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ANTI TUBERCULAR DRUGS

Definition

Antituberculosis drugs are medicines used to treat tuberculosis, an infectious disease that can affect the lungs and other organs.

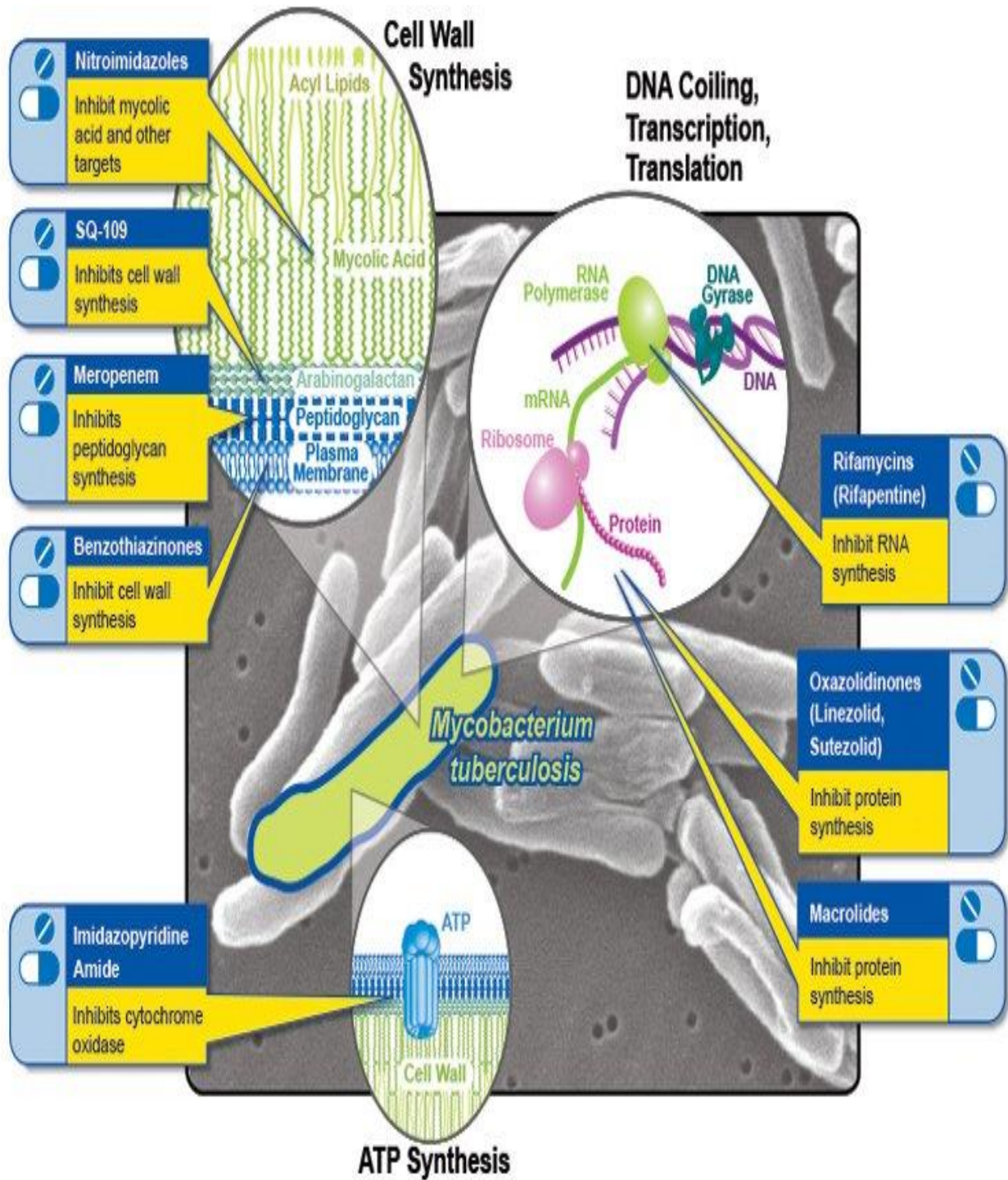
Tuberculosis (TB) is caused by a type of bacterium called *Mycobacterium tuberculosis*. It's spread when a person with active TB disease in their lungs coughs or sneezes and someone else inhales the expelled droplets, which contain TB bacteria.

CLASSIFICATION

According to clinical utility the anti TB drugs can be divided into 2 groups

- **First Line** : high antitubercular efficacy as well as low toxicity – routinely used
 - Isoniazid (H) , Rifampin (R), Pyrazinamide (Z), Ethambutol (E), Streptomycin (S) - HRZES
- **Second Line** : low antitubercular efficacy or high toxicity
 - Paraminosalicylic Acid, Cycloserine, Kanamycin, Amikacin, Ciprofloxacin, Ofloxacin, Clarithromycin, Azithromycin

MECHANISM OF ACTION OF VARIOUS ANTI TUBERCULAR DRUGS

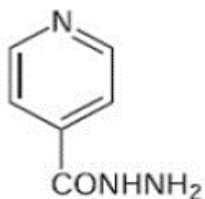


ISONIAZID

Isoniazid, also known as isonicotinic acid hydrazide (INH), is an antibiotic used for the treatment of tuberculosis. Isoniazid is a prodrug that inhibits the formation of the mycobacterial cell wall.

