Jbbt.org/ Journal articles

Volume 2, Issue 3

September-October, 2022

Received 27-8-2022

Revised 05-9-2022

Accepted 10-9-2022

CONTROL OF HUMAN ALLERGY BY USING PLANT-BASED ANTIHISTAMINE COMPOUNDS

Shiza Fatima [1], Hijab Fatima [1], Namreen Arif [2], Malhia Ijaz [3] and M.Gulfraz [3]

1. UIBB-Arid Agriculture University Rawalpindi
2. Bio Sciences COMSATS Islamabad
3. Grand Asian University Sialkot

Corresponding author ; Shizza31@gmail.com

ABSTRACT

Histamine is a bioactive amine that is thought to have an important role in allergic reactions. Thus, histamine receptor inhibitors (antihistamines) are used to treat a variety of atopic illnesses, including allergic rhinitis, cataracts, and associated with chronic urticaria. Histamine is generated by both immune cells and microorganisms in the stomach. Histamine has a variety of impacts in addition to its involvement in the acute allergic reaction via binding to its four pleiotropic G-protein-linked histamine channels. Depending on guidelines and standards, we outline the roles of various histamine receptors and antihistamines in the biological process, medical studies, health consequences, and innovative approaches for the use of antihistamines with variable specialization.

Keywords

Histamine, Allergies, complementary and alternative medicine (CAM), white blood cells, receptors, sensor

INTRODUCTION

An allergy is an immunological response or sensitivity to otherwise harmless chemicals. When an allergen is recognized, the immune system becomes oversensitive and releases histamine. Allergens are the compounds that cause the response. People's allergic response does have the same biological function (Marahatha et al., 2021). Allergens penetrate the skin by food, inhalation, or skin or mucocutaneous interaction. As a result, white blood cells produce an antibody, which attaches to the mast cells. Mast cells break and emit biological compounds such as histamine as a result. The resulting symptoms are known as an allergic response. Histamine causes blood vessels to expand and widen, which creates allergic symptoms.Anaphylaxis is a life-threatening allergic reaction that happens when the organism is subjected to an external pathogen (Ochoa-Repáraz et al., 2011). Exogenous allergens comprise heterologous serum (such as tetanus antitoxin), some unprocessed meats (such as those found in fish, shrimp, and crabs), microbes, infections, parasites, animal hair, plant pollen, dust mites in the atmosphere, and poisons and medications. Allergens can cause human B cells to create immunoglobulin E, which binds to antigens on human adhesion molecules and sensitized cells, breaks the cell membrane, causes downregulation, and produces histamine.

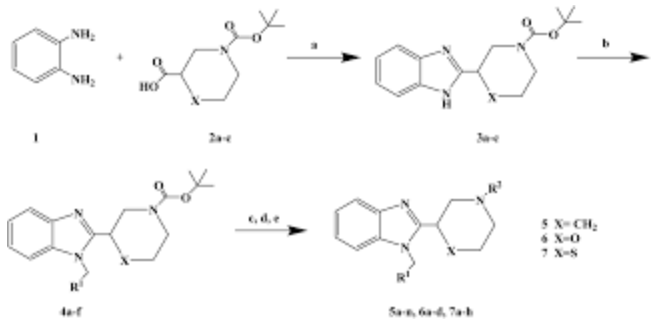

Figure 1. Synthesis of anti-allergic compounds(Ochoa-Repáraz)

Histamine and histamine sensors

Histamine is produced and released by a variety of human cells, including basophils, basophils, platelets, histaminergic neurons, lymphocytes, and enterochromaffin cells. It is kept in vesicles or granules that are produced in response to the stimulus. Histamine acts on target cells in different organs by attaching to one of four receptors: histamine receptor (HR)1, HR2, HR3, and HR4. According to Small et al, (2018) these receptors are members of the G protein-coupled receptor superfamily (GPCRs). HR1 receptor (HR1) is encoded on human chromosome 3 and is involved in various allergic illness symptoms such as pruritus, rhinorrhea, bronchospasm, and smooth intestinal contraction. The existence of histamine keeps the receptor in an active state.Antihistamines are medications used to treat allergic disorders. They are beneficial in reducing itching caused by histamine release. As a result, antihistamines are medications that cure seasonal allergies by obstructing histamine's effects by stabilizing the extracellular domain of the binding site (Bansal et al.,2008). Antihistamines are selective reverse agonists at the H1 receptor that preferentially bind to and stabilize the receptor in its inactive state. As a result, they are 'inverse agonists,' reducing the baseline level of regulatory activation at histamine H1 receptors while also suppressing histamine's agonist functions (Ayoub et a., 2021).

