COUGH

- dry cough.
- productive cough.

dry → no actual use for body.
→ there is no secretions, so doesn't remove anything.
→ Just irritates.

for **dry cough.**

↓

Anti-tussives.

↓

(−) cough centre of brain.

↓

CODEINE
Phol codeine
dextromethorphan.
Noscapine.

productive cough.

- sputum ✓
- harmful bacteria goes out through sputum.
- we don't wan to stop that
- we just wanna make it easier.

for **productive cough**

↓

Mucokinetics.

Expectorants.

↓ secretions in Resp tract & make it dilute

↓

so easy excretion.

↓

Guaifenesin
KI

mucolytics

- breaks down mucous

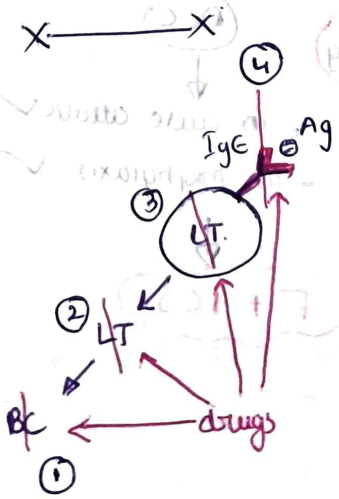
↓

so easy excretion.

↓

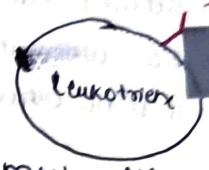
Ambroxol
Bromhexine.
acetyl-Cysteine
Dornase-α.

dry cough ko → Band karado.
productive ko → easy kar do.



Asthma.

- Type 1 HS reaction
- mediated by IgE



First exposure → IgE coating.

↓

priming of mast cell.

next exposure → ag bind to IgE on mast cell.

↓

degranulation.

↓

Leukotriene release.

↓

LT contract Bronchi.

LT → Bronchoconstriction.

↓

is the problm.

Solution?

1. Bronchodilators.
2. LT (−)
3. mast cell stabilizers.
4. (−) Ag-Ab interaction.

Bronchodilators

- acute attack → Bronchoconstriction.
- In acute attacks Bronchodilator is must
- acute attacks. can't be treated without (BD)... there is no other way.

Symp → Bronchodilator.

para → Bronchoconstriction.

So,

⊕ β_2 sympathetic Receptor.

⊖ M_3 parasympathetic Receptor.

① β_2 agonist.

Salbutamol / ALBUTEROL
Terbutaline
} Short acting

Salmeterol
Formoterol
} Long acting (long-metro)

all can be given by Inhalational route.

- long acting → for prophylaxis
- short acting are also fasting acting → stop acute attacks ✓ not prophylaxis.

	action / onset	duration of action
Salmeterol	slow	Long.
formoterol	fast	
Salbutamol	~~Long~~ slow	Short.
Terbutaline.	slow.	short.

	onset
Salbutamol	fast
Terbutaline	fast.
Salmeterol	slow
Formoterol	fast

DOC → In Acute attack & prophylaxis

Formoterol. + ICS combo. for both.

we give it in combo with Inhalational corticosteroids

DOC
- in acute attack ✓
- In prophylaxis ✓

↓

F + ICS

	duration	acute attacks	prophylaxis
Salbutamol	Short	✓	✗
Terbutaline	short.	✓	✗
Salmeterol	Long	✗	✓
Formoterol	Long.	✓	✓

S/E

T - tremors - (m/c)

T - tachycardia - at overdose

T - Tolerance.

T - T-wave changes.

✗ Does not Cause Hypoglycemia (Green Question)

{actually ↑ sugar}

Only in acute attack.

In p/o only

both a/c & p/o.

due to β_2 (+).

→ β_1 is also (+) at high dose.

→ due to Hypokalemia.

K is afraid of 2 things.

* Insulin.
* β_2 agonist

K^+ goes intracellularly & ↓ in serum.

M_3 blocker

Ipratropium, Tiotropium — Inhalation. COPD > Asthma.

* main use: COPD. In COPD, vagus overactivity is main reason of BC. so we use M_3 # → parasym (vagus) #
* also used in Asthma.

In some people...

Ipratropium causes (BC) → paradoxical Bronchoconstriction.

reasons:

1. Impurities in preparation → EDTA, Benzalkonium.
2. Hypersaline in nebulisation sol. Ionic
3. presynaptic muc receptor # {Breathe loose}

PDE Inhibitors.

