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# PHARMACOLOGY - III

## UNIT 1

TOPIC :

- c. Expectorants and antitussives



## Expectorants and antitussives

### Expectorants

- Expectorants are drugs that help remove mucus (sputum) from the respiratory tract.
- They make cough productive by increasing bronchial secretions or decreasing mucus viscosity.
- Expectorants are agents that facilitate expulsion of mucus from airways.

### Uses of Expectorants

Used in:

- Productive cough
- Bronchitis
- COPD
- Respiratory tract infections
- Bronchiectasis

### Classification of Expectorants

#### A. Secretory Expectorants

Increase respiratory secretions.

##### Examples

- Guaifenesin
- Ammonium chloride
- Potassium iodide
- Sodium citrate

#### B. Mucolytics

Reduce thickness of mucus.

##### Examples

- Acetylcysteine
- Bromhexine
- Ambroxol
- Carbocisteine

## **A. Secretory Expectorants**

### **Guaifenesin**

#### **Mechanism**

- Increases respiratory tract fluid
- Reduces mucus stickiness

#### **Uses**

- Productive cough
- Bronchitis

#### **Adverse Effects**

- Nausea, Vomiting, Drowsiness

### **Ammonium Chloride**

#### **Mechanism**

- Stimulates bronchial secretion reflexly.

#### **Uses**

- Productive cough

#### **Adverse Effects**

- Gastric irritation, Acidosis in high doses

### **Potassium Iodide**

#### **Mechanism**

- Increases bronchial secretions.

#### **Uses**

- Chronic bronchitis

#### **Adverse Effects**

- Metallic taste, Skin rash, Salivary gland swelling

### **Sodium Citrate**

#### **Mechanism**

Makes sputum less viscous.

#### **Uses**

- Productive cough

#### **Adverse Effects**

- Gastric irritation

## **B. Mucolytics**

### **Acetylcysteine**

#### **Mechanism**

- Breaks disulfide bonds in mucus proteins.

#### **Uses**

- COPD
- Bronchitis
- Thick mucus conditions

#### **Adverse Effects**

- Bronchospasm
- Nausea
- Unpleasant odor

### **Bromhexine**

#### **Mechanism**

- Depolymerizes mucopolysaccharides in mucus.

#### **Uses**

- Productive cough
- Respiratory infections

#### **Adverse Effects**

- Gastric irritation
- Headache

### **Ambroxol**

#### **Actions**

- Mucolytic action
- Improves mucus clearance
- Increases surfactant secretion

#### **Uses**

- Bronchitis
- COPD

#### **Adverse Effects**

- Dry mouth
- Nausea

## Anti-Tussives

- Antitussives are drugs used to suppress cough reflex.
- They are mainly used in dry, non-productive, irritating cough where no mucus is present.

### Dry Cough

Dry cough is characterized by:

- Absence of sputum
- Irritation in throat
- Persistent coughing

Common causes:

- Viral infections
- Allergy
- Smoke irritation
- Asthma

### Therapeutic Goals

- Suppress excessive cough
- Provide symptomatic relief
- Improve sleep and comfort
- Reduce throat irritation

### Classification of Antitussives

#### A. Opioid Antitussives

- Act centrally on cough center.

##### Examples

- Codeine, Pholcodine

#### B. Non-opioid Antitussives

- Suppress cough without strong opioid effects.

##### Examples

- Dextromethorphan, Noscipine

#### C. Peripheral Antitussives

- Act on cough receptors in respiratory tract.

##### Examples

- Benzonatate, Levodropropizine

## A. Opioid Antitussives

### Codeine

#### Mechanism of Action

- Acts on cough center in medulla and suppresses cough reflex.

#### Pharmacological Effects

- Reduces cough frequency
- Mild sedative effect
- Mild analgesic action

#### Pharmacokinetics

- Administered orally
- Well absorbed from GIT
- Metabolized in liver

#### Therapeutic Uses

- Dry cough
- Nocturnal cough
- Irritating cough

#### Adverse Effects

- Sedation
- Constipation
- Respiratory depression
- Nausea
- Dependence with prolonged use

#### Contraindications

- Asthma
- Respiratory insufficiency
- Children
- Head injury

## Pholcodine

### Mechanism of Action

- Suppresses medullary cough center.

### Pharmacological Effects

- Antitussive action
- Less respiratory depression than codeine

### Uses

- Dry cough
- Persistent irritating cough

### Advantages

- Lower addiction potential
- Longer duration of action

### Adverse Effects

- Drowsiness
- GI upset

## B. Non-opioid Antitussives

### Dextromethorphan

→ Most commonly used non-opioid antitussive.

#### Mechanism of Action

- Acts centrally on medullary cough center to suppress cough.

#### Pharmacological Effects

- Suppresses cough
- Minimal analgesic action
- No major respiratory depression

#### Pharmacokinetics

- Oral administration
- Rapid absorption

#### Therapeutic Uses

- Dry cough
- Common cold
- Upper respiratory tract infections

#### Advantages

- Less addictive
- Safer than codeine

#### Adverse Effects

- Drowsiness, Dizziness, Nausea

### Noscapine

#### Mechanism of Action

- Suppresses cough center without opioid analgesic effect.

#### Pharmacological Effects

- Antitussive effect
- Minimal respiratory depression

#### Uses

- Dry irritating cough

#### Adverse Effects

- Sedation
- GI discomfort

## C. Peripheral Antitussives

### Benzonatate

#### Mechanism of Action

- Anesthetizes stretch receptors in respiratory passages and lungs.

#### Pharmacological Effects

- Reduces cough receptor sensitivity
- Suppresses cough reflex

#### Therapeutic Uses

- Irritating cough
- Chronic dry cough

#### Adverse Effects

- Sedation
- Numbness of mouth
- Hypersensitivity reactions

### Levodropropizine

#### Mechanism of Action

- Acts peripherally on airway sensory nerves.

#### Uses

- Non-productive cough

#### Adverse Effects

- Dizziness
- Fatigue

## **Pharmacological Effects of Antitussives**

- Suppress cough reflex
- Reduce cough frequency
- Relieve throat irritation
- Improve sleep

## **Therapeutic Uses of Antitussives**

- Dry cough
- Allergic cough
- Nocturnal cough
- Irritating cough
- Post-viral cough

## **Advantages of Antitussives**

- Symptomatic relief
- Improved patient comfort
- Better sleep
- Reduced throat irritation