses - "leprosy globi" - in lepromatous leprosy
- (Cultivation – not applicable)



Treatment & Management

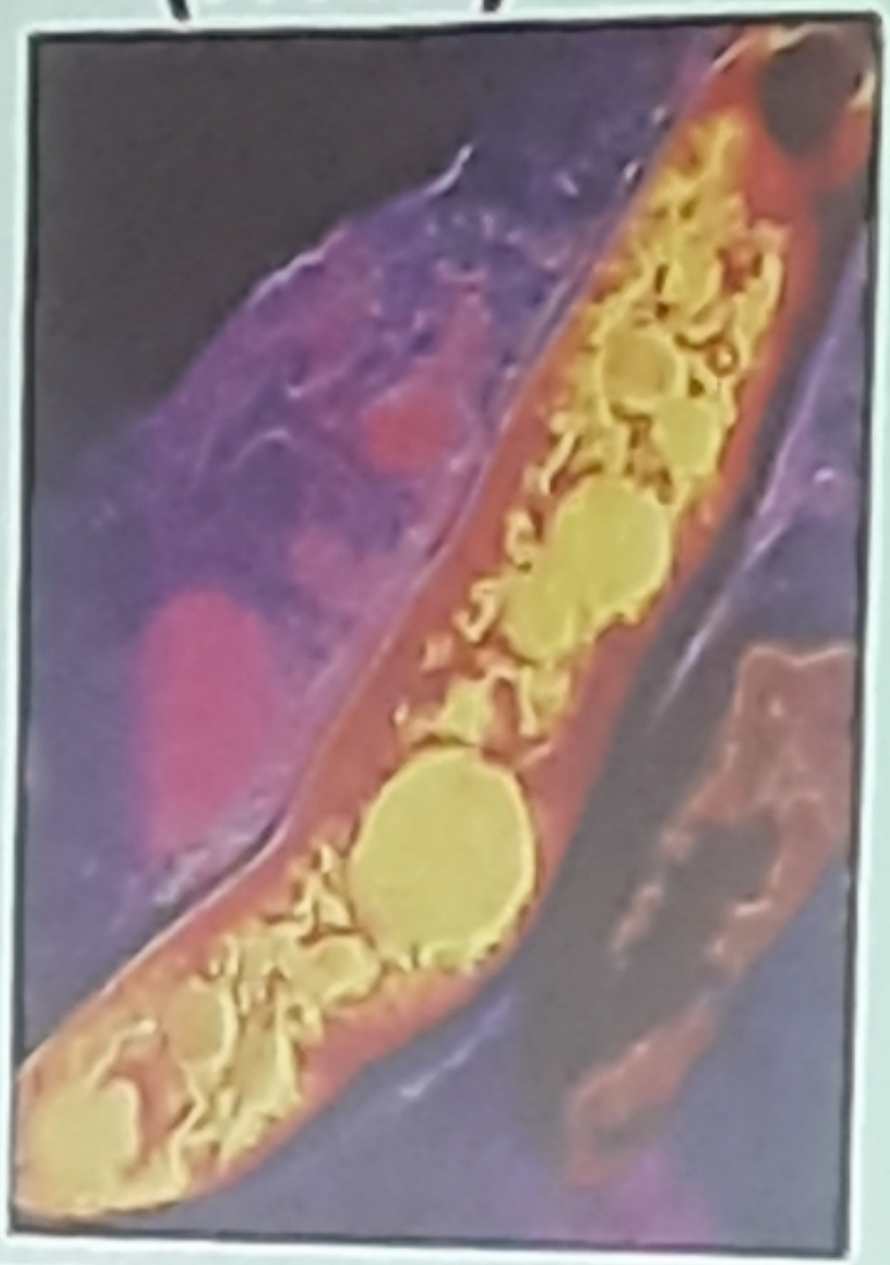
- Chemotherapy
- First line drugs are rifampicin, dapsone, and clofazimine
- The patients bacterial load decides length of treatment (6-24 months)
- Second line drugs are ofloxacin and minocycline
- Triple –drug combinations have been used in cases where a patient has only a single lesion

