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ALLERGIC RHINITIS: NEW APPROACHES TO THERAPY

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Annotation: This article focuses on new approaches to the therapy of allergic rhinitis (AR), a chronic inflammatory condition caused by allergens such as pollen, dust mites, and animal dander. AR is characterized by symptoms like nasal congestion, sneezing, and itching, which significantly impact patients' quality of life. Moreover, the article highlights innovative therapeutic strategies, including biologic agents like omalizumab and dupilumab, which target specific immune pathways, and allergen-specific immunotherapy (ASIT), which addresses the root cause of AR by inducing immune tolerance. This article highlights these new therapeutic strategies and their potential impact on the management of allergic rhinitis.

Key words: *AR therapy, nasal congestion, immune dysregulation, Cutting-edge technology, Antihistamines.*

Allergic rhinitis (AR) is a chronic inflammatory condition of the nasal mucosa triggered by allergens such as pollen, dust mites, animal dander, or mold spores. It is a global health problem affecting millions, with symptoms including sneezing, nasal congestion, rhinorrhea (runny nose), nasal itching, and postnasal drip. AR can significantly impact patients' quality of life, causing sleep disturbances, fatigue, and impaired daily functioning. While traditional therapies such as antihistamines and corticosteroids have long been the cornerstone of AR treatment, recent advancements have introduced innovative approaches to better manage symptoms and improve long-term outcomes. The primary goals of AR therapy include:

1. Symptom relief: Reducing nasal congestion, sneezing, itching, and other discomforts.
2. Improving quality of life: Minimizing the impact of AR on daily life, sleep, and overall well-being.
3. Addressing immune dysregulation: Modulating the immune system to prevent overreaction to allergens.

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4. Preventing complications: Reducing the risk of conditions like sinusitis, otitis media, or asthma.

The prevalence of allergic rhinitis (AR) is on the rise worldwide, creating a serious challenge for patients, healthcare workers and economies across all age groups [1]. Cutting-edge technology, such as mobile devices for e-health, offers the potential to gather valuable insights from real-world data, symptoms, patient adherence and epidemiological characteristics. Early identification of disease onset and implementation of preventive measures is particularly crucial for the infant population. Sensitization patterns, risk factors for the allergic rhinitis development and biomarkers predicting disease courses are the focus of many investigations in the infant population. In addition, the MeDALL framework aims to encourage customized, predictive, preventive and participative methods in treating allergy diseases by analyzing data from birth cohort studies. The development of infant asthma/wheeze, infantile eczema, early adult asthma and allergic rhinitis has been associated with food sensitization during the first 2 years. It is predicted that the persistence or reoccurrence of fatal type 2 signaling is associated with specific IgE production and sensitization in childhood, which offers a significant risk of developing multimorbidities, including asthma and allergic rhinitis in late childhood and at stage of adolescence. However, specific IgE production can be used to predict disease in up to 25% of children by examining IgE reactivity to PR-10 proteins in early infancy. Nearly half of pediatric AR patients have their first symptoms by age 6 and the prevalence of symptoms increases with age. Therefore, the development and spread of allergy disorders may be slowed or stopped by early-life prevention, diagnosis and medication [2].

AR has traditionally been managed using the following methods:

- Antihistamines: H1 receptor antagonists (e.g., loratadine, fexofenadine, cetirizine) reduce sneezing, itching, and rhinorrhea by blocking histamine, a key mediator of allergic reactions. Second- and third-generation antihistamines are preferred due to fewer sedative effects.
- Intranasal corticosteroids (INCS): Corticosteroids like fluticasone, mometasone, and budesonide effectively reduce nasal inflammation and are considered the most effective treatment for moderate-to-severe AR.
- Decongestants: Agents like oxymetazoline and pseudoephedrine alleviate nasal congestion but should only be used for short durations due to the risk of rebound congestion (rhinitis medicamentosa).

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- Allergen avoidance: Minimizing exposure to known allergens (e.g., using air purifiers, washing bedding frequently) is an essential component of AR management.

While these therapies provide symptom relief, they often do not address the underlying immune mechanisms or offer long-term benefits. Allergic rhinitis is the most common chronic disease affecting children and is frequently undiagnosed and untreated due to their limited ability to express symptoms. This condition significantly impacts psychosocial well-being, learning capacity and quality of life and is associated with potential complications like asthma, sinusitis and otitis media. Recognizing signs such as allergic shiners, creases and salute is vital for identification. Allergic rhinitis arises from an immune overreaction to environmental allergens, triggering the release of inflammatory mediators. Symptoms include congestion, sneezing, itching and rhinorrhea. Treatment options emphasize environmental control, although complete allergen avoidance may not be feasible. Initial therapy comprises nonsedating second-generation oral antihistamines, while intranasal corticosteroids offer effective relief with fewer systemic side effects. Decongestants may be necessary and allergen immunotherapy injections can be considered for persistent cases. Clinicians must consider factors influencing compliance in pediatric patients[3]. Rapid intervention and tailored management are crucial for improving outcomes and minimizing the allergic rhinitis impact in children.