REVIEW OF LITERATURE

Throughout olden history, natural items and various compounds have been used to cure a variety of ailments. Because of their significant therapeutic properties, several medicinal plants can be used to treat a variety of inflammation-mediated chronic disorders. Phytosterols have appeared as attractive natural products, owing to their diverse pharmacological actions. Presently existing drugs cause a variety of systemic side effects, such as hypertension, immunological suppression, osteoporosis, and metabolic disturbances (May and Dolen, 2017). Therefore, more study on phytosterols to alleviate these problems is critical. A thorough search of articles on numerous scientific search results was used to obtain information on phytosterols, their kinds, and activities against inflammatory response and allergic problems for this study. According to the literature review, phytosterols have antiinflammatory properties via several mechanisms such as transrepression as well as inhibition. Conventional medicine formulations are mostly produced from plant-based components and may be viable options for treating inflammation, allergic disorders, and associated problems with few systemic side effects. Because this study includes an in silico pharmacokinetic evaluation of eight phytosterols, toxicological and phytochemical research of these naturally occurring substances must be emphasized before clinical trials begin. Identifying foods and nutritional bioactive substances that can reduce inflammation is also important for creating disease-specific nutrition treatments(Thangam et al., 2018). As a result, this review thoroughly examines scientific findings on phytosterols and their anti-inflammatory properties. Therefore, this study investigates the significance of plant-based steroids, which may one day be employed as future therapeutic candidates to treat incendiary and allergic illnesses.Skin, food, and respiratory allergies are all examples of allergic diseases. Polyphenols, Quercetin, Gossypium, Saponin, Steroidal lactone, alkaloids, and many more are examples of

plant metabolites that have been studied for their antiallergic, antihistamine, and anti-inflammatory activities.

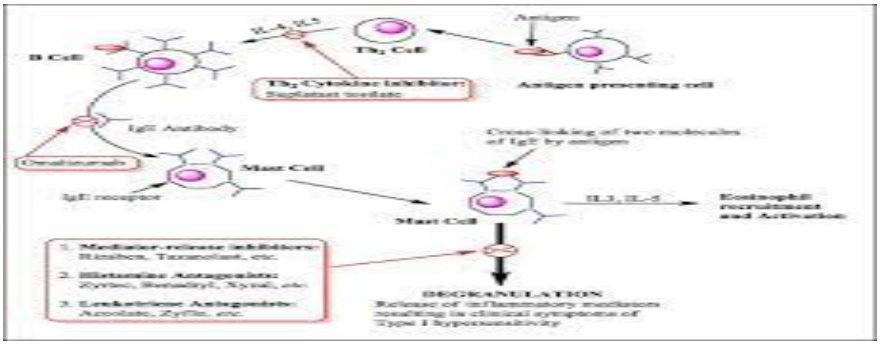

Figure 2. Clinical impact of anti-allergic compounds (Bjermer)

These plants have antiallergic properties by influencing mast cells, immunoglobulins, histamine, and suppressing various cytokines and interleukins. For therapeutic purposes, research into repositioning existing medications to treat diseases other than the initially intended ailment continues to expand and evolve(Bjermer et al., 2019).The application of phytoconstituents and contemporary understanding regarding SARS-CoV and SARS-CoV-2 pathology in the prevention and management of the COVID-19 pandemic. So it is seen to be a developing technology in which available plant compounds that have previously been shown safe in humans are misdirected and dependent on a legitimate template molecule to battle uncommon, neglected, and challenging disorders.

The significance of traditional medicines

Plant-derived compounds have lately gained popularity due to their numerous uses. Medicinal plants are the richest bioresource of medications from ancient medical systems, contemporary medicines, health supplements, nutritional supplements, folk remedies, chemical entities for synthetic drugs, and chemical entities for synthetic drugs. Antihistamines have several

downsides, including sleepiness and substantial anticholinergic side effects. As a result, many patients with chronic allergic disorders, such as asthma, seek complementary and alternative medicine (CAM) to improve symptom control. CAM refers to a group of therapeutic tools that encompasses herbs used by conventional healers.SCI has discovered that plant alkaloids have significant biological action(Leurs et al., 2002). They are utilized in medicine and are recognized to behave pharmacological action. Flavonoids are a type of natural substance that is commonly present in food and is connected with anti-allergic action. Saponins, which also are found in many food plants including soybeans, peas, spinach, ginseng, capsicum peppers, eggplant, quinoa, licorice, and yam, have glucocorticoid-like action and large biologic potential. Tannin has several therapeutic effects, including antibacterial, anti-inflammatory, and astringent action. They have also been claimed to have antimicrobial, antiseptic, and antiparasitic properties.

