

## Lecture 5: Pharmacological Treatment of Rhinitis and Cough

### Treatment of Rhinitis

| Non-pharmacological therapy  | Pharmacological therapy  |
|--|--|
| 1) Avoidance of irritants/ allergen (pollens, animal dander, dust etc.)<br>2) Dusting/vacuuming; washing of bed sheets<br>3) Intake of fluids<br>4) Rest | 1- Antihistamines (H1 receptor antagonists)<br>2- $\alpha$ -Adrenergic agonists<br>3- Corticosteroids<br>4- Cromolyn<br>5- Leukotriene receptor antagonists e.g. (Montelukast); new adjunct therapy for chronic allergic rhinitis. |

\*H1 & H2 are the most important receptors in this lecture.

### H1 & H2 Histamine Receptors

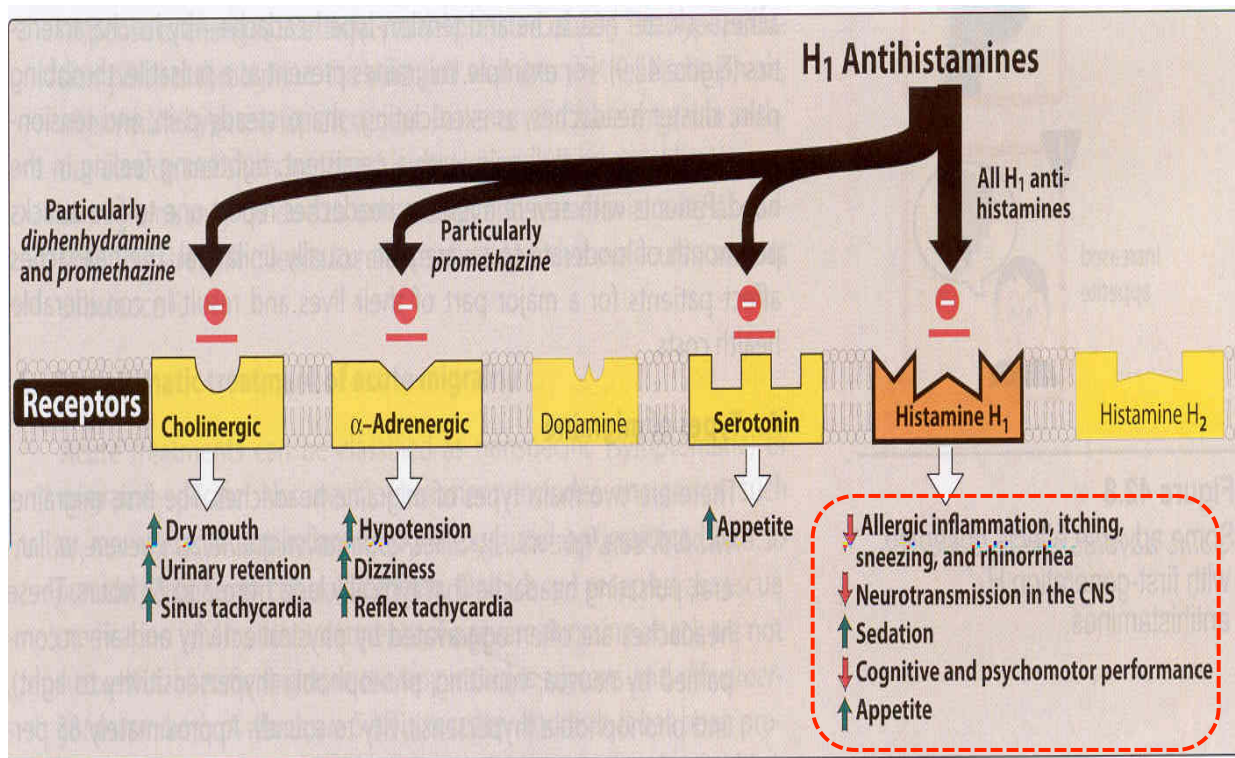
|           | Location  | Type of receptor   | Effect   | Used to Treat                             |
|-----------|---|--|--|---|
| <b>H1</b> | Specifically in: *Smooth muscles<br>*Vascular endothelial cells<br>*Heart<br>*CNS   | G-protein coupled, linked to intercellular <b>Gq</b> , which activates phospholipase C | Mediate an increase in vascular permeability at sites of inflammation induced by histamine | *Allergies<br>*Nausea<br>*Sleep disorders |
| <b>H2</b> | -Mainly in: Gastric parietal cells<br>-Low level can be found in:<br>*Vascular smooth muscles<br>*Mast cells & Neutrophils<br>*CNS<br>*Heart<br>*Uterus | G-protein coupled, linked to intercellular <b>Gs</b>                                   | Increases the release of gastric acid  | Stomach ulcers                            |

