

Unit-III

Anti-tubercular Agent

Presented By:-

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Specialization - Pharmaceutical Chemistry

Anti-tubercular Agent

- An **anti-tubercular agent** (or anti-tuberculosis drug) is a medication used to treat **tuberculosis (TB)**, which is a bacterial infection caused by *Mycobacterium tuberculosis*.
- These drugs are designed to kill or inhibit the growth of the TB bacteria.

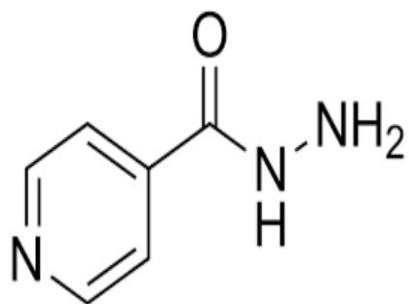
Classification-Anti-tubercular Agent

1. First-Line Drugs (most effective and commonly used)

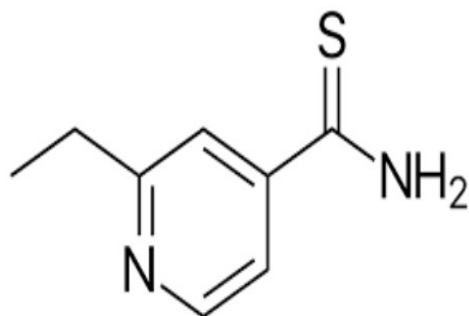
1. **Isoniazid (INH)** – bactericidal; inhibits mycolic acid synthesis
2. **Rifampicin (RIF)** – bactericidal; inhibits bacterial RNA synthesis
3. **Pyrazinamide (PZA)** – active in acidic environments; mechanism not fully understood
4. **Ethambutol (EMB)** – bacteriostatic; inhibits arabinogalactan synthesis (cell wall)
5. **Streptomycin** – aminoglycoside; inhibits protein synthesis (less commonly used now)

2. Second-Line Drugs (used for resistant TB)

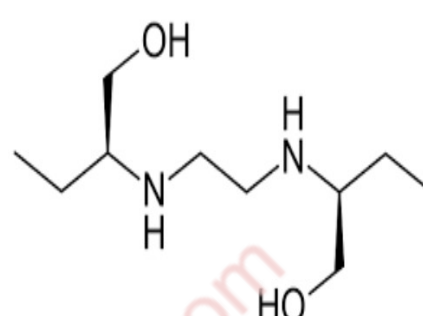
1. **Fluoroquinolones** – e.g., Levofloxacin, Moxifloxacin
2. **Injectable agents** – e.g., Amikacin, Capreomycin, Kanamycin
3. **Others** – Ethionamide, Cycloserine, Linezolid, Bedaquiline, Delamanid



