Treatment of Bronchial Asthma

- **Definition of Asthma:** Chronic inflammatory disorder with intermittent narrowing of the airways and it is characterized by wide variations, over short periods of time, in the resistance to flow in the intrapulmonary airways.
- **Factors in the Treatment Strategy:**
  - Asthma is a chronic condition.
  - The goal of therapy is normal function.
  - Asthma is heterogeneous in terms of:
    - Cause or trigger mechanism.
    - Extent of bronchoconstriction.
    - Degree of inflammation.
  - The course is unpredictable.
  - Therapy must be individualized.
- **Risk of Not Treating Asthma:**
  - Poor or no control of the patient's ashma.
  - Accelerated decline in the function of the patient's lungs.
  - Increased number of attacks of asthma.
  - Poorer response to therapy if started late.
  - Increased mortality from asthma.
- **Goals of Therapy in Asthma:**
  - Minimal symptoms even during sleep.
  - No, or infrequent, acute episodes.
  - No ED visits or missed days in school or work.
  - Rare need for beta-agonist inhaler therapy.
  - No limitation of activities – even sports.
  - Peak flow rate variability less than 20%.
  - No or minimal adverse effects from drugs.
- **Pathogenesis:**
  - Early Asthmatic Response:
    - Allergens provoke IgE production.
    - The tendency to produce IgE is genetically determined.
    - Re-exposure to the allergen causes antigen-antibody interaction on the surface of the mast cells leading to: Release of stored mediators, synthesis of other mediators and activation of neural pathways.
      (This response is prevented by bronchodilators).

- Late Asthmatic Response:
  - 4-5 hours later.
  - More sustained phase of bronchoconstriction.
  - Influx of inflammatory cells and an increase in bronchial responsiveness.
  - The mediators here are cytokines produced by TH2 lymphocytes, especially interleukins: 5, 9, and 13.
  - These mediators (produced in the early and late phases) will stimulate IgE production by B lymphocytes, and directly stimulate mucus production. (This response is prevented by corticosteroids).

- **Asthma Triggers:**
  - Exercise / cold air.
  - Cigarette smoke.
  - Stress / anxiety situations.
  - Animal dander's (cats, dogs etc..).
  - Allergens (grass, trees, molds, cockroach).
  - Pollutants (sulfur dioxide, ozone, etc…).
  - Fumes/toxic substances.
  - Medications (ASA, NSAID's, others).
- **Diagnosis of Asthma – Subjective:**
  - Cough - usually in spasms and to the point of vomiting – nighttime worse than daytime. Cough may follow exposure to cold air, exercise, URI (common cold), or exposure to an allergen.
  - Dyspnea > cough or wheezing > sputum.
  - Past history of bronchiolitis as a child.
  - Family history of asthma is common.
- **Diagnosis of Asthma – Objective:**
  - Diminished peak expiratory flow rate (PEFR).
  - Reduced mean and forced expiratory flow rate (FEFR).
  - Reversibility with Bronchodilators
  - Heightened response to Methacholine Test.
  - Increase in expired Nitric Oxide.
  - Increase in Inflammatory mediators and their metabolic products in body fluids.
- **Myths and Misconceptions:**
  - Patient and physician "Steroid-o-phobia".
  - Asthma is an emotional illness.
  - Asthma is an acute disease.
  - Asthma medications are addictive.

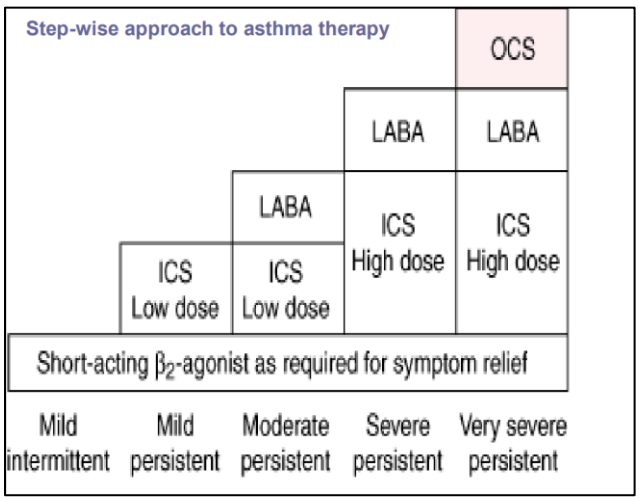
- Asthma medications become ineffective if they are used regularly.
- Asthma is not a fatal illness / It does not kill.

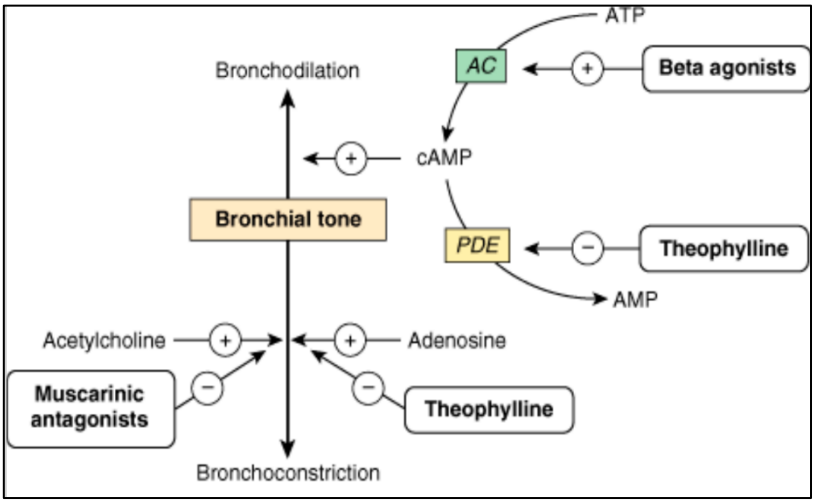
➢ **Overview of the changing therapy of asthma by decade:**

- 1960's: Aminophylline, Epinephrine, Ephedrine.
- 1970's: Beta-agonists, Theophyllines, Beclomethasone, Cromolyn, Ipratropium.
- 1980's: Beta-agonists, Inhaled Corticosteroids, Cromolyn, Ipratropium.
- 1990's: Inhaled Corticosteroids, Beta-agonists, Theophylline, Leukotriene Inhibitors.
- 2000's: Corticosteroids + LABA, LTRAs (Leukotriene receptor antagonists), Theophylline, Cromolyn, Ipratropium, Tiotropium.
- 2010's: Prevention, including gene therapy.

➢ **Relievers / Controllers:**

- Quick relief medications:
  - Inhaled Short acting Beta-2 Agonists.
  - Inhaled Anticholinergics.
  - Systemic Corticosteroids.
- Long-term control medications:
  - Topical (inhaled) Corticosteroids.
  - Inhaled Cromolyn Na and Nedocromil.
  - Oral Methylxanthines (Theophyllines).
  - Inhaled Long-acting Beta-2 Agonists (LABA).
  - Oral Leukotriene modifiers (LTRA).





- The following figures summarize what was previously mentioned, check them: