

## CHAPTER 39

### Antitubercular Agents

NDEG 26A – Pharmacology I  
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### Antitubercular Agents

- Tuberculosis (TB)
- Caused by *Mycobacterium tuberculosis*
- Antitubercular agents treat all forms of *Mycobacterium*

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### *Mycobacterium* Infections

- Common infection sites
- Lung (primary site)
- Brain
- Bone
- Liver
- Kidney

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### *Mycobacterium* Infections (cont'd)

- Aerobic bacillus
- Passed from infected:
  - Humans
  - Cows (bovine)
  - Birds (avian)

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### *Mycobacterium* Infections (cont'd)

- Tubercle bacilli are conveyed by droplets
- Droplets are expelled by coughing or sneezing, then gain entry into the body by inhalation
- Tubercle bacilli then spread to other body organs via blood and lymphatic systems
- Tubercle bacilli may become dormant, or walled off by calcified or fibrous tissue

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### Antitubercular Agents

#### First-Line Agents

isoniazid\*  
ethambutol  
pyrazinamide (PZA)  
rifampin  
streptomycin

#### Second-Line Agents

capreomycin  
cycloserine  
ethionamide  
kanamycin  
para-aminosalicylic acid (PAS)

\*Most frequently used

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## Mechanism of Action

### Three groups

- Protein wall synthesis inhibitors (streptomycin, kanamycin, capreomycin, rifampin, rifabutin)
- Cell wall synthesis inhibitors (cycloserine, ethionamide, isoniazid)
- Other mechanisms of action

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## Isoniazid (INH)

- Drug of choice for TB
- Resistant strains of *Mycobacterium* emerging
- Metabolized in the liver through acetylation—watch for “slow acetylators”
- Used alone or in combination with other agents

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## Indications

Used for the prophylaxis or treatment of TB

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## Antitubercular Therapy

Effectiveness depends upon:

- Type of infection
- Adequate dosing
- Sufficient duration of treatment
- Drug compliance
- Selection of an effective drug combination

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## Antitubercular Therapy (cont'd)

### Problems

- Drug-resistant organisms
- Drug toxicity
- Patient noncompliance

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## Antitubercular Therapy (cont'd)

Multidrug-resistant TB (MDR-TB)

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## Side Effects

- INH
  - Peripheral neuritis, hepatotoxicity
- Ethambutol
  - Retrobulbar neuritis, blindness
- Rifampin
  - Hepatitis, discoloration of urine, stools

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## Nursing Implications

- Obtain a thorough medical history and assessment
- Perform liver function studies in patients who are to receive isoniazid or rifampin (especially in elderly patients or those who use alcohol daily)
- Assess for contraindications to the various agents, conditions for cautious use, and potential drug interactions

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## Nursing Implications

Patient education is *critical*

- Therapy may last for up to 24 months
- Take medications exactly as ordered, at the same time every day
- Emphasize the importance of strict compliance to regimen for improvement of condition or cure

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## Nursing Implications

Patient education is *critical* (cont'd)

- Remind patients that they are contagious during the initial period of their illness— instruct in proper hygiene and prevention of the spread of infected droplets
- Emphasize to patients to take care of themselves, including adequate nutrition and rest

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## Nursing Implications

- Patients should not consume alcohol while on these medications or take other medications, including OTC, unless they check with their physician
- Diabetic patients taking INH should monitor blood glucose levels because hyperglycemia may occur
- INH and rifampin cause oral contraceptives to become ineffective; another form of birth control will be needed

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## Nursing Implications

- Patients who are taking rifampin should be told that their urine, stool, saliva, sputum, sweat, or tears may become reddish orange; even contact lenses may be stained
- Pyridoxine may be needed to combat neurologic side effects associated with INH therapy
- Oral preparations may be given with meals to reduce GI upset, even though recommendations are to take them 1 hour before or 2 hours after meals

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## Nursing Implications

### Monitor for side effects

- Instruct patients on the side effects that should be reported to the physician immediately
- These include fatigue, nausea, vomiting, numbness and tingling of the extremities, fever, loss of appetite, depression, jaundice

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## Nursing Implications

### Monitor for therapeutic effects

- Decrease in symptoms of TB, such as cough and fever
- Lab studies (culture and sensitivity tests) and CXR should confirm clinical findings
- Watch for lack of clinical response to therapy, indicating possible drug resistance

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