Thymoquinone (TQ) is the primary bioactive component in black seed oil (Nigella sativa). TQ has promising anti-disease pharmacological effects. It has exceptional antioxidant, anti-inflammatory, antitumor, and other essential biological properties.Because bioactive natural compounds have played a significant role in the development of many major therapeutic molecules, medicinal plants are regarded as potential sources of novel chemical elements (NCE), especially viral medicines(Bielory et al., 2010; Brune et al., 1993). The inclusion of polyphenols in the daily diet confers a health profile and warrants their designation as antiallergic medicines, according to SCI. Polyphenols have been shown to form intractable compounds with different proteins, altering their structure or making them less accessible.

Background history

ImmunoglobinIg-E mediated type-1 hypersensitivity to allergens has become an alarming world health issue. More than 25% population is facing different inflammatory disorders

such asasthma, conjunctivitis,allergic rhinitis and atopic dermatitis etc., in third world countries.(Tohidinik et al., 2019). Histamine is the main factor that has a role in the onset of many allergic diseases because it regulates lymphocytes (Helper T-cells). Histamine promotes the production of cytokine Th2 e.g. interleukinsIL-10, IL-13, IL-5, and IL-4, so production of cytokine Th1 gets inhibited [e.g. interferons, Interleuki-2, and interleukin-12]. As a result, histamine keeps the Th1 and Th2 cell levels balanced by promoting a Th2 switch. H4 receptors get activated by histamine this will lead to increases in secretion of Interleukin-5 and IL-4 in human chord inflammatory blood cells (mast) and tumor necrotizing factors get also released in mast murine cells (BMMCs) derived by bone marrow, these two events will lead to the development of allergic inflammation (Carovic-Strank et al., 2016; Hiroi and Takaiwa, 2006). Treatment of such allergies includes drug therapies e.g. antihistamines and mucosal corticosteroids. These compounds reduce hypersensitivity signs but this is not the ultimate solution to this problem (Leurs et al., 2002). T lymphocytes are essential modulators of allergic disorders genesis, and we use allergen specific immunotherapy (SIT) to control such hypersensitive responses. if treatment gets successful, the therapeutic effects are used for several years with no more further therapy. Standard SIT has been performed since over a decade through vaccination with raw allergens isolates using organic vaccines (plant based)(Takaiwa, 2011).

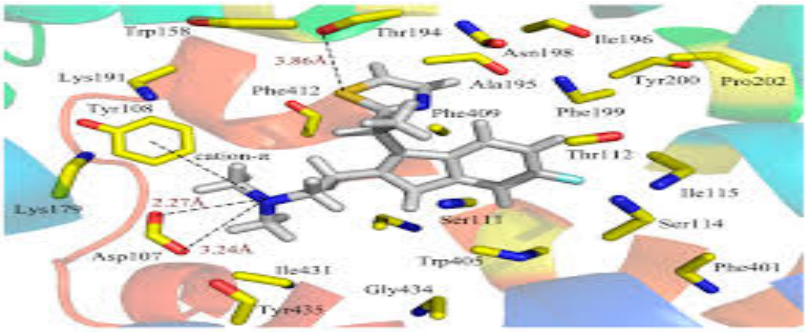

Figure 3. computerized annulation of structure (Takaiwa)

Allergy rhinitis (AR) is a prevalent allergic disorder that impacts 30% of thegobal population. We can also call it hay fever and its symptoms usually involve nasal congestion, runny nose, nasal inflammation, sneezing and bronchi constriction which is the result of IgE driven immune responses(Small et al., 2018). Allergens are the causative factors of AR and it is characterized by inflammation of mucosal membranes which is triggered by helper T cells (Type-2). AR is a kind of allergy characterized by aberrant immune system regulation. Allergic conjunctivitis has a high epidemiologic connection with AR (Bielory, 2010). Animal dander, dust mites, shellfish, and cigarette smoke are examples of allergens that may cause AR symptoms. It is usually impossible to avoid potential allergen vulnerability, hence medication is required to offer immediate relief (Skoner, 2001). The usage of traditional treatment is on the rise, as is the number of persons suffering from this condition. Antihistamines in combination with internasal corticosteroids were used for reducing inflammatory symptoms but the internasal route can harm the bones, eyesand the endocrine system, and also induce adverse effects e.g. thrush(May and Dolen, 2017). Because of the adverse effects of traditional drugs, plenty number of research has been conducted to investigate alternate approaches to assist in the alleviation of the symptoms of this illness. Several researches have been undertaken in quest of therapeutic plants with the ability to be an effective option for symptom alleviation in Allergic rhinitis. The exploration

of novel medicinalcompounds derived from plants to rectify Allergic rhinitis is undoubtedly crucial, particularly for plants that have demonstrated anti-allergic characteristics, notably in AR animal models. Medicinal herbs have undeniably been widely used as therapeutic techniques for both preventative and curative reasons (Hiroi and Takaiwa, 2006; Islam et al., 2018). They are incredibly important in keeping up with good health. Currently, we can witness the population expansion on global level and 80% of people worldwide rely on plant based therapeutic medicines for their basic health maintenance requirements. Plant phytochemicals possess anti-allergic and anti-inflammatory characteristics that may be effective in treating many forms of allergic disorders and symptoms (Ayoub et al., 2021). A large variety of mediators are implicated in pathogenesis of Allergic rhinitis. These many targeting cells or modulators are key components for many forms of phytomolecules present in therapeutic plants.Nasal obstruction, which is also one of the symptoms of Allergic rhinitis, has been treated with natural components such as garlic and Andrographispaniculata extract. (Hiroi and Takaiwa, 2006; Khoutry et al., 2016).

A recent study has discovered that formononetin, a plant molecule, may help treat food allergies as well as other forms of allergies. Formononetin, which is present in plants and herbs including red clover and green beans, has been demonstrated to have anticancer effects. It has a close resemblance to the structure of the hormone estrogen, which means it can interact with the cell's estrogen receptors (Xu and An, 2017). Food allergies develop when the immune system perceives a food or something in a portion of food as a threat. The immune system responds by producing immunoglobulin E (IgE) antibodies, which induce problems such as asthma, hives, itching, diarrhea, etc. In a recent study scientists isolated formononetin as a potential factor that suppresses levels of IgE antibodies in the blood

(Bansal et al., 2008). Following the identification of genes and protein targets, scientists confirmed them using in cultivated cell lines and their requirement in allergic research. These results produced by these cell lines demonstrated that formononetinaffects gene expression and protein targets discovered by systems pharmacotherapy (Ochoa-Reparaz et al., 2011; Platts-Mills,2001).

Similarly, another plant family called the Lamiaceae family, which has been traditionally used as herbal medicine to treat hypersensitivity disorders such as asthma and skin allergies, etc. The Lamiaceae family contains flavonoids, flavanones, flavones, flavonoids, monoterpenes, diterpenes, triterpenoids, fatty acids, and essential oils, according to phytochemical screening (Carović-Stanko et al., 2016). Numerous studies have demonstrated the anti-inflammatory properties of Lamiaceae family by using standard protocols and extracts. Various studies showed that, high levels of volatile chemicals in Lamiaceae species have led it to give therapeutic effects (Khoury et al., 2016). Lamiaceaespecies are historically known to be useful in treating various ailments such as fatigue, tiredness, anxiety, cognitive performance, circulatory improvement, repair of the fragile vascular system, skin allergies, and asthma. Furthermore, the Elsholziablanda leaves are known in treating itchiness. From thousands of years, traditional Chinese Medicine has been utilizingScutellariabaicalensis, another Lamiaceae species in therapeutics. In Chinese, it is referred as Huang Qin i.e. a traditional cure (dried roots) for respiratory infections (Sim et al., 2019).

Similarly, another plant family Malvaceae consisting of 200 genera and 2300 species was found to have anti-inflammatory and anti-allergic properties. Phtochemical studies showed that they contain phytoconstituentse.g alkaloids, flavonoids, triterpenes, and coumarins

which are therapeutic (Silva et al., 2014). Brachychiton (Malvaceae) is a genus of 30 species found in Australia. Genus members show notable biological impacts such as antioxidant, antimicrobial, hepatoprotective, and anti-schistosomal properties. Numerous investigations have been conducted to validate the anti-allergic properties expressed by differenttriterpenes (β-amyrin, lupeol and oleanolic acid) extracted from B. discolor. Member of this specie (Sterculia) is considered useful in folk medicine as it helps in treating itchiness, skin inflammations, dermatitis, and other skin diseases (Thabet et al., 2018).

There is a plant family called butterbur (Petasiteshybridus) usually found in Europe, South Asia, and northern Africa. Butterbur's leaves and roots contain nemophila sesquiterpenes (petasines). Butterbur extracts have been used to treat bronchial asthma and studies have revealed that petasines decrease leukotriene production, which is directly or indirectly linked with anti-spasmodic and anti-allergic efficacy in hypersensitivity reactions (type 1)(Brune et al., 1993). Butterbur was well tested on patients and did not elicit the sedative impacts linked with antihistamines. Both patients and physicians verified the effectiveness of this herbal medication (Thomet et al., 2001).

