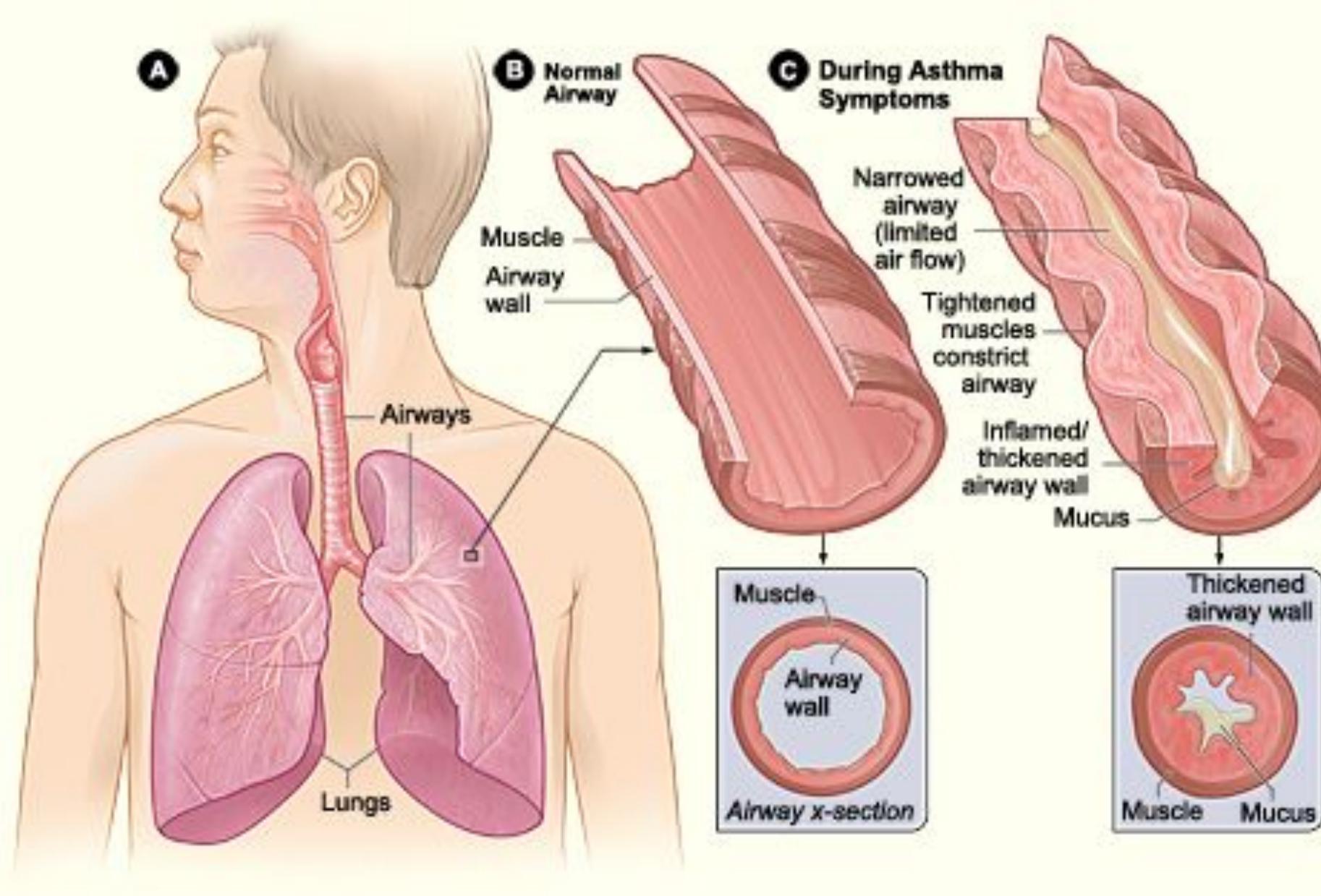


Bronchial Asthma

Asthma

- **Chronic inflammatory disorder of the airways**
- **Usually associated with atopy**
- **Obstruction to airflow which is reversible (either spontaneously or with use of medications)**
- **Airway hyperresponsiveness and narrowing in response to a variety of stimuli**





