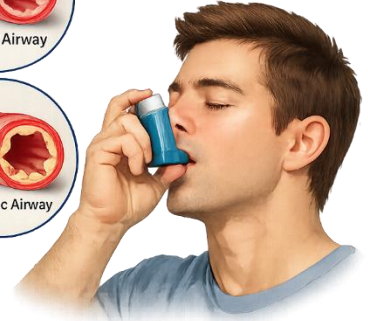
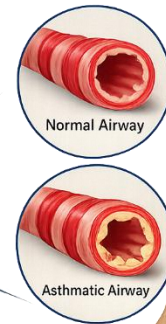
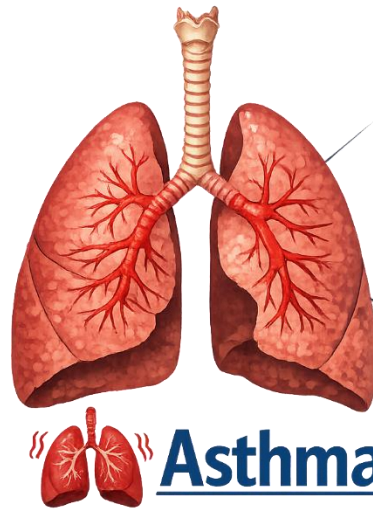


Pharmacology of drugs acting on Respiratory system

Introduction of Asthma

- Asthma is a chronic respiratory disease that causes airway narrowing, leading to recurring episodes of:

- Wheezing
- Chest tightness
- Shortness of breath
- Coughing



- These symptoms are often triggered by allergens, irritants, infections, or exercise.
- During an asthma attack, the airways become inflamed and swollen, making breathing difficult.
- While asthma is a lifelong condition, proper treatment and trigger avoidance can help manage symptoms.

Causes of Asthma

- The exact cause is not fully understood but involves both genetic and environmental factors, including:
 - Air pollution
 - Allergens
 - Respiratory infections
 - Certain medications

Types of Asthma

- Allergic Asthma** – Triggered by allergens (e.g., pollen, dust mites)
- Non-Allergic Asthma** – Triggered by irritants like smoke or cold air
- Exercise-Induced Asthma** – Triggered by physical activity
- Occupational Asthma** – Triggered by workplace irritants (e.g., chemicals, fumes)
- Childhood Asthma** – Begins in childhood, may improve with age
- Adult-Onset Asthma** – Develops in adulthood, influenced by hormones, obesity, or stress

Symptoms of Asthma

- Wheezing

- Shortness of breath
- Chest tightness
- Coughing
- Difficulty breathing

Mechanism of Asthma

- Asthma involves inflammation and narrowing of airways due to the release of inflammatory mediators (like histamine, leukotrienes) in response to triggers.
- This causes:
 - Swelling and inflammation
 - Constriction of airway muscles
 - Reduced airflow in and out of the lungs