Recent advances in understanding the pathophysiology of AR have paved the way for novel therapeutic approaches[4]:

1. Biologic Therapies. Biologic agents are targeted treatments designed to modulate specific immune pathways involved in allergic responses. They are particularly beneficial for patients with severe AR or comorbid conditions such as asthma. Examples include:

- Omalizumab:

  A monoclonal antibody targeting immunoglobulin E (IgE), a key player in allergic reactions. By neutralizing IgE, omalizumab reduces the activation of mast cells and basophils, leading to decreased inflammation. It is especially effective in patients with both AR and allergic asthma.

- Dupilumab:

  This monoclonal antibody inhibits interleukin-4 (IL-4) and interleukin-13 (IL-13) signaling, which are critical in the pathogenesis of allergic inflammation. Dupilumab has shown promise in managing AR associated with chronic sinusitis and nasal polyps.

2. Allergen-Specific Immunotherapy (ASIT). ASIT is the only treatment that addresses the underlying cause of AR by inducing immune tolerance to specific allergens. It can significantly reduce symptoms and decrease the need for medications over time.

- Subcutaneous immunotherapy (SCIT): Involves injecting small doses of allergens under the skin to desensitize the immune system. It requires regular visits to a healthcare provider but has proven long-term efficacy.
- Sublingual immunotherapy (SLIT): Allergens are administered as tablets or drops under the tongue. This method is less invasive than SCIT and can be performed at home, making it more convenient for patients.

ASIT not only improves AR symptoms but also reduces the risk of developing asthma in allergic individuals.

3. Probiotic and Microbiome-Based Therapies. Emerging evidence suggests that imbalances in the gut and nasal microbiomes may play a role in AR pathogenesis. Modulating the microbiome could provide a novel therapeutic avenue:

- Probiotics: Strains such as Lactobacillus and Bifidobacterium have been shown to improve immune regulation and reduce allergic symptoms. Probiotic supplementation may help restore microbial balance and reduce inflammation.
- Microbiome-targeted interventions: Future therapies may involve manipulating nasal and gut microbiota to modulate immune responses to allergens.

4. Innovative Nasal Sprays. Advances in nasal spray formulations have introduced new options for AR management: Lipid-based and nanotechnology sprays: These sprays form a protective barrier on the nasal mucosa, preventing allergens from penetrating and triggering immune responses.

Ectoine-based sprays: Ectoine, a natural compound with anti-inflammatory and membrane-stabilizing properties, helps protect the nasal mucosa from allergens and reduces symptoms without systemic effects.

5. Phototherapy. Phototherapy involves the application of low-level light (infrared or ultraviolet) to the nasal mucosa. This non-invasive treatment reduces inflammation and alleviates AR symptoms by modulating local immune responses. Phototherapy is particularly useful for patients who do not respond well to traditional therapies.

The use of genomic data to tailor treatments for AR is an exciting area of research. Understanding genetic predispositions and molecular pathways involved in allergic reactions

can enable the development of highly individualized therapies. For example: Identifying specific genetic markers could predict patient response to certain medications or immunotherapy. Personalized immunotherapy regimens could optimize efficacy and minimize side effects.

Future Directions in Allergic Rhinitis Therapy[5]: Personalized treatment plans: Advances in genomics, artificial intelligence, and big data analytics will allow for customized therapies based on individual patient profiles, including genetic, environmental, and lifestyle factors. Long-lasting biologics: Development of monoclonal antibodies with longer half-lives to reduce injection frequency and improve patient adherence. Combination therapies: Combining biologics, immunotherapy, and microbiome modulation could offer synergistic effects for more comprehensive AR management. Nanomedicine: Nanoparticles delivering targeted therapies directly to nasal tissues may enhance drug efficacy while minimizing systemic side effects

In conclusion it should be noted that allergic rhinitis remains a significant public health challenge, but recent advances in therapy are transforming its management. Biologic agents, allergen-specific immunotherapy, microbiome modulation, innovative nasal sprays, and phototherapy offer promising alternatives to traditional treatments. These novel approaches not only improve symptom control but also address the underlying immune mechanisms, potentially providing long-term relief. Future research into personalized medicine and cutting-edge technologies will further refine AR management, ensuring more effective and patient-centered care. For healthcare providers, staying informed about these advancements is crucial to delivering optimal outcomes for individuals with allergic rhinitis.

REFERENCES:

1. S.K. Kim, M.W. Jo and S.H. Kim, "Health-related quality of life by allergy symptoms in elementary school students," Health Qual. Life Outcomes, vol. 16, no. 1, pp. 1-7, 2018, doi: 10.1186/s12955-018- 0922-y.
2. C. Cingi, N.B. Muluk and G.K. Scadding, "Will every child have allergic rhinitis soon?," Int J Pediatr Otorhinolaryngol., vol. 118, pp. 53–58, 2019, doi: 10.1016/j.ijporl.2018.12.019.

3. https://pubmed.ncbi.nlm.nih.gov/24504526/
4. https://www.mediasphera.ru/issues/rossijskaya-rinologiya/2023/1/1086954742023011054?ysclid=m60mv42kyf887556907