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Role of Histamine Type-2 Receptor Antagonists (H2 Blockers)

Asad Siddique[1], Abdul Mannan[2], Mohd Rifaqat[3], Raghav Deepak Singh[4]

[1,2,3]Research Scholar, [4]Assistant Professor
[1,2,3,4]Pharmacy

ABSTRUCT-

Histamine type 2 receptor antagonists (H2 blockers) are a class of medications that inhibit histamine-induced gastric acid secretion by competitively blocking H2 receptors located on the parietal cells of the stomach. Introduced in the 1970s, H2 blockers revolutionized the management of acid-related gastrointestinal disorders, such as peptic ulcer disease, gastroesophageal reflux disease (GERD), Zollinger-Ellison syndrome, and functional dyspepsia. By reducing gastric acid output, these agents promote ulcer healing, relieve symptoms of acid reflux, and prevent recurrence of acid-related damage. Commonly used H2 blockers include ranitidine, famotidine, cimetidine, and nizatidine. Although the advent of proton pump inhibitors (PPIs) has shifted clinical preference due to their more potent acid suppression, H2 blockers remain valuable for their rapid onset of action, favorable safety profile, and effectiveness in mild-to-moderate acid-related conditions. Additionally, H2 blockers are useful in nocturnal acid breakthrough and in patients intolerant to PPIs. Ongoing evaluation of safety concerns, particularly regarding long-term use, is essential. This abstract reviews the pharmacological role, therapeutic applications, and clinical relevance of H2 blockers in current medical practice.

KEY WORDS- Histamine,GERD,ZE syndrome,Functional dyspepsia,Proton Pump Innhibitor

INTRODUCTION-

H2 receptor blockers, or histamine-2 receptor antagonists (H2RAs), are gastric acid-suppressing agents frequently used to treat various gastric conditions. The U.S. Food and Drug Administration has approved the short-term administration of H2RAs for patients with uncomplicated gastroesophageal reflux disease (GERD), gastric or duodenal ulcers, gastric hypersecretion, and mild to infrequent heartburn or indigestion. H2RAs may also be used off-label for stress ulcer prophylaxis, esophagitis, gastritis, gastrointestinal bleeding, or urticaria. H2RAs are sometimes part of a multidrug regimen for *Helicobacter pylori* eradication.[1]

Relieve symptoms of acid reflux, or gastroesophageal reflux disease (GERD). This is a condition where food or liquid moves up from the stomach into the esophagus (the tube from the mouth to the stomach) and also Treat a peptic or stomach ulcer.[2]

HISTAMINE RECEPTOR

The **histamine receptors** are a class of G protein–coupled receptors which bind histamine as their primary endogenous ligand.[1][2] Histamine is a neurotransmitter involved in various physiological processes. There are four main types of histamine receptors: H1, H2, H3, and H4. H1 receptors are linked to allergic responses, H2 to gastric acid regulation, H3 to neurotransmitter release modulation, and H4 to immune system function.[3]

TYPES OF HISTAMINE RECEPTOR

- H_1 receptor – Primarily located on smooth muscle cells, endothelial cells, and neurons. Activation of H1 receptors mediates various responses, including smooth muscle contraction (leading to bronchoconstriction, intestinal cramping), increased vascular permeability (resulting in edema), and stimulation of sensory nerve endings (causing itching and pain). H1 antagonists, commonly known as antihistamines, are used to alleviate symptoms of allergies and allergic reactions.
- H_2 receptor – Found mainly in the stomach lining (parietal cells), H2 receptors regulate gastric acid secretion by stimulating the production of hydrochloric acid. H2 antagonists (H2 blockers) are used to reduce stomach acid production and treat conditions like gastroesophageal reflux disease (GERD) and peptic ulcers.
- H_3 receptor – Predominantly located in the central nervous system (CNS), particularly in regions associated with neurotransmitter release and modulation. H3 receptors act as presynaptic autoreceptors and heteroreceptors, regulating the release of neurotransmitters such as dopamine, serotonin, norepinephrine, and acetylcholine. Modulation of H3 receptors is being explored as a potential target for various neurological and psychiatric disorders.
- H_4 receptor – Initially discovered on immune cells, particularly mast cells, eosinophils, and T cells, H4 receptors are involved in immune responses, including chemotaxis (cellular movement in response to chemical signals) and cytokine production. These receptors play a role in inflammation and allergic reactions. Research on H4 receptors is ongoing to better understand their involvement in immune-related disorders and to develop potential therapeutic interventions.[4]