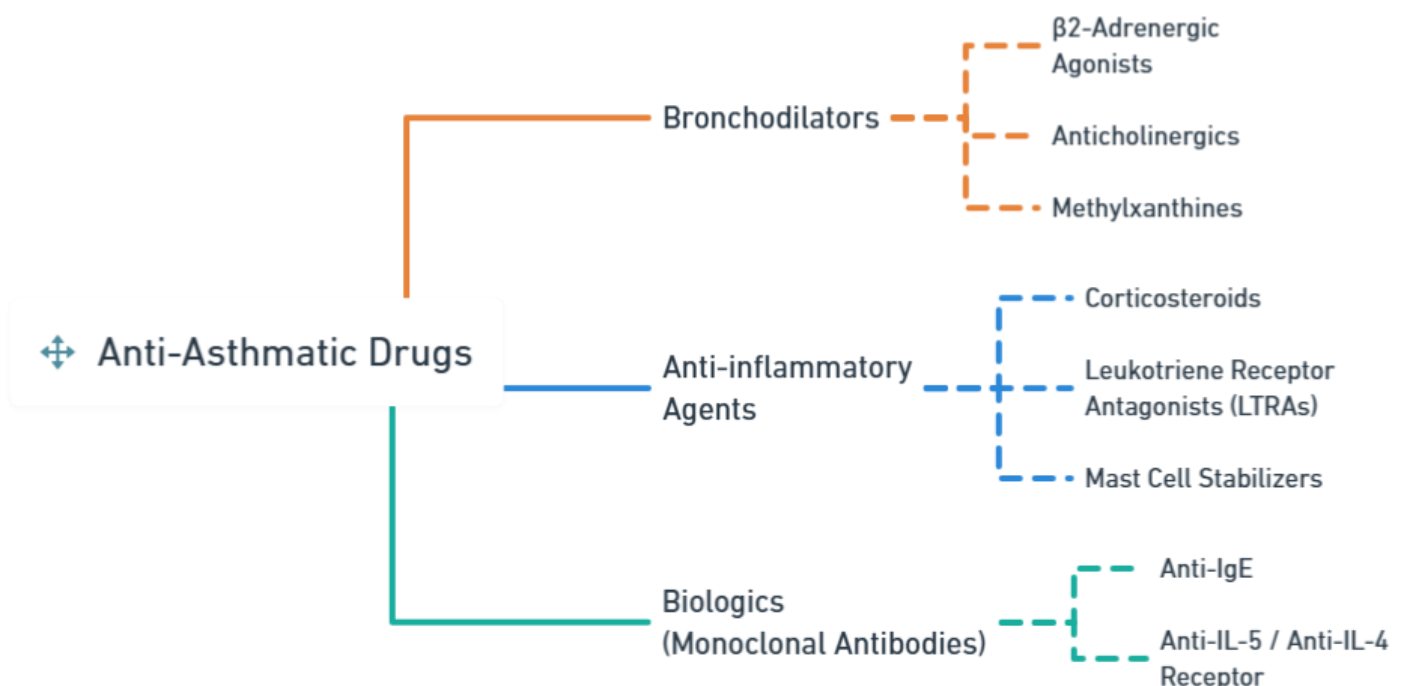
Treatment of Asthma

- Medications

Lifestyle and Management

- **Avoiding Triggers** – Allergens, smoke, exercise, etc.
- **Healthy Lifestyle** – Balanced diet, exercise, no smoking
- **Monitoring** – Use peak flow meters to track lung function
- **Asthma Action Plan** – Develop a personalized plan with a healthcare provider

Pharmacology of anti-asthmatic drugs



Main Classes of Anti-Asthmatic Drugs

1. Bronchodilators

- These drugs relieve bronchoconstriction and are primarily used in acute asthma attacks.

A. β 2-Adrenergic Agonists

- **Examples:** Salbutamol (short-acting), Salmeterol (long-acting)
- **Mechanism:** Stimulate β 2-receptors on bronchial smooth muscle, activating adenylate cyclase to increase cAMP. This leads to powerful muscle relaxation.
- **Use:**
 - Short-acting (SABA): Rescue inhaler in acute attack
 - Long-acting (LABA): Maintenance therapy (usually with corticosteroids)
- **Adverse Effects:** Fine skeletal muscle tremors, tachycardia, and palpitations.

B. Anticholinergics (Muscarinic antagonists)

- **Examples:** Ipratropium (short-acting), Tiotropium (long-acting)
- **Mechanism:** Block M3 receptors → inhibit vagal-mediated bronchoconstriction
- **Use:** More commonly used in COPD, but can be adjunct in asthma

C. Methylxanthines

- **Example:** Theophylline
- **Mechanism:** Inhibits phosphodiesterase → ↑ cAMP → bronchodilation; also has anti-inflammatory effect
- **Use:** Less commonly used due to narrow therapeutic index and side effects

2. Anti-inflammatory Agents

- These control the underlying inflammation in chronic asthma.

A. Corticosteroids

- **Examples:** Beclomethasone (inhaled), Prednisolone (oral)
- **Mechanism:** Inhibit inflammatory gene expression, reduce cytokine production
- **Use:**
 - Inhaled: Maintenance therapy
 - Oral: For severe or uncontrolled asthma



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