NON-INFECTIONOUS DISEASES - THE RESPIRATORY TRACT

Most common: asthma, allergic rhinitis, cough, chronic bronchitis, chronic obstructive pulmonary disease (COPD) and cystic fibrosis.

Asthma – basically an inflammatory disease.

Cystic fibrosis is a genetic disease with respiratory manifestations.

Cough is usually a symptom of underlying disease.

Chronic bronchitis is actually due to infection often in the presence of COPD.

FEATURES OF ASTHMA.

Acute attacks of dyspnoea associated with acute reversible obstruction of airways.

Mucous secretion and potential airway plugging.

Airway inflammation.

Bronchial hyper-responsiveness to bronchoconstrictor agents.
**GOAL OF DRUG TREATMENT IN ASTHMA**

Relax airway smooth muscles:

Directly – by beta$_2$ agonists including epinephrine, xanthines.

Indirectly by blocking receptors for bronchoconstrictors – e.g. antagonists for leukotrienes, acetylcholine, histamine

Indirectly by preventing the formation or release of mediators of bronchoconstriction - cromolyn, epinephrine.

Reduce inflammation - steroids, xanthines, leukotriene antagonists

Reduce cholinergic dependent secretions – atropinic drugs e.g. ipratropium

Reduce and loosen thick secretions (mucolytics, DNAases).
MAJOR DRUGS FOR THE TREATMENT OF ASTHMA.

Beta adrenoceptor agonists mediate bronchodilation to overcome bronchoconstriction.

Glucocorticoids act principally as suppressants of the inflammatory response in asthma.

Xanthines (theophylline) combine bronchodilator and anti-inflammatory properties.

Muscarinic receptor antagonists prevent acetylcholine acting on airways.

Leukotriene receptor antagonists prevent LT induced bronchoconstriction.

H1 antihistamines prevent H induced bronchoconstriction.
ASTHMATIC DRUG CLASSIFICATION

Symptomatic (bronchodilator) treatment via Beta$_2$ adrenoceptor agonists – local aerosol application to lungs, or oral

*Short-acting (2-4 hours) as aerosols:* salbutamol (US albuterol), terbutaline,

*Long-acting (>10 hours) as aerosols:* salmeterol, aformoterol

*Others* – isoproterenol (non-selective $\beta_1$ and $\beta_2$) not used.

Anticholinergic Muscarinic Antagonists – best given as aerosols (ipratropium, oxtropium, tiotropium)

Xanthines *(e.g. theophylline)*

Leukotriene antagonists *(e.g. montelukast, zafirlukast)*

H1 antihistamines Long lasting antihistamines may occasionally be useful

Prophylactic (prevention of inflammation) treatment *(Cromolyn, nedrocomil, ketotifen)*

Xanthines (theophylline)

Glucocorticosteroids *(e.g. beclamethasone)*

Leukotriene antagonists *(e.g. montelukast, zafirlukast)*

Glucocorticosteroids

Many available for oral or aerosol use *(AEROSOL: beclamethasone, budesonide, fluticasone, triamcinolone, mometasone, ciclesonide – ORAL: prednisone, methylprednisolone, cortisone)*
ADVERSE EFFECTS OF RESPIRATORY DRUGS

Beta 2 agonists cause tremor and their long term use may worsen the underlying disease.

Xanthines (theophylline) cause tremor, tachycardia, nausea and gastrointestinal irritation, as well as CNS excitation in children.

The toxicity associated with the long term oral use of glucocorticosteroids is such that their use should be reserved for patients who do not adequately respond to other therapy.

Aerosol glucocorticosteroids are less likely to produce severe toxicity. Main adverse effects are thrush (Candida infection of mouth and throat) and hoarseness.