

The role of nerve growth factor in allergic rhinitis

2nd Vice President APAAACI, Director, Centre of Allergy and Clinical Immunology Research (ACIR),
College of Medicine, National Cheng Kung University Tainan, Taiwan

Jiu-Yao Wang

Learning objectives

1. Review of pathogenies of allergic rhinitis.
2. Review the role of nerve growth factor (NGF) in allergen-induced upper and lower airway inflammation.
3. Prove of concept in inhibiting NGF in house dust mite-induced experimental model of allergic rhinitis.
4. How we suppress NGF production in AR using natural product of water soluble chitosan.
5. Consider future application in prevention and treatment of allergic rhinitis target on NGF.

Abstract

Allergic rhinitis (AR) is a chronic inflammatory disease of the nasal mucosa and nasal airway hyperresponsiveness (AHR) that involved inappropriate activity of nervous systems and neuropeptides released. Whether inhibiting nerve growth factor (NGF) neuropeptide alleviates allergic inflammation and AHR in AR is unclear. To assess the effects of the non-toxic, natural product of water soluble chitosan (WSC) on NGF in *Dermatophagoides pteronyssinus* (Der p) allergen-induced AR. NGF heterozygote (NGF^{+/-}) and wild type mice were intranasally sensitized and challenged with Der p. WSC was intranasally administered in mice with Derp induced AR. Primary lung culture and human nasal septum epithelial cells (RPMI-2650) were used to evaluate WSC action in vitro. We found WSC attenuated nasal allergic inflammation by reducing eosinophilia, mast cells degranulation, TH2 related cytokines and NGF productions in the nasal mucosal and nasal cavity lavage fluids (NLFs), and decreased the total IgE and Der p-specific IgE levels in the sera of mice with AR. There were reduced TH2 and ILC2 activation in the nasal draining

lymph nodes of WSC-treated AR mice. Moreover, the expressions of NGF and VIP, but not NGF receptors-TrkA and p75NTR or TRPV1 in nasal mucosa also decreased in WSC-treated AR mice. RPMI-2650 pretreated with WSC suppressed IL-13 or Der p-induced NGF production, respectively. In addition, Der p failed to induce allergic inflammation and TH2 and ILC2 activation in NGF^{+/-} mice. In conclusions: The therapeutic effect of WSC in mite-induced AR was through the attenuation of NGF-induced airway inflammation, which provide a novel treatment in AR.

References

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