STRUCTURE & IUPAC NAME

Pyridine-4-carbohydrazide



PROPERTIES

- Colorless or white crystals or a white crystalline powder.
- odorless ,taste is slightly sweet at first and then bitter.
- Soluble in alcohol & chloroform. Practically insoluble in ether & benzene.

STABILITY & STORAGE

- Stable at room temp for more than 14 days in aq soln and more than 6 wk when stored at about 4 °c.
- When heated to decomposition it emits toxic fumes of nitrogen oxides.

USES

- For active tuberculosis it is often used together with rifampicin, pyrazinamide, and either streptomycin or ethambutol.
- For latent tuberculosis it is often used by itself.
- It may also be used for atypical types of mycobacteria, such as *M. avium*, *M. kansasii*, and *M. xenopi*.
- It is usually taken by mouth but may be used by injection into muscle.

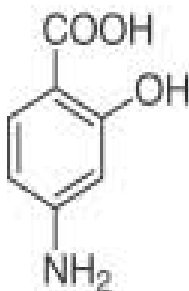
BRAND NAMES - Nydrazid, Laniazid

PARA AMINO SALICYLIC ACID (PAS)

para-Aminosalicylic acid, also known as 4-aminosalicylic acid and sold under the brand name Paser. The main use for 4-aminosalicylic acid is for the treatment of tuberculosis infections.

STRUCTURE & IUPAC NAME

4-Amino-2-hydroxybenzoic acid



PROPERTIES

- White or nearly white bulky powder, also occur as minute crystals or needles or plates.
- Odorless, or has slight acetous odor
- Soluble in dilute nitric acid & dilute sodium hydroxide.
- Virtually insoluble in benzene, chloroform or carbon tetrachloride.
- Slightly soluble in ether; practically insoluble in benzene.

STABILITY & STORAGE

- Darkens on exposure to light & air
- Temp above 80 °c, aqueous solution are readily decarboxylated to give brown solution consisting of m-aminophenol /hcl & na salts/

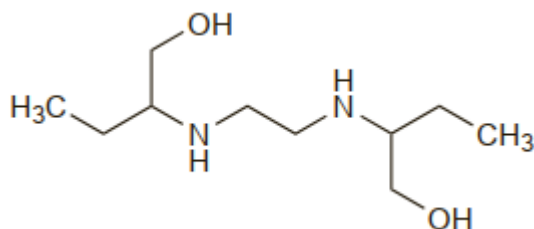
USES

- It is an antibiotic primarily used to treat tuberculosis.
- Specifically it is used to treat active drug resistant tuberculosis together with other antituberculosis medications.
- It has also been used as a second line agent to sulfasalazine in people with inflammatory bowel disease such as ulcerative colitis and Crohn's disease.
- It is typically taken by mouth.

ETHAMBUTOL

Ethambutol (EMB, E) is a medication primarily used to treat tuberculosis. It is usually given in combination with other tuberculosis medications, such as isoniazid, rifampicin and pyrazinamide.

STRUCTURE & IUPAC NAME



(2S,2'S)-2,2'-(Ethane-1,2-diyl diimino)dibutan-1-ol

PROPERTIES

- A white or almost white, crystalline powder.
- Freely soluble in water; soluble in alcohol and in methyl alcohol; slightly soluble in chloroform and in ether.
- Essentially odorless, has bitter taste.

STABILITY & STORAGE

Stable in light & heat but is hygroscopic when exposed to high relative humidities. store in airtight containers.

USES

- Ethambutol is used with other antituberculous drugs in the primary treatment of pulmonary and extrapulmonary tuberculosis to suppress emergence of resistance to the other drugs used in the regimens.
- It is also used as a component of regimens for the treatment of nontuberculous mycobacterial infections.
- It may also be used to treat Mycobacterium avium complex, and Mycobacterium kansasii.
- It is taken by mouth.

BRAND NAMES

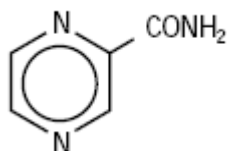
Myambutol, Etibi, Servambutol.

PYRAZINAMIDE

Pyrazinamide is a medication used to treat tuberculosis. For active tuberculosis, it is often used with rifampicin, isoniazid, and either streptomycin or ethambutol. It is not generally recommended for the treatment of latent tuberculosis. It is taken by mouth.

STRUCTURE & IUPAC NAME

pyrazine-2-carboxamide



PROPERTIES

- Pyrazinamide is a white powder or Crystals.
- Soluble in methanol, absolute ethanol, ether & chloroform.

STORAGE & STABILITY

- When heated to decomposition it emits toxic fumes of /nitric oxides/
- Store in a well-closed container at controlled room temperature.

Uses

- Pyrazinamide is used with other medications to treat tuberculosis (TB).
- It is an antibiotic and works by stopping the growth of bacteria.
- This antibiotic treats only bacterial infections. It will not work for viral infections (such as common cold, flu).
- Pyrazinamide is only used in combination with other drugs such as isoniazid and rifampicin in the treatment of *Mycobacterium tuberculosis* and as directly observed therapy (DOT).
- It is never used on its own.