## Effects of Histamine

|                        |  |
|------------------------|--|
| CVS                    | <ul style="list-style-type: none"> <li>*Dilatation of arterioles, capillaries &amp; venules → ↓ B.P</li> <li>*Histamine (H1) increases the permeability of capillary vessels → passage of fluid &amp; protein into the extracellular space → edema.</li> <li>*Direct +ve inotropic (contraction force) &amp; chronotropic (heart rate) effects on the heart thru stimulation of H2 receptors.</li> </ul> |
| GIT                    | <ul style="list-style-type: none"> <li>*↑ Acid production + ↑ intestinal secretion (stimulation of H2)</li> <li>*Contraction of smooth muscles (H1 receptor stimulation)</li> </ul>  |
| Respiratory Tract      | Bronchoconstriction [Contraction of smooth muscles ] (H1 receptors)  |
| CNS                    | <ul style="list-style-type: none"> <li>*H1: maintenance of wakeful states.</li> <li>*H1 &amp; H2: -Regulation of body temperature</li> <li>-Affect CVS system &amp; sexual arousal</li> <li>-Causes pain &amp; itching by stimulation of peripheral nerve endings.</li> </ul>  |
| Intra Dermal Injection | *Red spot   *Edema   *Flare & itching  |
| Toxicity               | *Flushing   *Hypotension   *Tachycardia   *Headache   *Bronchoconstr   *G.I upset.   |

## Classification of Antihistamines

| First Generation Drugs  | Second Generation Drugs  |
|---|--|
| <ul style="list-style-type: none"> <li>• Diphenhydramine</li> <li>• Dimenhydrinate</li> <li>• Doxylamine</li> </ul> <p style="margin-left: 150px;">} [Ethanolamine]</p> <ul style="list-style-type: none"> <li>• Cyclizine</li> <li>• Meclizine</li> </ul> <p style="margin-left: 100px;">} [Piperazine Derivatives]</p> <ul style="list-style-type: none"> <li>• Chlorpheniramine [Alkylamines]</li> <li>• Promethazine [Phenothiazine Derivatives]</li> <li>• Cyproheptadine [Cyproheptadine]</li> <li>• Triprolidine</li> </ul> <p>Lipid soluble → Easily cross into brain →<br/>Produce sedation &amp; drowsiness</p> | <p><u>1-Piperidine:</u><br/>Fexofenadine</p> <p><u>2-Miscellaneous:</u><br/>*Loratadine = Claritin® (longer acting),<br/>*Cetirizine</p> <p>Less lipid soluble → Not significantly pass into brain → Do not cause sedation &amp; drowsiness.</p> |



**Figure 42.7**

Effects of H<sub>1</sub> antihistamines at histamine, adrenergic, cholinergic, and serotonin-binding receptors. Many second-generation antihistamines do not enter the brain and, therefore, show minimal CNS effects.