Ananascomosus is also known as pineapple (Bromeliaananas). Pineapple is produced in several tropical and subtropical nations including Thailand, Kenya, Philippines, Nigeria, Indonesia, Malaysia, and India (Tohidinik et al., 2001). It has been used as a medicinal herb in several native cultures, and its medicative qualities are attributed to bromelain, a raw isolate from pineapple that comprises chemical compounds which show properties like proteolysis, fibrolysis , antithrombotic, and anti-inflammatory actions in

vivo and in vitro. Bromelain has been recognized chemically as a phytomedicine since 1875 (Taussig and Batkin, 1988). Bromelain is a therapeutic medicine for reducing inflammation and sinusitis and allergic sensitization.

MATERIAL AND METHODS

In this article, we reviewed the medicinal plant clinical trials with reppressive properties on allergic rhinitis. Merely trials on many medicinal plants were evaluated, and their sources were confirmed. Table 1 contains a catalogue of medicinal plants and phytochemicals under study for their action against allergic rhinitis, in vivo and in vitro, whereas Table 2 has a catalogueof plants under study for their anti-allergic rhinitis action in clinical research trials. Herbal extractsused as combinational treatment or supplements alone and the studies that did not employ model (AR induced) in animal research or Allergic rhinitis patients for medical investigations were eliminated from the search and data extraction. Furthermore, toxicological data on medicinal herbs with high anti AR properties was required to discuss the safety levels for future usage in treating AR (Yagami and Ebisawa, 2019; Presta et al.,1994).

Molecular mechanisms involved in suppression of Allergic rhinitis by plant compounds:

Herbal medicines and their active compounds have several modes of functioning in fighting immune system modulators engaged in Inflammatory mechanisms in AR or AR sensitivity mechanisms. A number of these phytochemicals contain anti-hypersensitivity and anti-inflammatory characteristics that may be effective in treating many forms of hypersensitivity disorders and signs. Several studies at cellular level, animal level, and investigations at clinical are devisedto investigate the anti-inflammatory and anti-allergic

characteristics of therapeutics plants, specifically in the treatment of Allergic rhinitis employing model (induced by AR) or Allergic rhinitis patients (Small et al., 2018). A large variety of mediators are implicated in the pathogenesis of Allergic rhinitis. Such diverse targeting cells or mediators are important core components for the many types of phyto-compounds in a vast variety of therapeutic plants. The phyto-molecules can be useful in combating the major factors implicated thus reducing symptoms in AR patients. The anti-AR actions of therapeutic plants and their biologically active metabolites can be mediated by immune system repression via IgE inhibition, cytokine suppression, histamine suppression, and eosinophil inhibition (Sim et al., 2019).

Inhibition of Immunoglobin E release:

Immunoglobulin (Ig-E) induced allergy Type 1 hypersensitivity to allergens, is becoming an alarming world wide health problem. A large percentage of the population in developed nations suffers from allergic conditions, such as bronchial asthma, AR, atopic dermatitis, conjunctivitis, etc, and its frequency is rapidly growing. Interleukins, particularly IL-4 and IL-3, which are released during Th2 cell activation, may increase the production of IgE antibodies. This will eventually boost eosinophil function regulation and stimulate mast cell degradation (Bjermer et al., 2019). IgE is a possible essential component that should be addressed early in the allergic inflammatory reaction since it causes the stimulation of additional biochemical or immunity response based pathways afterwards(Platts-Mills, 2001). Allergic sensitization occurs when naive T cells are first exposed to allergens via APCs, resulting in the stimulation of Th2 cells which are allergen specific and the production of Immunoglobulin E. Subsequent allergen exposure activates inflammatory cells and releases mediators, which are involved in both earlier and late allergic reactions.

These antibodies then bound to cell surface receptors on mast cells, eosinophils, basophils, CD23 and B lymphocytes to connect to particular receptors on other indegenous cells (Presta et al., 1994). Even when the quantity of IgE in the blood is relatively low, mast cells and basophils can be extremely sensitive to allergens. Type I hypersensitive reactions are IgE synthesis and mast cell degranulation, which result in high levels of histamine and different modulators causing allergic sensitivity. After the early phase of allergic reactions,production of cytokines such as Interleukin-5, IL-5, Interleukin-4, and Tumor necrosis factor-alpha, increases Immunoglobulin E production. Interferons IFN and TGF-beta, on the other hand, may also limit IgE formation (Ayoub et al., 2021).

