

Demonstration of fungal hyphae and hyphal fragments aeroallergenicity among allergic rhinitis patients using a novel immunostaining technique.

Abstract:

Background: More than 80 species of fungi are suspected of inducing immunoglobulin E (IgE) mediated hypersensitivity, exposure to airborne fungal conidia has been linked to the respiratory symptoms in subjects with fungal allergy however the contribution of airborne fungal hyphae and hyphal fragments to allergic diseases is poorly understood.

Objective: We sought to investigate the expression of allergens from airborne fungal hyphae and hyphal fragments using the Halogen immunoassay, which uses Patient's serum IgE to immunostain immobilized allergens extracted from individual fungal particles.

Methods: Airborne fungi were collected from 25 patient's and 10 nasal cavities 10 randomly selected subjects having no allergy through a refined nasal wash technique, fixed on mixed cellulose ester protein-binding membranes, incubated overnight in a humid chamber to promote the germination of conidia and immunostained with patient's own serum IgE. The samples were examined by means of light microscopy, and positively immunostained fungal particles were classified and counted.

Results: All samples contained fungal particles that expressed soluble allergens and were significantly higher in concentration than counts of conidia of individual well-characterized allergenic genera ($P < 0.05$).

Resultant immunostaining of fungal hyphae was heterogeneous, and approximately 27% of all hyphae expressed detectable allergen compared with non stained hyphae ($P < 0.05$).

Conclusions: This study conclusively demonstrates that fungal hyphae and fragments are underestimated sources of aeroallergen because positively immunostained hyphal fragments were detected in all samples and the number of the detected fungal hyphae in any of the individual protein binding membrane (PBM) was significantly higher than the conidial counts belonging to any of the commonly recognized aero allergenic species.

Key Words: Halogen immunoassay, Fungal hyphae, Fungal fragments, Fungal aeroallergenicity, Immunostaining.