

Chemotherapy

Tuberculosis (TB)

What is Tuberculosis (TB)?

- **TB** is a serious infectious disease caused by *Mycobacterium tuberculosis*.
- Primarily affects the lungs but can spread to other organs.
- **Transmission:** Through airborne droplets (coughing, sneezing).
- **Symptoms:** Cough, chest pain, hemoptysis, fever, night sweats, weight loss, fatigue.

Common Symptoms of TB

1. Persistent cough
2. Chest pain
3. Coughing up blood
4. Fatigue
5. Loss of appetite
6. Night sweats
7. Fever
8. Shortness of breath

Pharmacology of Antitubercular Agents

- Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis*.
- Effective treatment requires a prolonged, multi-drug regimen to achieve the following goals:
 - Prevent resistance
 - Ensure complete eradication of the bacteria
 - Treat both active and latent bacilli (intracellular and extracellular)

First-Line Antitubercular Drugs (HRZE)

- These are the standard drugs used for the treatment of tuberculosis and form the cornerstone of therapy.
- They are effective against both active and latent tuberculosis.

1. Isoniazid (INH)

- **Mechanism of Action:** Inhibits mycolic acid synthesis in the bacterial cell wall.
- **Adverse Effects:** Hepatotoxicity, peripheral neuropathy, hemolysis in G6PD deficiency.

2. Rifampicin

- **Mechanism of Action:** Inhibits DNA-dependent RNA polymerase, blocking RNA synthesis.
- **Adverse Effects:** Hepatotoxicity, orange discoloration of body fluids, enzyme induction.

3. Pyrazinamide

- **Mechanism of Action:** Disrupts mycobacterial membrane metabolism (exact mechanism unclear).
- **Adverse Effects:** Hepatotoxicity, hyperuricemia (may cause gout).

4. Ethambutol

- **Mechanism of Action:** Inhibits arabinosyl transferase, reducing cell wall synthesis.
- **Adverse Effects:** Optic neuritis reduced visual acuity, red-green color blindness.

Second-Line Antitubercular Drugs

- These drugs are typically used when first-line drugs are ineffective, such as in multidrug-resistant (MDR-TB) or extensively drug-resistant tuberculosis (XDR-TB).

1. Streptomycin

- **Mechanism of Action:** Aminoglycoside antibiotic that inhibits protein synthesis by binding to bacterial ribosomes.

2. Ethionamide

- **Mechanism of Action:** Inhibits mycolic acid synthesis by interfering with the fatty acid synthase II complex.

3. Cycloserine

- **Mechanism of Action:** Inhibits cell wall synthesis by blocking the incorporation of D-alanine into peptidoglycan.

4. Para-aminosalicylic acid (PAS)

- **Mechanism of Action:** Interferes with folic acid metabolism, inhibiting bacterial growth.

5. Fluoroquinolones (e.g., levofloxacin)

- **Mechanism of Action:** Inhibits bacterial DNA gyrase and topoisomerase IV, interfering with DNA replication and transcription.

Fixed-Dose Combination (FDC) Therapy

- **Purpose:** FDC therapy is used to improve patient adherence to treatment and reduce the risk of drug resistance
- **Example:** HRZE in a single tablet (commonly used in the DOTS – Directly Observed Treatment, Short-course program)

Leprosy (Hansen's Disease)

Leprosy (Hansen's Disease)



- **Cause:** *Mycobacterium leprae*
- **Affects:** Skin, peripheral nerves, upper respiratory tract
- **Transmission:** Prolonged close contact (exact mode not fully understood)
- **Progression:** Slow; may lead to disfigurement and disability if untreated

Types of Leprosy

Type	Features
Tuberculoid	Few, well-defined reddish-brown skin lesions; numbness; nerve involvement
Lepromatous	Multiple, poorly defined nodular lesions; more diffuse; progressive and contagious

Treatment of Leprosy

Multidrug Therapy (MDT)

- Standard regimen recommended by WHO, typically includes:
 - Dapsone
 - Rifampin
 - Clofazimine

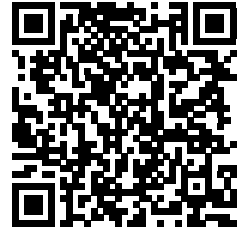


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