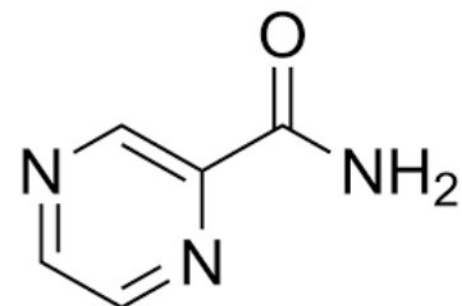
Isoniazid



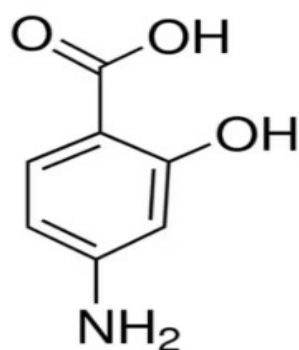
Ethionamide



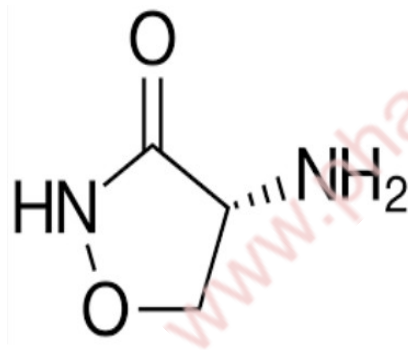
Ethambutol



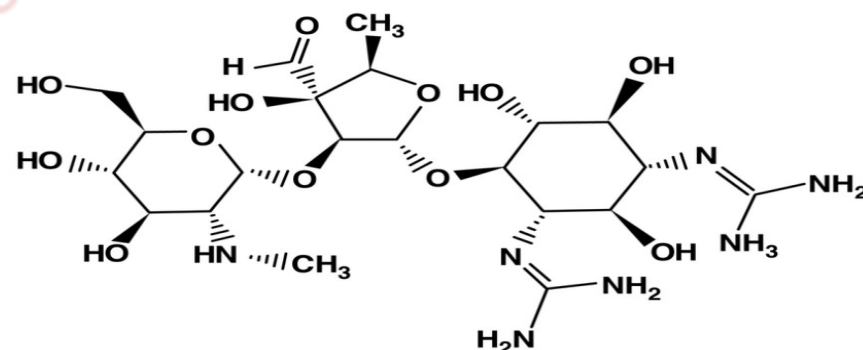
Streptomycin



Para amino salicylic acid



Cycloserine



Streptomycin

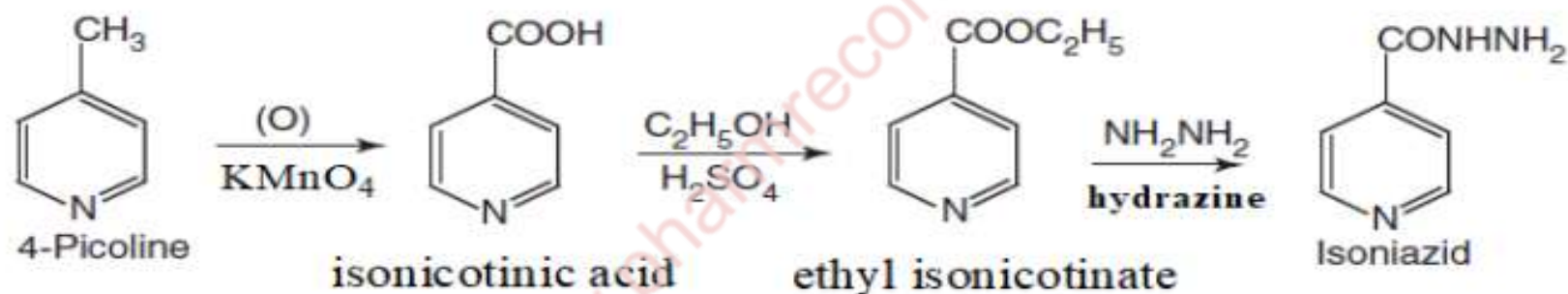
Synthetic anti tubercular agent

Drug	Mode of Action	Uses
Isoniazid*	Inhibits synthesis of mycolic acids (essential components of the mycobacterial cell wall)	First-line treatment of tuberculosis (TB); active against rapidly dividing bacilli
Ethionamide	Inhibits mycolic acid synthesis by blocking InhA enzyme	Second-line drug for multidrug-resistant TB (MDR-TB)
Ethambutol	Inhibits arabinosyl transferases involved in cell wall arabinogalactan synthesis	First-line treatment of TB; mainly used to prevent resistance
Pyrazinamide	Disrupts mycobacterial cell membrane metabolism and transport functions	First-line drug; particularly effective in acidic environments (e.g., inside macrophages)
Para-aminosalicylic acid*	Inhibits folic acid synthesis by acting as a PABA analog	Second-line agent for drug-resistant TB

