

DRUG THERAPY

Drug Delivery

■ Definition

- The appropriate administration of drugs through various routes in the body for the purpose of improving health
- It is highly interdisciplinary
- It is not a young field
- It has recently evolved to take into consideration
 - Drug physico-chemical properties
 - Body effects and interactions
 - Improvement of drug effect
 - Patient comfort and well being



ROUTES OF ADMINISTRATION

Oral Administration

Buccal/Sublingual

Rectal

Intravenous (IV)

Subcutaneous

Intramuscular

Inhalers

Transdermal

Factors Influencing the Selection of the Delivery Route

Drug physico-chemical properties

- Drug molecular size (molecular weight)
- Half-life
- Chemical stability
- Loss of biological activity in aqueous solution

Proteins

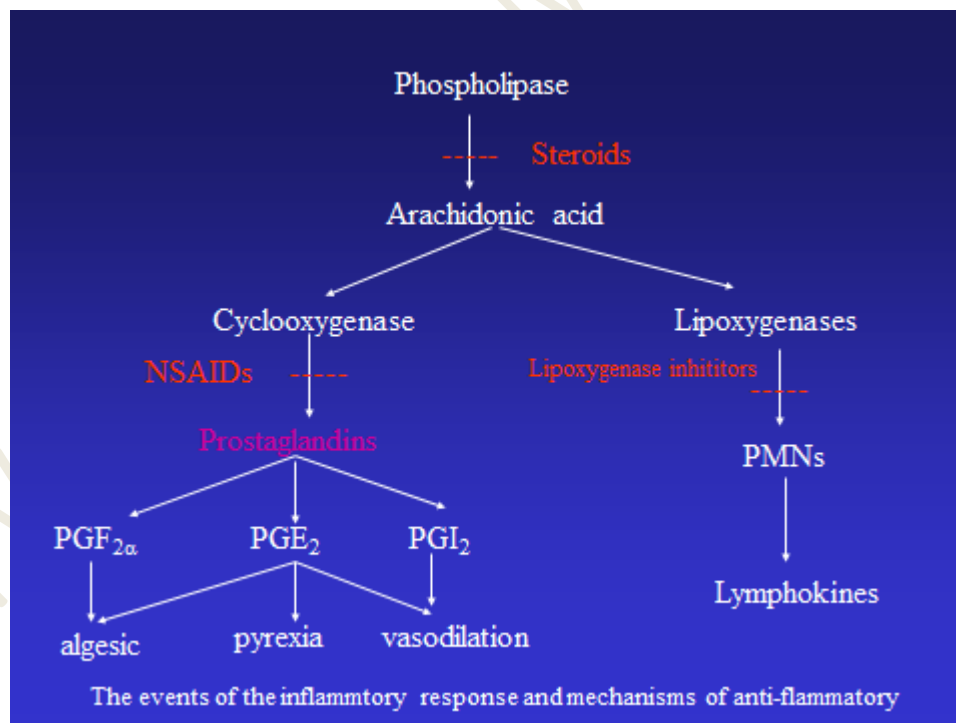
- Denaturation, degradation

Drug biological interactions

- Sensitive to FPM
- Low membrane permeability

- Efflux pumps (MRP, MDR) – cancer drugs
- Hydrophilicity
- High-density charge
- Enzymatic degradation
- Bacterial degradation
- Half-life
- Side effects
- Irritation

ANTIPYRETIC-ANALGESIC AND ANTIINFLAMMATORY DRUGS



Non-steroidal anti-inflammatory drugs (NSAIDs)

NSAIDs have three major actions, all of which are due mainly to the inhibition of arachidonic acid cyclo-oxygenase in inflammatory cells (the COX-2 isoenzyme), and the resultant decrease in prostanoid synthesis.

