

Editorial

Mold Allergens and Antigenic Epitopes Correlation with Fungal Diseases

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Today we are experiencing an unprecedented change in pattern and the prevalence of mycotic infections in humans due to pathogenic and opportunistic fungi. Currently, 69000 fungal species have been classified taxonomically and among those more than 80 are recognized as the source of potent allergens of diverse categories and thus considered as the major cause of allergic disease [1-3]. Fungal allergens are usually complex macromolecules, i.e., proteins, polysaccharides, or glycoproteins, some with diverse chemical nature and unknown biological functions. The most common presenting symptoms of fungal allergy are sneezing, nasal discharge, coughing, wheezing, shortness of breath with evidence of reversible airway obstruction, urticaria, angioedema, and anaphylaxis. The major allergic diseases associated with fungi are asthma, rhinitis, allergic bronchopulmonary mycoses, and hypersensitivity pneumonitis. Mold allergy covers almost 25% to 30% of all reported cases of allergic asthma. More than 300 allergens from plants, animals, and fungi have been reported so far, and many of them show cross-reactivity due to presence of similar antigenic epitopes in their amino acid sequences [4]. Bioinformatic tools are available for the identification of sequential epitopes in the amino acid sequences of the allergenic protein whereas advance *in silico* prediction tools are further helping in locating discontinuous and/or conformational epitope by mapping of three dimensional structures of the allergens. The dissimilarity in the linear and conformational epitopes in the same protein is considered as a confounding factor for prediction of immunoreactivity. IgE binding epitopes are believed to be more cross-reactive than the IgG binding epitopes due to the presence of structural mimics of the hyper-allergenic epitopes of the antigenic proteins [5, 6]. Thus, avoiding the regions of antigens which contain cross reactive epitopes has to be an important criterion while designing the libraries of diagnostically relevant allergenic peptides. There remains an urgent need to develop thoroughly characterized, less cross reactive molecules which have capability to distinguish healthy individuals from allergic patients.

This special issue “fungal allergens and antigenic epitopes” provides an overview of different type of fungal infections caused by pathogenic species of fungi. Special emphasis is provided on the allergic and invasive aspergillosis, hypersensitivity pneumonitis and other allergic diseases caused by potential environmental source of allergens. Strategies for identification of diagnostically relevant and vaccine candidate molecules, reported allergens/immunogens, molecular screening approaches and therapy options have been critically evaluated that may help to reduce the global burden of fungal disease. In this context, Zahur *et al.* reviewed the infection caused by dermatophytes and immune responses generated in the humans. A list of most common cause of dermatomycoses and the molecules secreted by the pathogens to modulate immune system of the host are described by the authors. A brief account of innate, cell mediated and humoral immune responses in addition to diagnostic, therapeutic and vaccination options has also been discussed.

Millon *et al.* highlighted the importance of recombinant antigenic molecules instead of crude antigenic extracts for diagnosis of the hypersensitivity pneumonitis and other occupation related allergic diseases. They discussed the application of immuno-proteomics approaches for the environmental microbes to identify novel diagnostically relevant molecules and recombinant proteins to use them as disease markers. Authors also proposed a panel of recombinant antigens which may have potential to improve serodiagnosis of hypersensitivity pneumonitis as well as other mold-induced allergic diseases such as allergic broncho pulmonary aspergillosis and asthma.

Singh *et al.* discussed high sensitivity and low specificity of crude antigens based diagnostic tests for allergic and non-allergic forms of aspergillosis. They emphasized that reported recombinant allergens of *A. fumigatus* are less important due to their cross-reactivity with other fungal and bacterial allergens. The authors proposed a panel of potential allergens for diagnosis and desensitization therapy of allergic aspergillosis based on immuno-proteomics approach combined with *in silico* characterization. They further discussed the recombinant expression strategies and characterization of antigenic epitopes through peptide library screening. This information will be helpful for designing more sensitive diagnostic assays and desensitization therapies for allergic aspergillosis.

Reichard *et al.* proposed an account of vaccination strategies that could be used against *Aspergillus* induced invasive infections. Attention is given to the various approaches that are being employed to identify protection-mediating *Aspergillus*-antigens and their rationale. A comprehensive list of potential vaccine molecules available so far to induce a protective immune response against systemic *Aspergillus* infection in animals is also provided by the authors.

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