Plenty of researches at cellular and animal level are conducted to evaluate the reppressive impact of therapeutic herbs on Immunoglobulin E in an Allergic rhinitis induced paradigm. In an ovalbumin induced Allergic rhinitis mouse model, the effect of Bupleurumchinense concentrate on hypersensitive inflammatory responses was studied by quantifying anti-OVA specific IgG2a, IgG1, and IgE levels in serum. Hence the results concluded that at dosages of 100 and 200 mg/kg of BupleurumChinese, a substantial (<0.05 &< 0.01, respectively) dosage dependent decrease of anti-OVA specific IgE was observed. Serum anti-OVA induced Immunoglobulin G1 contents were likewise decreased in a dosage dependent manner, inhibiting histamine release.

Suppression of histamine release:

Histamine has been identified as a possible target in control of AR disorder.It is among the most essential criticial components in the initial stages of Allergic rhinitis pathogenesis inducing severe signs and symptoms after allergen exposure. This might give immediate relief in an individual suffering with AR caused by a specific kind of allergen (Thangam et al., 2018).

A study on human epithelial cells was undertaken (in vivo), in which upregulation of H1 receptor messenger nucleric acid expression by phorbolmyristate acetate and histamins levels was studied by using wild type grapes or ampelopsis glandulosa, Momiy extract (Islam et al., 2018). Phorbolmyristate acetateor histamine stimulation of HeLa cells led to a significant rise in mRNA H1R (3 hours before activation). When more than one dosages of wild type grape isolate (10, 25, and 30 g/ml) were related to HeLa (PMA-induced), significant differences at p 0.01 were observed. Furthermore, there were clear differences at p 0.04 and p 0.01 between 25 and 40 g/ml of grape extract when related to HeLa which are histamine-induced(Marahotha et al., 2021).

Using plant-based vaccines against hypersensitivity reactions:

Many studies have been made to immunize humans against specific allergens called allergen-specific immunotherapy (SIT), with the help of mucosal (oral) vaccines). Oral immunization is an effective vaccination method and it is simple and inexpensive. For the treatment of allergic individuals, Dosage given by mucosal application route (oral, lingual, or intranasal administration) is preferred over intravenous infusion, because it is more safe and reliable.allergen specific immunotherapy has typically been provided by intravenous infusion of large dosages of specific allergen isolate as the main therapeutic option for type I allergic disease. SIT produces clinical effects such as (1) a drop in allergen-specific ImmunoglobulinE levels, and (2) a rise in ImmunoglobulinA and ImmunoglobulinG4 isotypes which are allergen specific that will downregulate the recruitment of allergen-specific IgE to mast cells, basophils, and (3) decrease in specific T-cell production (Silva, 2014). When a specific allergen is administered systemically, it causes a different types of T cells including CD4, CD25, Tr3, and Th1 to proliferate so that they can further produce IL-10 and TGfβ (suppressive cytokines). This is associated to decrease T-cell levels which are allergen specific and drop in production of Th2-

type cells (IL-5, IL-13, IL-4) and Th1-type cells (IL-2, IFN) cytokines, leading to lower levels of Immunoglobulin E which is allergen sensitive and increased levels of Immunoglobulin G4 and ImmunoglobulinA. So the strategy of allergen-specific immunotherapy (SIT) leads to clinical symptom relief (Sim et al., 2019).

Rice seed-based vaccines against pollen allergy:

Pollen allergy is the basic problem which we are facing these days. The patients with pollen allergy have Immunoglobulin E antibodies acting on hypersensitivity caused by pollen allergens (cedar) circulating in their bodies. Cryj1 and Cryj2 are termed as principle allergy inducers causing pollinosis. Their Tcell epitopes are dominant. Key epitopes on T cells of Cryj2 and Cryj1 have been precisely defined as principal allergens causing this pollinosis(Yagami and Ebisawa, 2019). To verify the efficacy of rice derived parenteral shots for stimulating body's immune system against pollen allergens (cedar) by allergen specific site (SIT) technique, main mice T-cell domains inferred from Cry j 2 (p245-259) and Cry j 1 (p 277-290) were injected into C-terminal wildly divergent regions of soy storage protein glycinin A1bB1b basic and acidic domains.They were subsequently produced as recombinant protein in the endosperm of recombinant rice cultivars regulated by endosperm sensitive GluB-1 promoter glutelin.In a preclinical model, we saw that mice were administered with recombinant rice cultivars seeds (250 mg) daily for four weeks before exposure to raw pollen grains (allergens) that suppressed the proliferation of T cells which are allergen specific, Immunoglobulin E proliferation, and levels of histamine related to mice who were given control rice seeds (non-transgenic) (Fig. 5). T-cell domain peptideadministrationderived from rice also suppressed the formation of allergen-specific cytokine mediators (Th-2 type) e.g. Interleukin-13, Interleukin-4, and Interleukin-5. Moreover, after being exposed to cedar allergens hypersensitivity signs i.e. nasal discomfort was

relieved. These findings show that immunization of the mucosa using rice based seed cultivars bearing T cell epitopes effectively develops immunological resilience(Hiroi and Takaiwa, 2006).

