

Chapter-7

Pharmacology & Toxicology

D.Pharma 2nd Year Notes

Chapter- 7

Definition, classification, pharmacological actions, dose, indications and contraindications of

1. **Bronchodilators**
2. **Expectorants**
3. **Anti-tussive agents**
4. **Mucolytic agents**

Chapter-7 | Pharmacology & Toxicology

Drugs Acting On Respiratory System

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We learn in this Topic:

Chapter-7 | Definition, classification, pharmacological actions, dose, indications and contraindications of

- Bronchodilators
- Expectorants
- Anti-tussive agents
- Mucolytic agents

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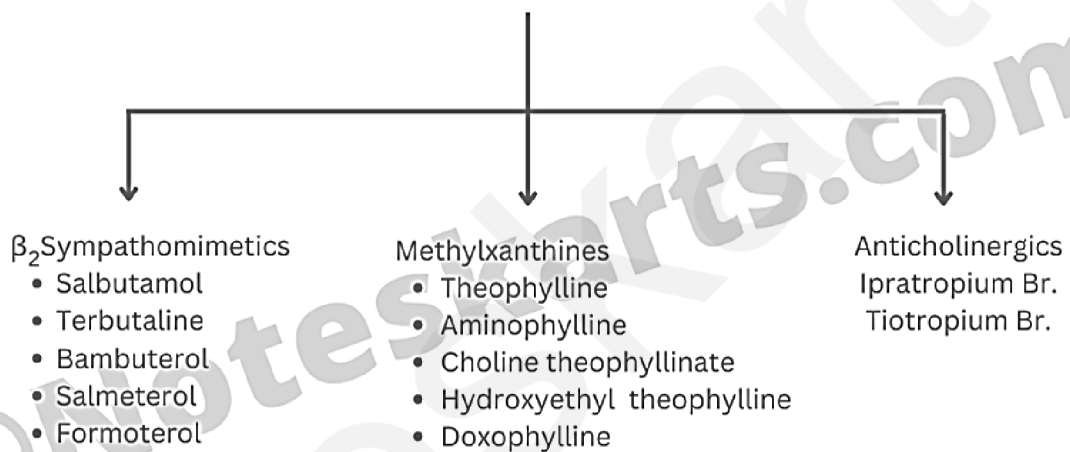


1. Bronchodilators:

- Bronchodilators are a type of medication that make breathing easier by relaxing the muscles in the lungs and widening the airways (bronchi).
- They're often used to treat long-term conditions where the airways may become narrow and inflamed, such as: asthma, a common lung condition caused by inflammation of the airways.

Classification:

Bronchodilators



Salbutamol:

- It belongs to a class of medications known as short-acting beta-2 adrenergic agonist.
- Salbutamol works by stimulating the beta-2 adrenoceptors in your bronchial muscles

Pharmacological actions:

- Salbutamol stimulate β_2 adrenergic receptors which are predominant receptors in bronchial smooth muscle (β_2 -receptors are present in human heart in a concentration between 10% and 50%).
- Stimulation of β_2 receptors leads to the activation of enzyme adenylyl cyclase that form cyclic AMP (adenosine-mono-phosphate) from ATP (adenosine-tri-phosphate).

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Dose:

- 2-4 mg oral
- 0.25-05 mg I.M./S.C.
- 100-200 µg by inhalation

Indications:

- (i) Salbutamol is indicated for the symptomatic relief and prevention of bronchospasm due to bronchial asthma, chronic bronchitis, reversible obstructive airway disease, and other chronic bronchopulmonary disorders in which bronchospasm is a complicating factor.
- (ii) The acute prophylaxis against exercise-induced bronchospasm and other stimuli known to induce bronchospasm.
- (iii) Salbutamol (albuterol) is a medication used to relax and open up your airways.
- (iv) It is used to relieve wheezing, coughing, chest tightness and breathlessness.
- (v) Salbutamol injection is also used for the management of uncomplicated premature labour between 22 and 37 weeks of pregnancy.

