Local Allergic Rhinitis

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KEYWORDS

• Local allergic rhinitis • Asthma • Nasal allergen provocation test • Local IgE
• Natural evolution • Allergen immunotherapy

KEY POINTS

- Local allergic rhinitis (LAR) is a rhinitis phenotype defined by a nasal allergic response in patients with negative skin prick test and nondetectable serum specific immunoglobulin E (sIgE) antibodies.
- Patients from different countries, ethnic groups, and ages may be affected. Impairment of quality of life and association with conjunctivitis and asthma are frequent.
- Diagnosis is based on clinical history, the demonstration of a positive response to nasal allergen provocation test and/or the detection of nasal sIgE. A positive basophil activation test may support the diagnosis.
- Allergen immunotherapy is a clinically effective immune-modifying treatment for LAR.

DEFINITION OF LOCAL ALLERGIC RHINITIS

Local allergic rhinitis (LAR) is a clinical entity characterized by symptoms suggestive of allergic rhinitis (AR) owing to a localized allergic response in the nasal mucosa in the absence of systemic atopy assessed by conventional diagnostic tests such as skin prick test or determination of specific immunoglobulin E (sIgE) in serum.[1–17]

UNDERLYING IMMUNE MECHANISMS

A better understanding of the underlying immune mechanisms is essential for developing diagnostic methods and targeted therapies. The immune characteristics of LAR (**Fig. 1**) include:

- Nasal T-helper 2 cell allergic inflammation[4–6,18,19]
- Positive response to nasal allergen provocation test (NAPT)[3,5,11,20]
- Nasal production of sIgE[5,6,8,9,18,19] and inflammatory mediators[8,21,22]
- Allergen-specific basophil activation[23,24]
- No detectable sIgE antibodies in serum[16,17]

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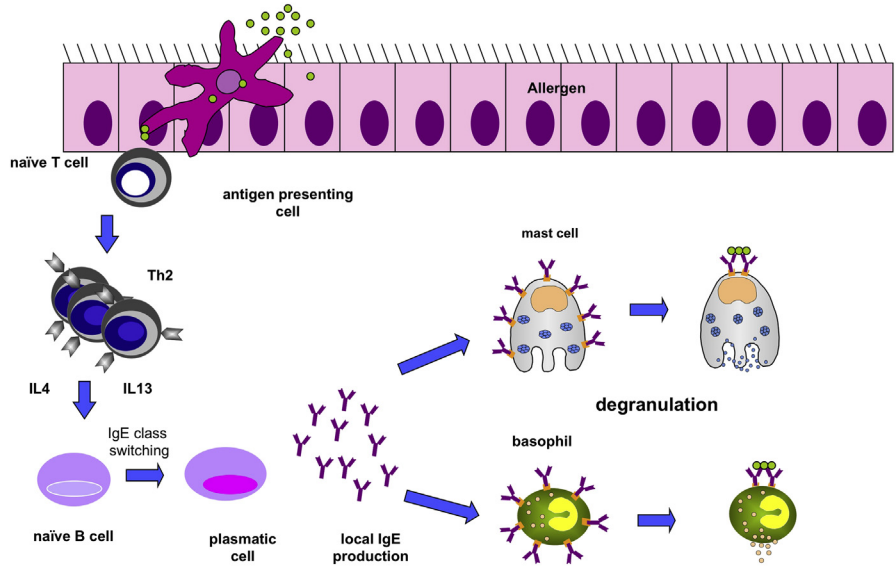

Fig. 1. Local allergic immune response. IgE, immunoglobulin E; IL, interleukin; Th2, T-helper 2 cell. (*Adapted from* Rondón C, Fernandez F, Canto G, et al. Local allergic rhinitis: concept, clinical manifestations, and diagnostic approach. J Investig Allergol Clin Immunol 2010;20:366.)

T-helper 2 Cell Nasal Immunologic Response

Natural exposure to aeroallergens induces a nasal T-helper 2 cell inflammatory response in LAR with increased eosinophils, basophils, mast cells, $CD3^+$, and $CD4^+$ T cells.[5,6] T cells may play a role in eosinophil recruitment and IgE production.

Positive Response to the Nasal Allergen Provocation Test

NAPT studies have helped to increase our understanding of the pathophysiology of LAR,[13] confirming the characteristic immediate/early and late phases of the allergic response in LAR patients.[21,22] The response to NAPT has been confirmed objectively by acoustic rhinometry,[5,6,8,20–22] anterior rhinomanometry,[3] and by nasal secretion of sIgE[5,6,8,9,21,22] and inflammatory mediators[5,6,8,21,22] as well as subjectively by nasal and ocular symptoms.[3,5,6,20–22]

In LAR, aeroallergen exposure induces local sIgE production, mast cells, and eosinophil activation with nasal secretion of tryptase and eosinophil cationic protein (ECP).[21,22] The maximum secretion of tryptase occurs 15 minutes after NAPT, returning to baseline at 6 hours (immediate responders), or 24 hours (dual responders). Nasal secretion of ECP is long lasting, increasing progressively from 15 minutes to 24 hours.[21,22] A recent study showed that 83% of LAR subjects sensitized to *Olea europaea* pollen responded to NAPT with nOle e 1, demonstrating that purified allergens can also induce an allergic response with secretion of ECP potentially acting as a confirmatory biomarker of this inflammatory response.[24]

Local Specific Immunoglobulin E Production

Mechanistic studies have shown nasal production of sIgE in AR[25–28] and LAR.[2,5,6,8,9,19,21,22] The local production of sIgE in target organs may explain why