Rice seed-based vaccines against dust mite allergy:

House dust mites are the prevalent source of household allergens related to disorders such as bronchial asthma, atopic dermatitis and AR. Allergens of the class 1 and 2 are the primary drivers for Immunoglobulin E antibody responsive reactions in more than eighty percent of mite allergy cases. Derp1 belongs to Class I allergen having cysteine proteolytic activity which plays role in allergy elicitation by degrading CD25 and CD23 from immunocytes.The whole peptide (p1-222) of Derp1 (mite allergen), with an additional portion (p45–145) comprising the majority of human and mice (BALB/c) significant T cell peptide domains, were upregulated selectively rice seed driven recombinant tissue regulated by GluB-1 promoterglutelin. Even after several years of storage at room temperature, these antigens remain persistently present with immunogenicity in seeds. Allergic asthma induced by dust mites allergens, was suppressed in mice after they were given allergen specific recombinant rice seeds.Oral supplementation of this transgenic rice significantly lowered allergen specific blood Immunoglobulin E and Immunoglobulin G levels by suppressing Interleukin-13 and Interleukin-4 synthesis (Takaiwa, 2011).

CONCLUSION

Antihistamines are used to treat allergic symptoms. They are beneficial in reducing itching caused by histamine release. Sedation was caused by the initial generation of antihistamines, including promethazine. Using newersecond generation' antihistamines like loratadine and 'third

generation' antihistamines like desloratadine, this is less of an issue. Sedating antihistamines no longer has a function in allergic diseases. Less sedating antihistamines are similarly effective. Lower sedating antihistamines can be administered for an extended period with no loss of effectiveness and a continuous favorable safety profile. Antihistamines play no function in the immediate treatment of anaphylaxis.

REFERENCES

Ayoub I M., Korinek M., El-Shazly M., Wetterauer B., El-Beshbishy H. A., Hwang T L., Chen B H., Chan F R., Wink M., Singab A N B and Youssef F S. (2021). Anti-allergic, anti-inflammatory, and anti-hyperglycemic activity of charmanteaethiopica leaf extract and its profiling using lc/ms and GLC/ms. .*Plants*, 10(6).

Bansal G., Xie Z., Rao S., Nocka K H and Druey K M. (2008). Suppression of immunoglobulin E-mediated allergic responses by the regulator of G protein signaling 13. *Nature Immunology*, *9*(1); 73–80.

Bielory L. (2010). Allergic conjunctivitis and the impact of allergic rhinitis. *Current Allergy and Asthma Reports*, 10(2); 122–134.

Bjermer L., Westman M., Holmström M and Wickman M C. (2019). The complex pathophysiology of allergic rhinitis: Scientific rationale for the development of an alternative treatment option. *Allergy, Asthma and Clinical Immunology*, 15(1); 1–15.

Brune K., Bickel D and Peskar B A. (1993). Gastro-protective effects by extracts of Petasiteshybridus: The role of inhibition of peptide-leukotriene synthesis. *Planta Medica*, 59(6); 494–496.

Carović-Stanko K., Petek M., Grdiša M., Pintar J., Bedeković D., Ćustić M H and Satovic Z. (2016). Medicinal plants of the family Lamiaceae as functional foods-A review. *Czech Journal of Food Sciences*, 34(5); 377–390.

Hiroi T and Takaiwa F. (2006). Peptide immunotherapy for allergic diseases using a rice-based edible vaccine. *Current Opinion in Allergy and Clinical Immunology*, 6(6); 455–460.

Islam R., Mizuguchi H., Shaha A., Nishida K., Yabumoto M., Ikeda H., Fujino H., Kitamura

Y., Fukui H and Takeda N. (2018). Effect of wild grape on the signaling of histamine H1 receptor gene expression responsible for the pathogenesis of allergic rhinitis. Journal of Medical Investigation, 65(3–4); 242–250.

Khoury M., Stien D., Eparvier V., Ouaini N and El Beyrouthy M. (2016). Report on the Medicinal Use of Eleven Lamiaceae Species in Lebanon and Rationalization of Their Antimicrobial Potential by Examination of the Chemical Composition and Antimicrobial Activity of Their Essential Oils. *Evidence-Based Complementary and Alternative Medicine*, 2016.

Leurs R., Church M. K and Taglialatela M. (2002). H1-antihistamines: Inverse agonism, anti-inflammatory actions, and cardiac effects. *Clinical and Experimental Allergy*, *32*(4); 489–498.