Bronchus



Normal

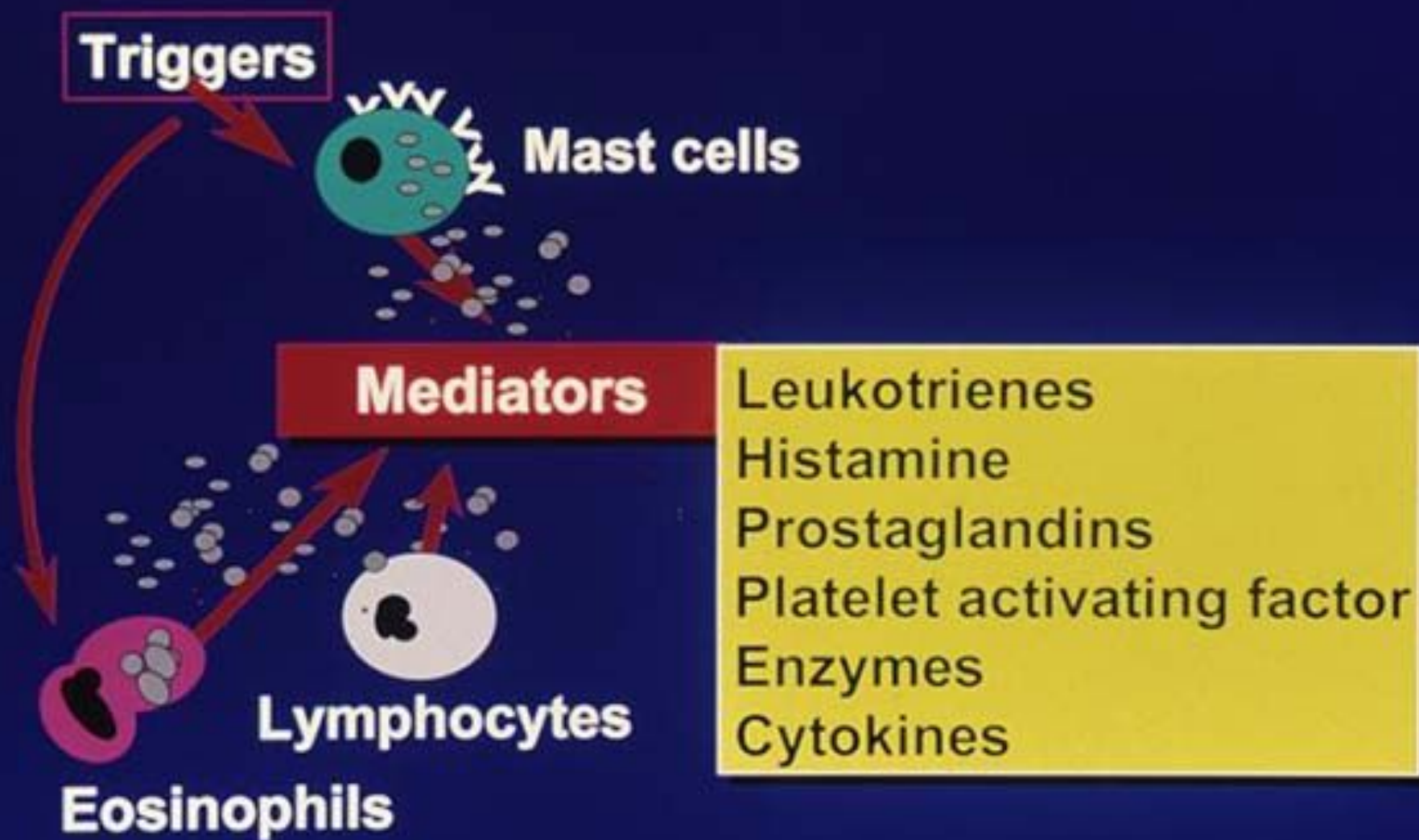
Asthma Triggers

- Allergens
- Drugs
- Exercise
- Occupational stimuli
- Infections
- Environmental changes
- Air pollutants
- Chemical irritants
- Emotions
- Weather/Temp.
- Food additives