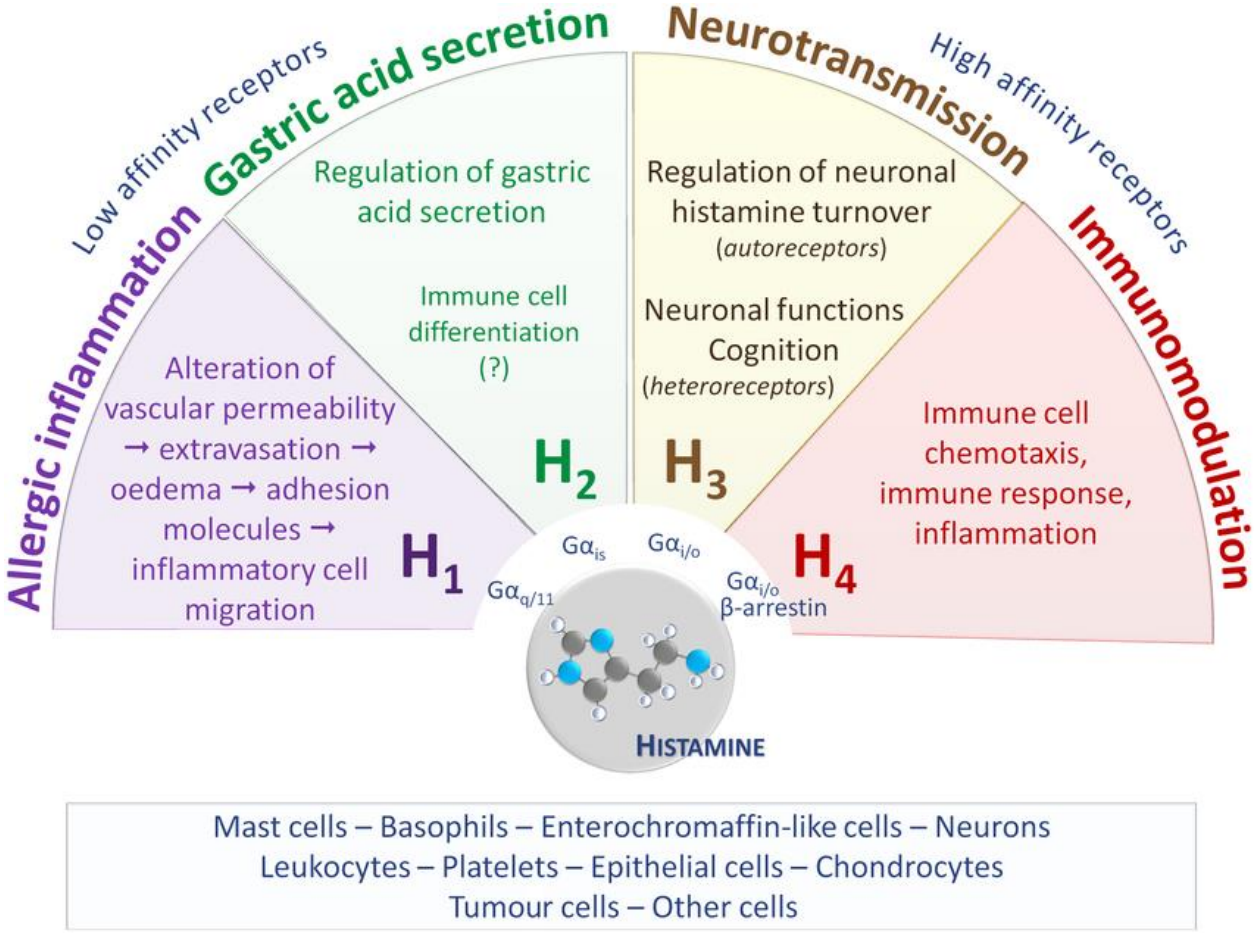

Figure- Comparison of All type of Histamine[5]

ANTIHISTAMINE RECEPTOR

Antihistamines are a class of medication that commonly treat allergy symptoms, like runny nose, sneezing and itchy eyes. They can also treat some digestive conditions.

Most antihistamines are over-the-counter (OTC) medications, but they also come in prescription form. Antihistamines are also common ingredients in the following OTC medications:

- Cold and flu products.
- Decongestants.
- Cough suppressants.
- Pain relievers.[6]

Antihistamines work by blocking histamine receptors. “Anti-” means “against.” Histamine is a chemical your immune system releases to send messages between different cells. Histamine has several functions, but it’s mainly known for its role in causing allergic and anaphylactic symptoms. Allergic reactions can happen due to several substances (allergens), including:

- Environmental allergens, like pollen, dust, mold and pet dander.
- Insect bites and stings.
- Foods.
- Medications.[7]

Antihistamines can help manage all these allergies.