Marahatha R., Gyawali K., Sharma K., Gyawali N., Tandan P., Adhikari A., Timilsina G., Bhattarai S., Lamichhane G., Acharya A., Pathak I., Devkota H P and Parajuli N. (2021). Pharmacologic activities of phytosterols in inflammatory diseases: Mechanism of action and therapeutic potentials. *Phytotherapy Research*, 35(9); 5103–5124.

May J R and Dolen W K. (2017). Management of Allergic Rhinitis: A Review for the Community Pharmacist. *Clinical Therapeutics*, 39(12); 2410–2419.

Ochoa-Repáraz J., Mielcarz D W., Begum- Haque S and Kasper L H. (2011). Gut, bugs, and the brain: Role of commensal bacteria in the control of central nervous system disease. *Annals of Neurology*, 69(2); 240–247.

Platts-Mills T A E. (2001). The role of immunoglobulin E in allergy and asthma. *American Journal of Respiratory and Critical Care Medicine*, 164(8 II). https://doi.org/10.1164/ajrccm.164.supplement_1.2103024

Presta L., Shields R., O'Connell L., Lahr S., Porter J., Gorman C and Jardieu P. (1994). The binding site on human immunoglobulin E for its high-affinity receptor. *Journal of Biological Chemistry*, 269(42); 26368–26373. https://doi.org/10.1016/s0021-9258(18)47203-1

Silva F. V., Oliveira I. S., Figueiredo K. A., Júnior F B M., Costa D A., Chaves M H., Amaral M P M., Almeida F R C., Oliveira F A and Oliveira R C M. (2014). Anti-inflammatory and antinociceptive effects of sterculiastriata A. St.-Hil. &Naudin (Malvaceae) in Rodents. *Journal of Medicinal Food*, 17(6); 694–700

Sim L Y., Rani N Z A and Husain K. (2019). Lamiaceae: An insight on their anti-allergic potential and its mechanisms of action. *Frontiers in Pharmacology*, 10(JUN). https://doi.org/10.3389/fphar.2019.00677

Skoner D P. (2001). Allergic rhinitis: Definition, epidemiology, pathophysiology, detection, and diagnosis. *Journal of Allergy and Clinical Immunology*, 108(1 SUPPL); 2–8. https://doi.org/10.1067/mai.2001.115569.

Small P., Keith P K and Kim H. (2018). Allergic rhinitis. *Allergy, Asthma and Clinical Immunology*, *14*(s2); 1–11. https://doi.org/10.1186/s13223-018-0280-7

Takaiwa F. (2011). Seed-based oral vaccines as allergen-specific immunotherapies. *Human Vaccines*, *7*(3); 357–366. https://doi.org/10.4161/hv.7.3.14302

Taussig S J and Batkin S. (1988). Bromelain, the enzyme complex of pineapple (Ananascomosus) and its clinical application. An update. *Journal of Ethnopharmacology*, *22*(2); 191–203.

Thabet A A., Youssef F S., Korinek M., Chang F. R., Wu Y C., Chen B H., El-Shazly M., Singab A N B and Hwang T L. (2018). Study of the anti-allergic and anti-inflammatory activity of Brachychitonrupestris and Brachychiton discolor leaves (Malvaceae) using in vitro models. *BMC Complementary and Alternative Medicine*, 18(1); 1–15. https://doi.org/10.1186/s12906-018-2359-6

Thangam E B., Jemima E A., Singh H., Baig M S., Khan M., Mathias C B., Church M K and Saluja R. (2018). The role of histamine and histamine receptors in mast cell-mediated allergy and inflammation: The hunt for new therapeutic targets. *Frontiers in Immunology*, 9(AUG); 1–9.

Thomet O A R., Wiesmann U N., Schapowal A., Bizer C and Simon H U. (2001). Role of the petition in the potential anti-inflammatory activity of a plant extract of Petasiteshybridus. *Biochemical Pharmacology*, 61(8); 1041–1047.

Tohidinik H R., Mallah N and Takkouche B. (2019). History of allergic rhinitis and risk of asthma; a systematic review and meta-analysis. *World Allergy Organization Journal*, 12(10); 100069. https://doi.org/10.1016/j.waojou.2019.100069

Xu N and An J. (2017). Formononetin ameliorates mast cell-mediated allergic inflammation via inhibition of histamine release and production of pro-inflammatory cytokines. *Experimental*

and Therapeutic Medicine, 14(6); 6201–6206.

Yagami A and Ebisawa M. (2019). New findings, pathophysiology, and antigen analysis in pollen-food allergy syndrome. *Current Opinion in Allergy and Clinical Immunology*, 19(3); 218–223.