Control

- Detection & treatment of infectious cases
- Early detection of disease in close contacts
- Chemoprophylaxis for exposed children - dapsone
- Vaccination with BCG- varying results

Characters	Lepromarous leprosy	Tuberculoid leprosy
Lesions	Patches or nodules of 1-2 cm First involves face, ear lobes then to extremities	Assymetrical patches with well defined margin Involves face, gluteal regions and limbs
Nerve involvement	Mild and symmetrical anesthesia (late sign)	Thickened peripheral nerves common, usually assymetric
Lepra bacilli in lesion	Numerous	Scanty
Infectivity	Highly infectious	Usually non infective
CMI	Deficient/absent	Adequate
Lepromin test	Negative	Positive
Prognosis	Bad	Good

NON-TUBERCULAR MYCOBACTERIUM (NTM)



Nontuberculous Mycobacteria

- >100 NTM species
- Other names
  - Mycobacteria other than tuberculosis (MOTT)
  - Atypical
  - Environmental
  - Opportunistic
- Variable pathogenicity and geographic regions
- 40% cause diseases in human
- Immunosuppressed host

Scrofula

- A cervical lymphadenitis
- Source: Environmental H_2O sources, human respiratory tract
- Chronic, painless mass in the neck – known as a cold abscess
- In children – agent - *M.scrofulaceum*
  - Surgery, usually resistant to antibiotics
- In adults – agent - *M.tuberculosis* – antiTB drugs.

M.marinum

- Causes swimming pool or fish tank granuloma
- Lesions usually localized but may form secondary lesions
- Self-limiting; can use minocycline, cotrimoxazole or rifampicin with ethambutol

M.ulcerans

- Causes Buruli ulcer
- Found in low-lying marshy areas subject to periodic flooding
- Treatment
  - Early, pre-ulcerative lesion –excision and primary closure
  - Ulcerated lesions – excision & grafting
  - Antimicrobial agents – variable results

CONCLUSION

- Describe the structure and main pathogenic features of M. tuberculosis.

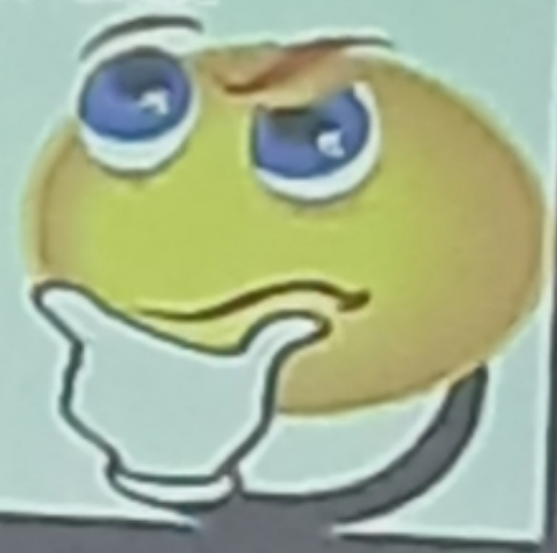
What is extra-pulmonary TB?

- What is Latent M. tuberculosis and Active TB

- MDR and XDR TB: what are they, how have they come about, and how
have they spread? Can they be treated? If so, how, and how is this
different from treatment of traditional TB infections?

- What is the connection between TB and AIDS?

- Different classifications of Leprosy



Quiz

A case of leprosy with good Cell mediated immunity usually presents as following form of disease:

a. Lepromatous
b. Tuberculoid
c. Determinate
d. Borderline
e. Leproid

14Buruli ulcer is caused by:

a. M. tuberculosis
b. M. ulceran
c. M. marinum
d. M. chelonei
e. M. Leprae

15. MDR TB: is defined as resistance to

a. more than three anti tubercular drugs
b. Isoniazid and rifampin irrespective of resistance to any other drug
c. Isoniazid, Pyrazinamide and Rifampicin
d. fluoroquinolones and at least one of the three injectable second-line drugs used to treat TB
e. Doxycline, Isoniazid and Rifampicin

Quiz

Briefly discuss the significance of the Tubercular granuloma formation to both the host and the pathogen