TYPES OF ANTIHISTAMINE

Antihistamine are of two types

1. H1 RECEPTOR ANTIHISTAMINE
2. H2 RECEPTOR ANTIHISTAMINE

1. H1 RECEPTOR ANTIHISTAMINE - You have H1 receptors throughout your body, including in neurons (brain cells), smooth muscle cells of your airways and blood vessels. Activation of the H1 receptors causes the well-known allergy and anaphylaxis symptoms. So, H1 receptor antihistamines mainly treat allergy symptoms.

The U.S. Food and Drug Administration (FDA) has approved the use of H1 antihistamines to help treat the following conditions:

- Allergic rhinitis (hay fever).
- Allergic conjunctivitis (pink eye).
- Allergic skin reactions, like atopic dermatitis (a condition that causes skin rashes and itchiness).
- Sinus infection (sinusitis).
- Hives.
- Angioedema (skin swelling that often happens from an allergic reaction).
- Bronchitis.
- Motion sickness.
- Nausea.
- Vomiting.[8]

2. H2 RECEPTOR ANTIHISTAMINE- **H_2 antagonists**, sometimes referred to as **H2RAs**[1] and also called **H_2 blockers**, are a class of medications that block the action of histamine at the histamine H_2 receptors of the parietal cells in the stomach. This decreases the production of stomach acid. H_2 antagonists can be used in the treatment of dyspepsia, peptic ulcers and gastroesophageal reflux disease. They have been surpassed by proton pump inhibitors (PPIs). The PPI omeprazole was found to be more effective at both healing and alleviating symptoms of ulcers and reflux oesophagitis than the H_2 blockers ranitidine and cimetidine.[9]

H2 RECEPTOR ANTAGONIST OR H2 BLOCKER

H2 blockers, also known as H2 receptor antagonists (H2RAs), are medications that reduce the amount of stomach acid produced by the body. They are commonly used to treat conditions like heartburn, gastroesophageal reflux disease (GERD), and stomach ulcer

TYPES OF H2 RECEPTOR ANTAGONIST DRUGS -

The FDA has approved the use of the three H2 blockers. Below, we describe the generic and branded forms:

Cimetidine

Cimetidine (Tagamet, Leader Heartburn Relief) comes in prescription, OTC, injectable, and IV forms. A doctor can advise about the most effective type for each person.

It is important to follow directions for use carefully. The right dosage depends on a person's age, whether they are taking any other medications, and the form of the drug.

Older adults should avoid taking this medication, or use it with extreme caution. It may worsen or cause periods of confusion.

People with kidney or liver disease should consult a doctor before using Tagamet. Some common side effects include:

- **headaches**
- **drowsiness**
- **joint or muscle pain**
- **breast swelling and tenderness, in anyone**
- **dizziness**
- **confusion in elderly people, people with dementia, and those who are critically ill**

In some cases, people may also experience:

- **a rash**
- **an allergic reaction**
- **production of breast milk**
- **trouble urinating**
- **pancreatitis**
- **a kidney infection[10]**

Nizatidine

Nizatidine (Axid, Tazac) comes as an oral solution or capsule.

The right dosage depends on a person's age, their symptoms, and the form of the drug. A person should consult a doctor before taking it.

Like other H2 blockers, this medication may not be suitable for people with disorders of the kidneys or liver. A doctor or another healthcare professional can offer specific guidance.

Some common side effects include:

- **congestion, a runny nose, and similar symptoms, which are more common with Axid than with other H2 blockers**
- **a rash**
- **drowsiness**
- **irritability**
- **anxiety**
- **vomiting**
- **diarrhea**
- **a fever**

On rare occasions, a person may experience more serious side effects, including:

- **hepatitis**
- **anemia**
- **jaundice**
- **chest pain**
- **impotence**
- **seizures**
- **a rapid heart rate**
- **a severe allergic reaction[11]**

Famotidine

Famotidine (Fluxid, Pepcid) comes in prescription and nonprescription oral formulas and as an IV infusion.

A doctor or another healthcare professional can recommend the right dosage, based on the person's symptoms, age, kidney function, and overall health.

Side effects can include:

- **diarrhea**
- **dizziness**
- **nausea**
- **a loss of appetite**

Rarely, people experience more severe side effects, including:

- **conjunctivitis, also called pink eye**
- **hepatitis**
- **depression**
- **confusion**
- **seizures**
- **severe allergic reactions**
- **Stevens-Johnson syndrome, a potentially life threatening skin disorder[12]ETC.**

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