Inflammation

Reduced airway opening





Factors favoring the Th1 phenotype

- Presence of older siblings
- Early exposure to day care
- Tuberculosis, measles, or hepatitis A infection
- Rural environment

Factors favoring the Th2 phenotype

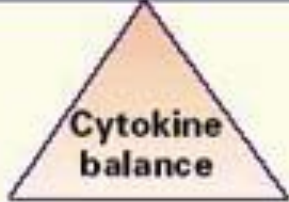
- Widespread use of antibiotics
- Western lifestyle
- Urban environment
- Diet
- Sensitization to house-dust mites and cockroaches



Protective immunity



Allergic diseases including asthma

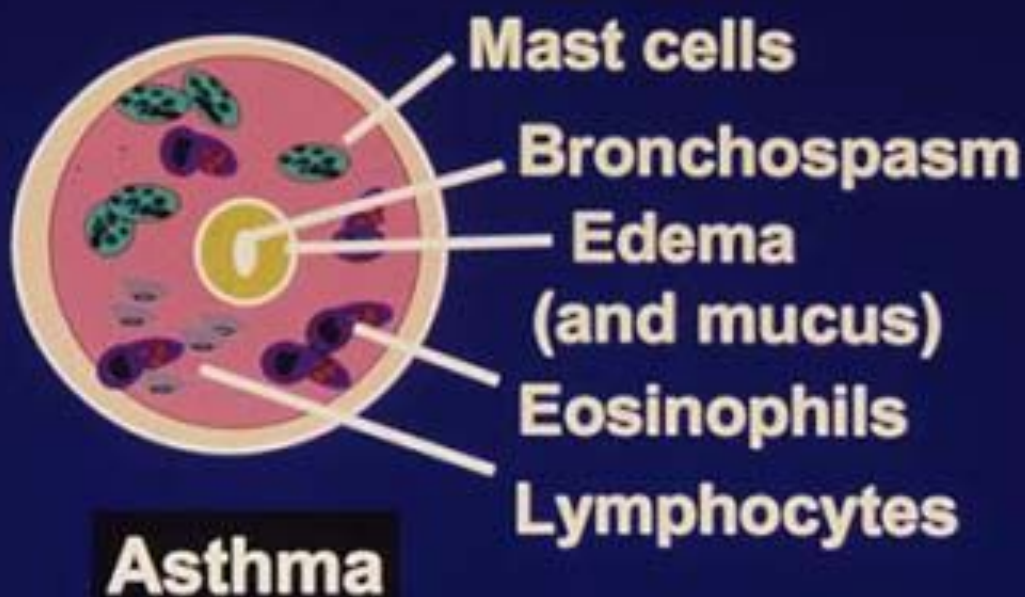


Asthma: A Lung Disease with Airway

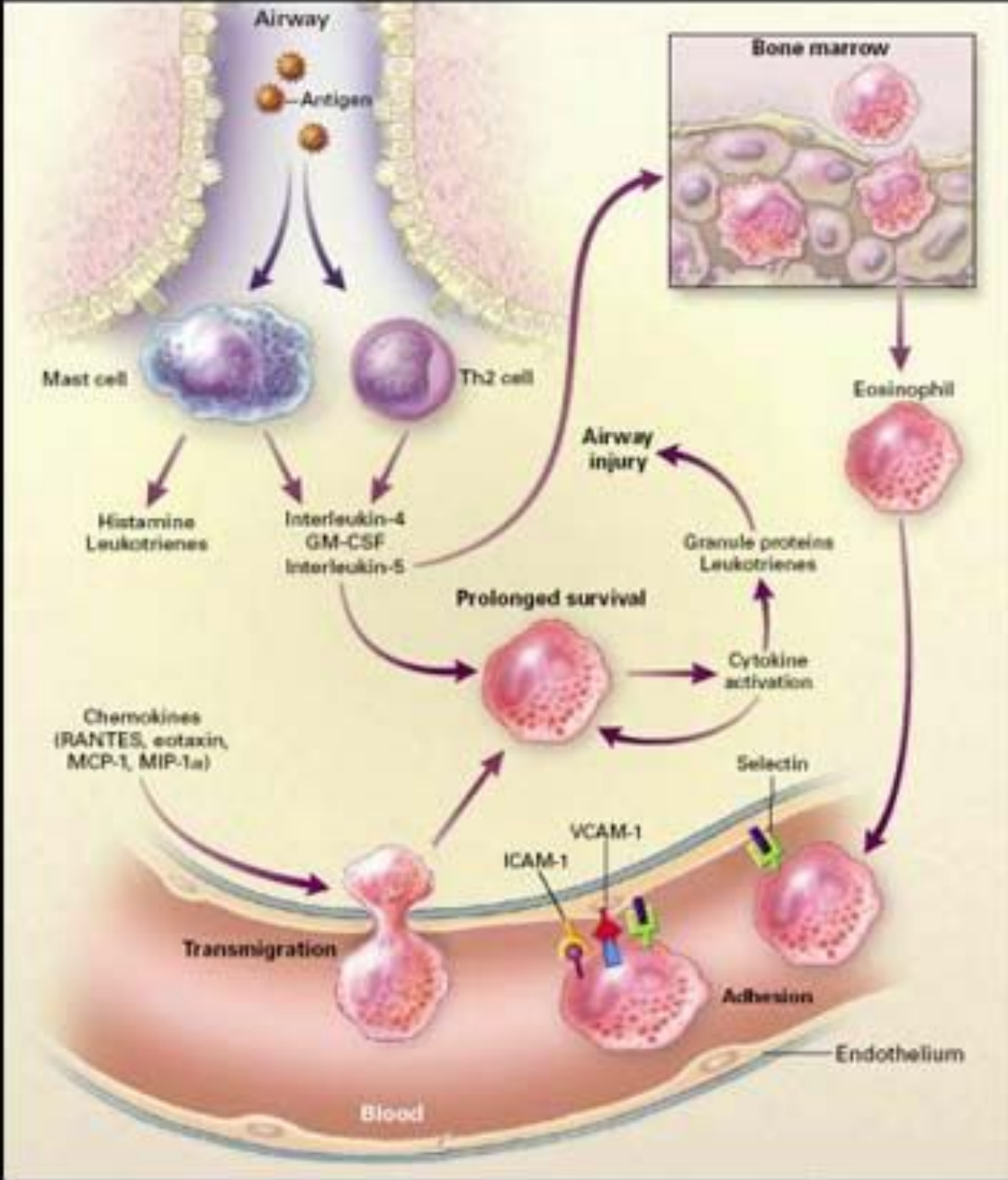
- ➔ **Obstruction (at least partially reversible)**
- ➔ **Hyperreactivity**
- ➔ **Inflammation**