Contraindications:

- Feeling shaky
- Headache
- Muscle cramps
- Muscle tension
- Your heart beats too fast, too slow or irregularly (cardiac arrhythmia).



2. Expectorants

- Expectorants are the drugs that help in removing sputum from the respiratory tract either by increasing the fluidity (or reducing the viscosity) of sputum or increasing the volume of fluids that have to be expelled from the respiratory tract by coughing.
- **Examples of inorganic expectorants are ammonium chloride, potassium iodide, sodium iodide and related substances.**

Classification of expectorants is according to their mechanism of action

1. Sedative type
2. Stimulant type.

1. Sedative expectorants.

These are stomach irritant expectorants which are able to produce their effect through stimulation of gastric reflexes.

- **Examples of sedative expectorants :** Asipecac, senega, Indian squill, and compounds such as antimony potassium tartrate, ammonium chloride, sodium citrate, potassium iodide, etc.

2. Stimulant expectorants.

These are the expectorants which bring about a stimulation of the secretory cells of the respiratory tract directly or indirectly.

- **Example:** Eucalyptus, lemon, anise, and active constituents of oil like terpinehydrate, anethole.

Pharmacological Action

- Expectorants reduce the viscosity of tenacious secretions by irritating the gastric vagal receptors that stimulate respiratory tract fluid, thus increasing the volume but decreasing the viscosity of respiratory tract secretions.

Indications:

- Expectorants also help to relieve chest congestion that occurs because of a cold, the flu, or allergies.
- Potassium iodide has been used to increase the water content of secretions and improve breathing in people with conditions such as asthma, chronic bronchitis, or emphysema.

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- Expectorants aim to make coughing up mucus easier, they do not actually stop coughing.

Contraindications:

- A severe headache
- Confusion
- Excess salivation
- Fatigue
- Irregular heartbeat
- Numbness, tingling, pain or weakness in the hands or feet
- Gastrointestinal effects (such as acid reflux, diarrhea, nausea, vomiting, and stomach pain)

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3. Anti-tussive agents

- Cough is an essential protective reflex response to irritating stimuli in the respiratory tract. It involves the sudden, usually involuntary, expulsion of air from the lungs.
- Cough can prevent foreign bodies from entering the lungs or aid the removal of mucus and irritants from the lungs.

Classification of Antitussives

1. Opioids:
 - Ex-Codeine, Ethylmorphine, Pholcodeine.
2. Nonopioids:
 - Ex-Noscapine, Dextromethorphan, Chlophedianol.
3. Antihistamines:
 - Ex-Chlorpheniramine, Diphenhydramine, Promethazine.
4. Peripherally acting:
 - Ex-Prenoxdiazine.
5. Adjuvant antitussives/ Bronchodilators:
 - Ex-Salbutamol, Terbutalin.

Note: Pharmacological actions, indications and contraindications Same As Bronchodilators

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4. Mucolytics

- These are agents that reduce viscosity (liquefaction) of respiratory tract secretions without increasing their amount.
- Mucolytics are drugs used to manage mucus hypersecretion and its sequelae like recurrent infections in patients of COPD, cystic fibrosis, and bronchiectasis.
- They belong to a group of agents called mucoactive agents.

Classification of Mucolytics

1. **Bromhexine**
2. **Ambroxol** (It is metabolite of bromhexine and less gastric irritant).
3. **Acetylcysteine** (It could be given orally or by inhalation).

Pharmacological Action:

It reduces the viscosity of bronchial secretion by fragmenting its glycoproteins so mucus becomes less viscid and easily to expel.

Indications:

- Respiratory diseases e.g. bronchiectasis
- Post-operative and post-traumatic pulmonary - complications.
- Chronic sinusitis.

Contraindications:

- Fever.
- Runny nose.
- Sore throat.
- Drowsiness.
- Nausea.
- Vomiting.
- Diarrhea.
- Headache.