Theophylline, Aminophylline — Oral, IV ✓ Inhalational ✗

MOA

* PDE # → ↑ cAMP → BD.
* adenosine A_1 receptor #.
* ↑ HDAC → anti-inflammatory action.

Theophylline S/E.

/ due to

PDE ⊖	Adenosine ⊖
GIT: N, V, Dr.	Arrhythmia.
Headache.	Diuresis
Arrhythmia.	Epileptic seizure.

Freq. used Qstn. which S/E is due to which.

Theophylline follows –

- Zero order kinetics.
- Microsomal Enzyme (DI). degrades it {metabolizes it}

ME

Inducer: Smoking. ↓: In smokers, we have to give ↑ dose.

Inhibitor: Erythromycin, Ciprofloxacin. ↓ plasma level of Th ↑ → affect → ♡ arrhythmia; Brain. seizures.

DI of Th is very imp.

- If a patient is on theophylline for asthma and he comes to hospital for resp TI - a common medication prescribed for RTI is Erythromycin

If we give him that w/o knowing proper H/o he will get seizures & arrhythmias

Steroids.

- they are not BD
- they are anti inflammatory

↓

ie, ↓ Inflammatory reaction.

⇒ they are given in prophylaxis.

⇒ ↑ β_2 sensitivity to Bronchodilators.

⇒ they are not B.D they are adjuvants.

Inhalation CS - ICS.

Beclomethasone
Fluticasone
Flunisolide
Mometasone
Ciclesonide
Budesonide

No candidiasis
Safe steroid
Pro drug.
Only 5% is active in Bronchus

only 5% reaches Bronchus. rest is in resp tract

↓

m/c SE

↓

Oral candidiasis.

↓

prevention ⇒ Gargling

candidiasis Rx → Topical Nystatin.

Zileuton

Inhibit Leukotriene number.

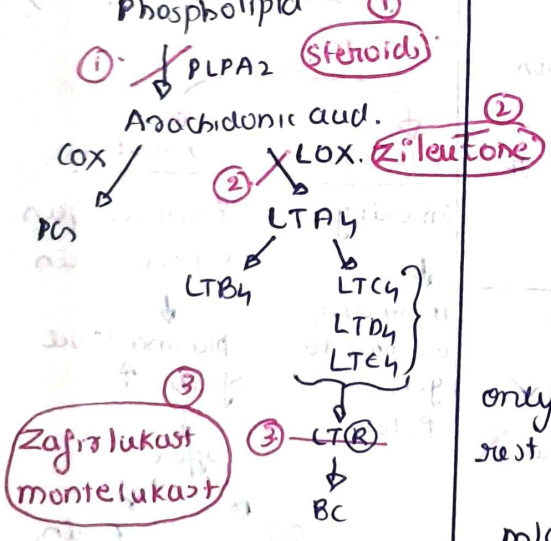
↑ cent on ← inhibit

Zafirlukast
Montelukast

Leukotriene Antagonist of LT(R)

Cys LT(R) antagonist

(2) Leukotriene.



- COX Inhibition doesn't cure B.C.
- It will actually ↑ BC. as all AA will be conv. to LT.
- Aspirin Induced Asthma.

(3) Mast cell stabilizer.

- even after Ag-Ab Interaction mast cell won't degranulate.
  - CROMOGLYCATE
  - NEDOCROMIL.
  - KETOTIFEN

Inhalation

In acute attack, mast cell already broken.

↓

Not useful.

↓

used in P/o only.

3 Inhalation at a time.

- β_2 agonist
- steroids.
- mast cell stabilizers.

Zileuton

Inhibit leukotriene number.

↓ lead on
inhibit

Zafirlukast
monte lukast

Leukotriene Antagonist
of LT (R)

Luk (as F) antagonist

3) Mast cell stabilizer.

- even after Ag-Ab Interaction mast cell won't degranulate.

- CROMOGLYCATE
- NEDOCROMIL.
- KETOTIFEN

} Inhalation

In acute attack, mast cell already broken.
↓
Not useful.
↓
Used in P/o only.

3 Inhalational group. (puff)

- β_2 agonist
- steroids.
- mast cell stabilizers.

4) Ab-Ag Interaction (−)

Anti-Ab → Anti-IgE
↓
OMALIZUMAB.

- s/c injection.
- doesn't treat BC. NO BD.

✗ acute attack.

✓ P/o.

IL-5 (−)
↓
mepolizumab.
Reslizumab.

Global Initiative for Asthma.
(2021) GINA.

{ Rescue therapy {acute attack}
maintenance therapy {Prevention}
} Both.

F + ICS. - low dose. puff.
→ acute attack.
→ for maintenance