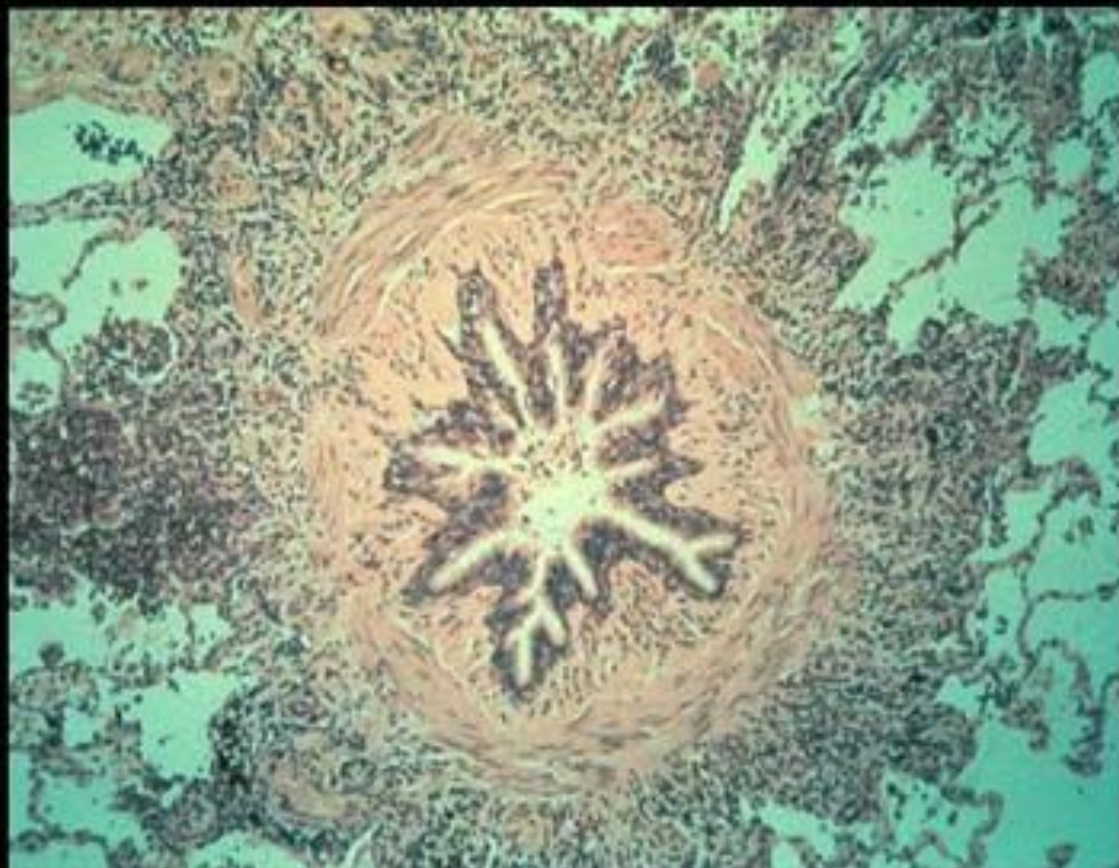
**Normal
Bronchiole**

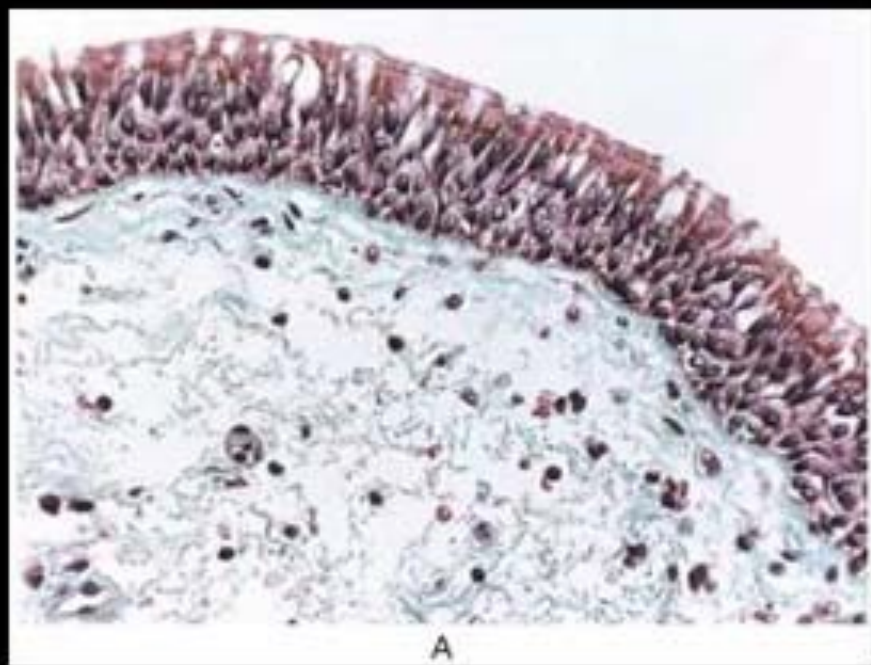


Asthma

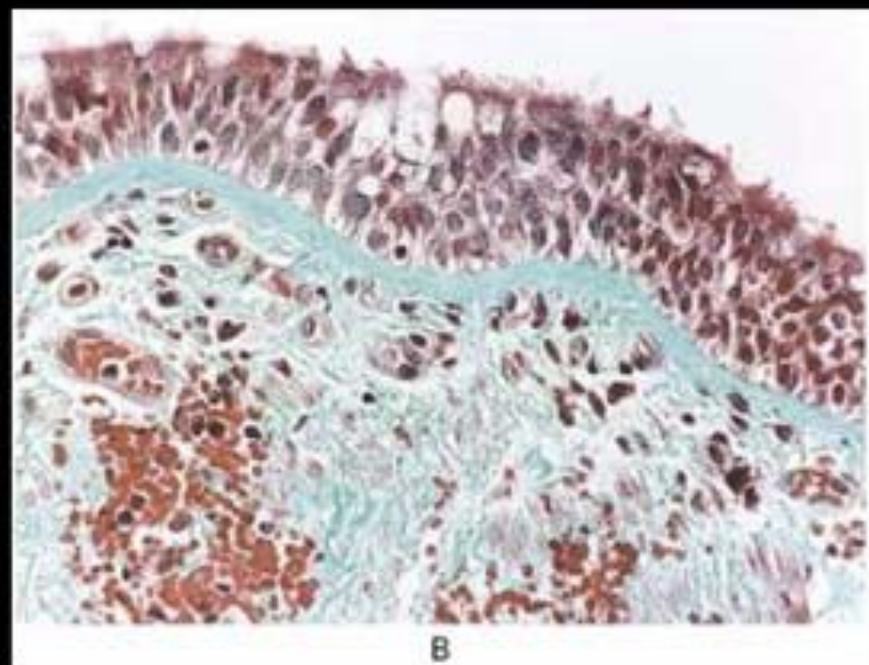


Airway inflammatory changes in asthma

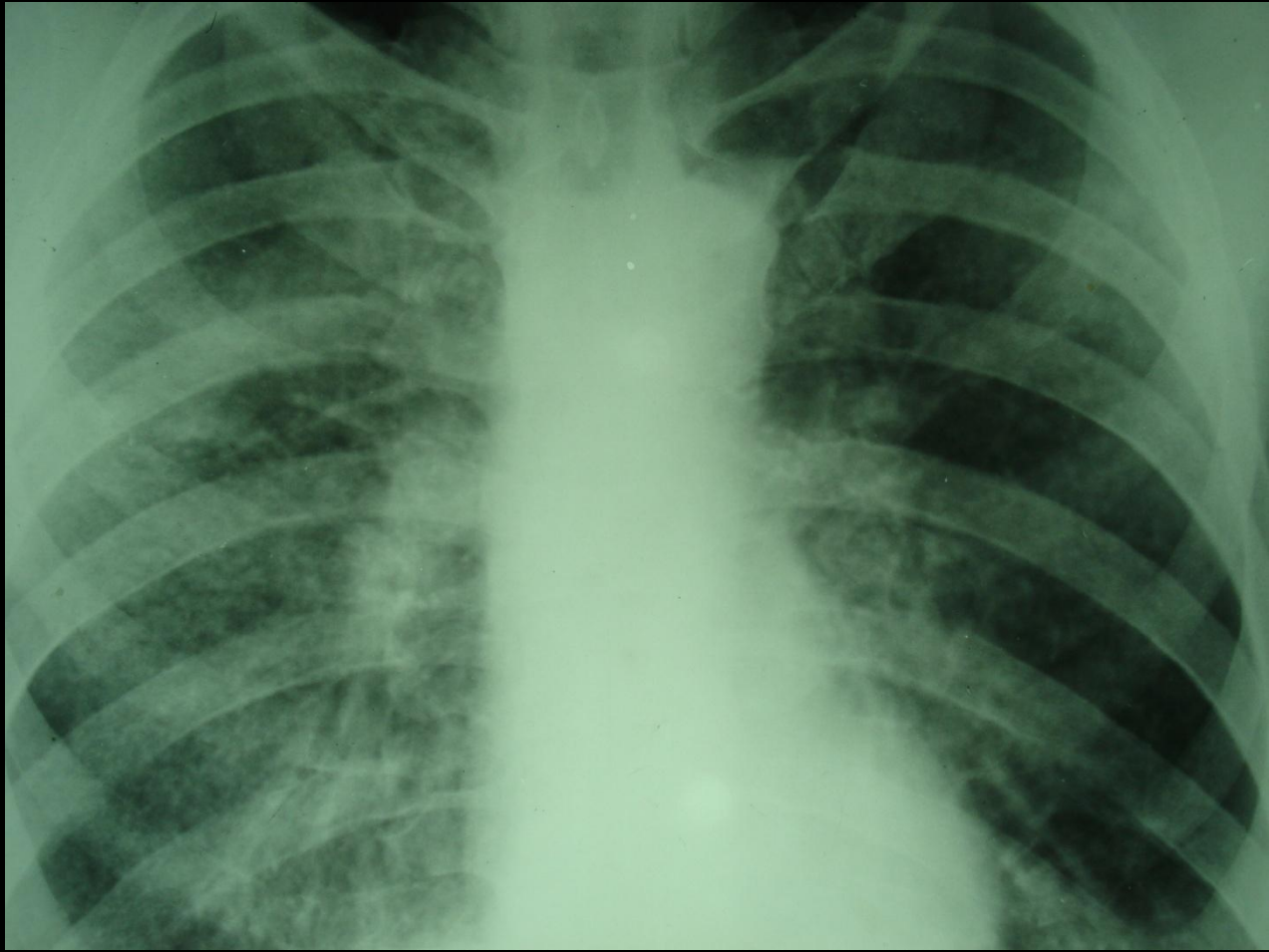




normal



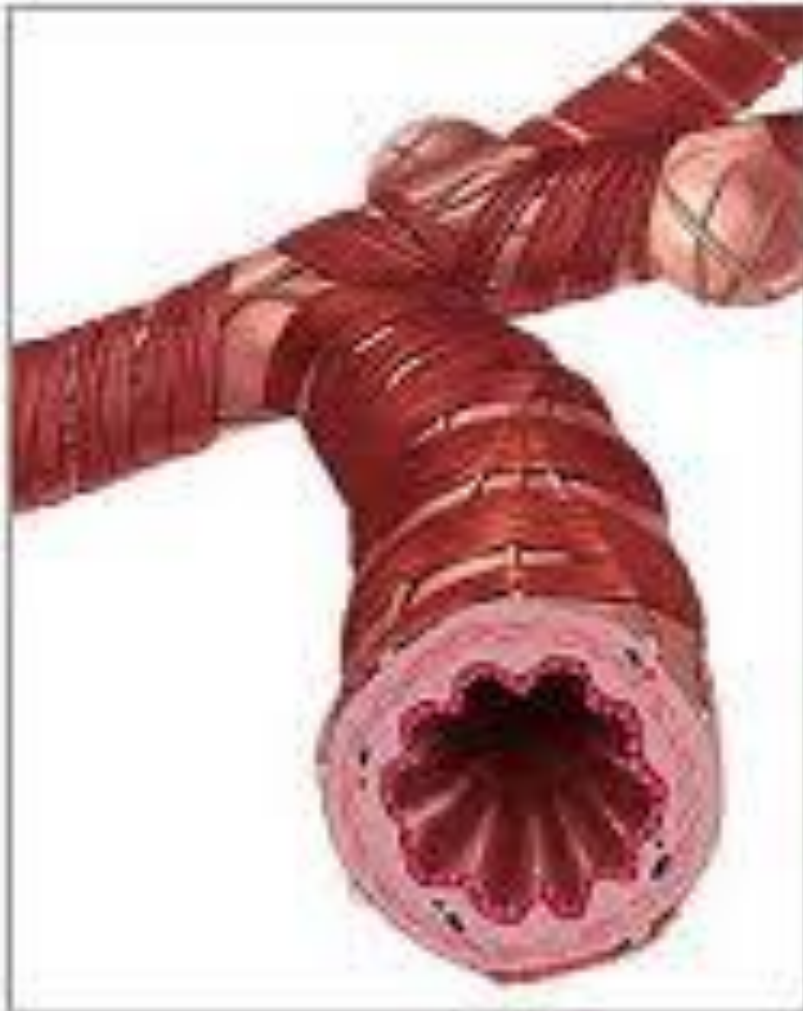
mild asthma



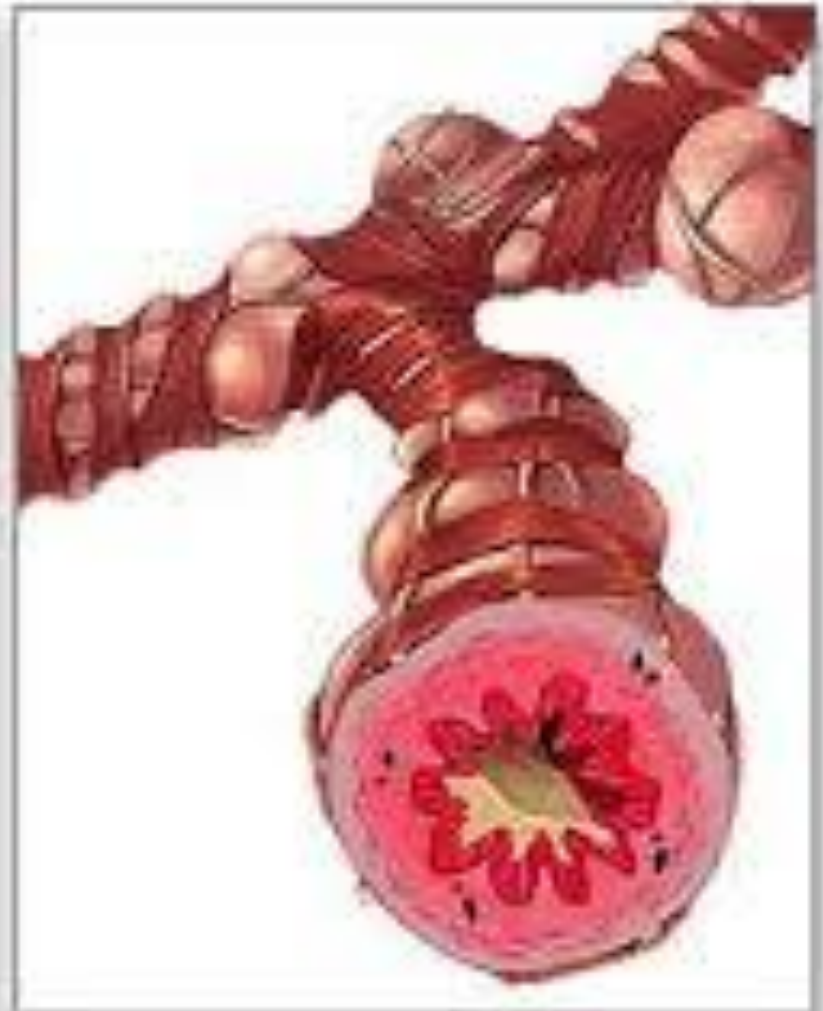
Contributing factors to asthma exacerbation

- Poorly controlled airway inflammation
- Cold air
- Exercise
- Upper respiratory tract infection
- sinusitis, rhinitis, GERD
- smoking
- environmental allergens

Normal bronchiole



Asthmatic bronchiole





Normal Lung

Asthmatic Lung

β_2 -agonists

- **Most effective bronchodilator for asthma**
- **bind to β_2 receptors on airway smooth muscle cells**
- **useful as “rescue” for acute symptom relief**
- **Side effects are due to overlap β_2 activity (cardiac) and activation of non-airway β_1 receptors (skeletal muscle, metabolic)**
- **no effect on inflammation**

Anticholinergic drugs (ipatropium bromide, tiotropium)

- Slower onset of action
- reduced efficacy compared with β_2 agonists
- may be useful for nocturnal asthma
- additive bronchodilatory effect when combined with albuterol, especially in acute exacerbation.

Inhaled glucocorticoids

- **First line therapy for all but very mild asthma**
- **Reduce exacerbation frequency**
- **Improve lung function**
- **? Prevent or delay airway remodeling**
- **Inhaled glucocorticoid use inversely correlates with asthma mortality**