- An anti-inflammatory action:

- (1) The decrease in vasodilator prostaglandins (PGE_2 , PGI_2) means less vasodilatation and, indirectly, less oedema.
- (2) The inhibition of activity of adhesion molecule.
- (3) Accumulation of inflammatory cells is also reduced

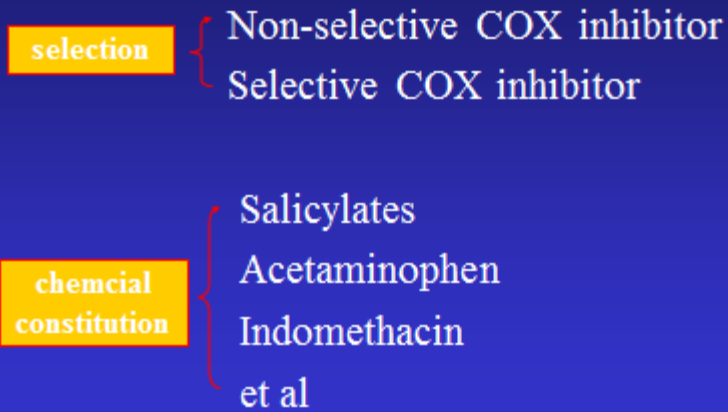
COX:

COX-1: constitutive enzyme: is involved in tissue homeostasis.

COX-2: inducible enzyme: is responsible for the production of the prostanoid mediators of inflammation.

- An analgesic effect: decreased prostaglandin generation means less sensitisation of nociceptive nerve endings to inflammatory mediators such as bradykinin and 5-hydroxytryptamine.
- Relief of headache is probably due to decreased prostaglandin-mediated vasodilatation.

Classification



Non-steroidal anti-inflammatory drugs (NSAIDs)

- Some important examples are aspirin, ibuprofen, naproxen, indomethacin, paracetamol. (The last agent has analgesic and antipyretic effects but little anti-inflammatory action).

DRUGS TO RELIEVE BRONCHOSPASM

DRUGS USED IN ASTHMA

Treatment classification



Preventers

- Inhaled corticosteroids
- Oral corticosteroids

Controllers

- Long acting β_2 agonists
- Methylxanthines
- Leukotriene receptor antagonists

Relievers

- Short acting β_2 agonists
- Anticholinergic agents
- Short acting theophylline

Exercise induced asthma

- Leukotriene receptor antagonists
- Long acting β_2 agonists
- Cromolyns
- Oral β_2 agonists
- Theophyllines



DRUGS USED IN COPD

Bronchodilators

- SHORT ACTING β_2 agonists-**Salbutamol, Fenoterol, Terbutaline**
- LONGACTING β_2 agonists-**Salmeterol, Formoterol**

Anticholinergic agents

- Short acting anticholinergics: **Ipratropium**
- Long acting anticholinergics **Tiotropium**

Methylxanthines

- **Theophylline OR Aminophylline**

Corticosteroids

- Oral: **Prednisone, Prednisolone**
- IVI: **Hydrocortisone**
- Aerosol: **Budesonide, Beclometasone, Fluticasone**

Leukotriene modulators

- 5 lipoxygenase inhibitor: **Zileuton**
- Leukotriene receptor antagonist: **Montelukast, Zafirlukast**

Treatment of Cough

- Antitussives (cough centre suppressants)
Opioid drugs (codeine, pholcodeine, noscapine, dextromethorphan)
- Expectorants (Mucokinetics)
Classified into
 - A) Directly acting**
E.g., Guaifenesin (glyceryl guaiacolate), Na⁺ & K⁺ citrate or acetate,
 - B) Reflexly acting**
E.g., Ammonium salt
- Mucolytic
Bromhexine, Acetyl cysteine
- Antihistamines
Chlorpheniramine, diphenhydramine, promethazine
- Bronchodilators
 β_2 -agonist (salbutamol, terbutaline)
- Pharyngeal Demulcents
lozenges, cough drops, glycerine, liquorice,

SEDATIVE-HYPNOTICS

Benzodiazepines

- Chlordiazepoxide (Librium)
- Diazepam (Valium)
- Temazepam (Restoril)
- Triazolam (Halcion)
- Clonazepam (Klonopin)
- Lorazepam (Ativan)
- Alprazolam (Xanax)

Benzodiazepines is a class of drugs that have an effect on the brain that, in turn, induces sleep and causes feelings of relief, relaxation and a state of euphoria.

DRUGS TO TREAT PULMONARY HYPERTENSION

- Epoprostenol (generic and Flolan)
- Treprostinil (Remodulin)
- Iloprost (Ventavis)
- Bosentan (Tracleer)
- Ambrisentan (Letairis)
- Tadalafil (Adcirca)
- Sildenafil (Revatio)

Adjunctive treatments of PAH

- Anticoagulation
- Diuretics
- Digoxin
- Oxygen
- Calcium channel blockers
- Exercise
- Salt restriction