### Pharmacological Actions of Antihistamine

|                                     |                                       |                                  |                                |
|-------------------------------------|---------------------------------------|----------------------------------|--------------------------------|
| Sedation                            | *Promethazine<br>*Doxylamine          | *Diphenhydramine,<br>*Pyrilamine |                                |
| Antinausea & Antiemetic Actions     | *Promethazine<br>*Doxylamine          | *Meclizine<br>*Dimenhydrinate    | *Cyclizine<br>*Diphenhydramine |
| Antiparkinsonism Effects            | *Diphenhydramine                      |                                  |                                |
| Anticholinceptor Actions            | *Diphenhydramine<br>*Triprolidine     | *Promethazine<br>*Dimenhydrinate |                                |
| Alpha-Adrenoceptor Blocking Actions | *Phenothiazine sub group              |                                  |                                |
| Serotonin blocking Actions          | *Cyproheptadine — Antiserotonin agent |                                  |                                |
| Local Anesthesia                    | *Diphenhydramine                      | *Promethazine                    |                                |
| Other Actions                       | Cetirizine                            |                                  |                                |

## Cough Medication

| Peripheral antitussives | Central antitussives   |
|-------------------------|--|
| e.g. Benzonatate        | a. Narcotic Analgesics: Morphine – Codeine<br>b. Synthetic Narcotic Analgesics<br>c. Antihistaminics ( H1-Blockers ) |

| Central antitussives  |   |  |
|---|---|--|
| Narcotic Analgesics   | Synthetic Narcotic Analgesics   | Antihistaminics (H1-Blockers)  |
| <p>*Used to suppress dry cough<br/>*Used in doses below those required for pain relief.</p> <p><b>E.G.</b> Codeine (methyl-morphine)</p> <p><b>Side Effects:</b></p> <ol style="list-style-type: none"> <li>1- Constipation</li> <li>2- Drowsiness &amp; mild respiratory depression</li> <li>3- Inhibition of mucociliary clearance (thick sputum)</li> <li>4- Decrease secretions in the bronchioles</li> <li>5- Dependence</li> <li>6- Dry mouth.</li> </ol> | <p><b>E.G.</b> <u>Dextromethorphan – Levo-Propoxyphene</u></p> <ol style="list-style-type: none"> <li>1- As potent as codeine.</li> <li>2- No drowsiness.</li> <li>3- Less constipating effect.</li> <li>4- No respiratory depression.</li> <li>5- No inhibition of mucociliary clearance.</li> <li>6- No addiction.</li> </ol> | <p><b>E.G.</b> <u>*Diphenhydramine</u><br/><u>*Triprolidine</u></p> <p><b>Side Effects:</b></p> <ul style="list-style-type: none"> <li>▪ Anticholinergic actions</li> <li>▪ Sedation</li> <li>▪ Drowsiness.</li> </ul> |

**Notes:**

- Antitussives are used for dry cough.
- Contraindicated in:
  - Chronic bronchitis
  - Cough associated with asthma (harmful sputum thickening & retention)

## Classification of Expectorants

| Sedative Expectorants  | Stimulant expectorants   |
|--|--|
| <p>*They increase the fluidity of sputum &amp; its expulsion by cough.</p> <p>*These drugs are used in chronic inflammation of respiratory mucosa (chronic bronchitis)</p> <p>E.G.</p> <ul style="list-style-type: none"><li>▪ Ammonium chloride</li><li>▪ Na &amp; K iodide.</li><li>▪ Guaifenesin.</li></ul> | <p>* These drugs are used in chronic inflammation of respiratory mucosa (Chronic bronchitis).</p> <p>*Stimulating reflex expectorants in which person vomit thus ejecting the mucus &amp; phlegm.</p> <p>*They promote healing &amp; repair of mucosal tissues thins the mucus which helps the body to cough it up.</p> <p>E.G. Terpene hydrate.</p> |

## Mucolytics

Acts by reducing the viscosity of sputum.

### E.G.

1. Acetyl cysteine (interfering with disulphide bonds in mucus).
2. Bromohexine (destroy muco-polysaccharride structure of mucus).
3. Steam inhalation

### Uses:

1. Acute & chronic bronchitis
2. Asthma.

بالتوفيق للجميع (=)

ملاحظة: فه العليد ملخص وليس

مرجع