

Non-Allergic Rhinitis: Mechanisms

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Although the term rhinitis indicates inflammation of the nasal mucous membranes, inflammatory cell infiltrates are not always characteristic of all forms of rhinitis. As a clinical term, rhinitis can be considered as a heterogeneous group of nasal disorders characterized by 1 or more of the following symptoms: sneezing, nasal itching, rhinorrhea, and nasal congestion. Rhinitis can be caused by allergic, non-allergic, infectious, hormonal, occupational, and other factors.

To better understand the pathomechanisms of rhinitis, an understanding of the anatomy and physiology of the nose is crucial. The nasal cavity is divided by the nasal septum composed of bone and cartilage. The inferior, middle, and superior turbinates in the nasal cavity promote air filtration, humidification, and temperature regulation and are lined with mucosa comprised of pseudostratified columnar ciliated epithelium. The submucosa consists of serous and seromucous nasal glands, nerves, extensive vasculature, and cellular elements. Overlying the nasal epithelium is a thin layer of mucus that dynamically moves by means of ciliary action to the posterior nasopharynx. Infections (viral or bacterial) and allergic inflammation impair mucociliary clearance. Nasal tissues are highly vascular and vascular changes can lead to significant nasal obstruction. Vasoconstriction and consequent decrease in nasal airway resistance result from sympathetic nerve stimulation. Parasympathetic nerve stimulation promotes secretion from nasal airway glands and nasal congestion.

Allergic rhinitis is the most common type of rhinitis and its mechanisms are well defined. Looking at the research over the last 40 years, there is still a lack of universal terminology of non-allergic rhinitis (NAR) phenotypes with objective criteria. However, with current knowledge non-allergic rhinitis can be with and without eosinophilia. NAR comprises vasomotor rhinitis, gustatory rhinitis, infectious rhinitis and non allergic rhinitis with eosinophilia syndrome (NARES). Vasomotor rhinitis can occur due to changes in temperature, odors like perfumes, smoke alcohol, emotional factors. NARES is characterized by perennial nasal symptoms especially nasal congestion, bouts of sneezing and profuse watery rhinorrhea. Nasal smears have

> 5 to >20% eosinophils. These patients have no allergen specific IgE in the serum and negative skin test but activated mast cells and eosinophils are seen in the nasal mucosa. In NAR, pathophysiological research has described nasal hyperreactivity and autonomic nerve dysfunction, but with limited evidence. Cytological studies, studies using nasal secretions and challenge studies have provided some information into the pathomechanisms. Nasal mucosal inflammation such as local allergy with local IgE production in the absence of systemic sensitization can identify specific subsets of NAR. Other types of rhinitis that are due to non-allergic causes are drug-induced, occupational, hormonal, atrophic and those associated with immunologic diseases. Further studies are needed for better phenotyping and understanding of the mechanisms in order to develop better treatment approaches.