Anti-tubercular anti-infective agent

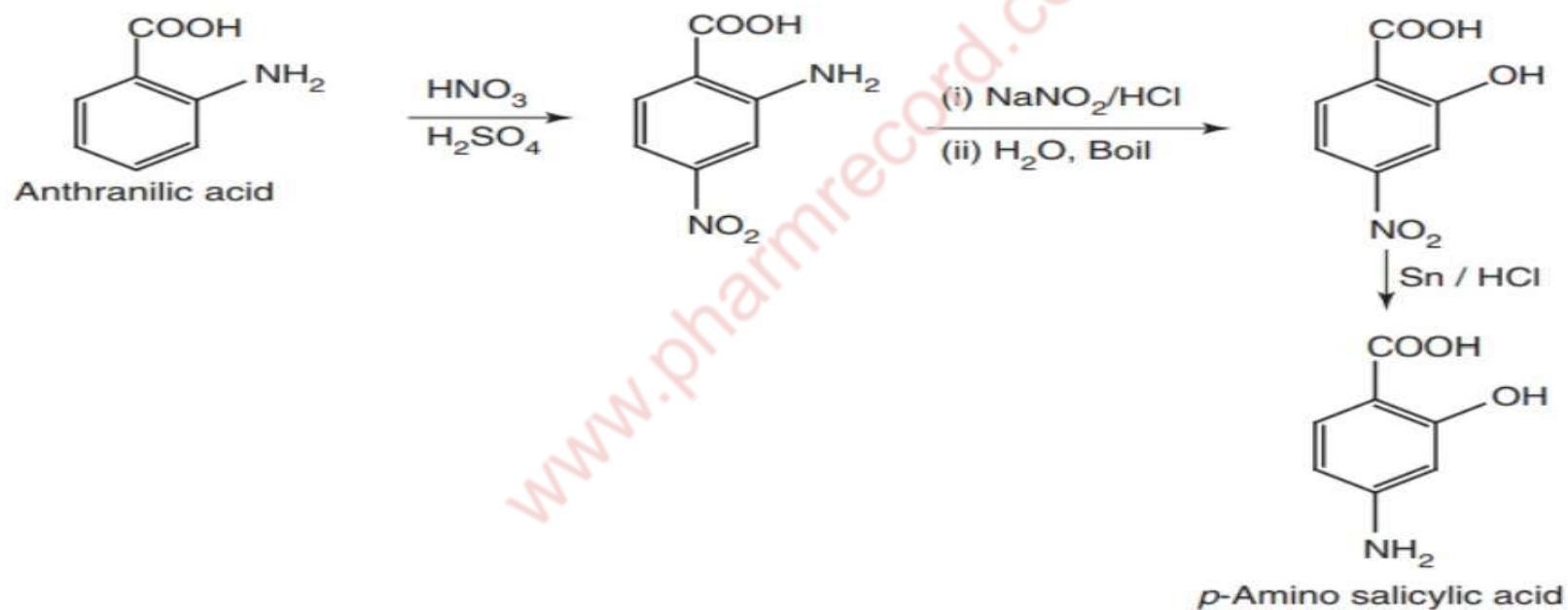
Drug	Mode of Action	Uses
Rifampicin	Inhibits DNA-dependent RNA polymerase, blocking RNA synthesis	First-line treatment of TB; active against both intracellular and extracellular bacilli
Rifabutin	Similar to rifampicin; inhibits bacterial RNA polymerase	Used in TB patients co-infected with HIV (fewer drug interactions than rifampicin)
Cycloserine	Inhibits bacterial cell wall synthesis by blocking alanine racemase and D-alanine ligase	Second-line agent for multidrug-resistant TB (MDR-TB)
Streptomycin	Aminoglycoside antibiotic; inhibits protein synthesis by binding 30S ribosomal subunit	First-line injectable for TB; used especially in severe or extrapulmonary TB
Capreomycin sulphate	Cyclic peptide antibiotic; inhibits protein synthesis (exact target not fully defined)	Second-line injectable for drug-resistant TB (especially MDR-TB)

Synthesis of Isoniazid



Synthesis of Para amino salicylic acid

From- anthranilic acid



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THANK YOU