Introduction
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*Aspergillus fumigatus* is an ubiquitous saprophytic fungus associated with a broad spectrum of diseases in humans. These diseases range from benign colonization of the lung to life threatening diseases such as allergic bronchopulmonary aspergillosis (ABPA) and invasive aspergillosis (IA). *A. fumigatus* is associated with over 80% of all human syndromes caused by aspergilli. Saprophytic presence to extensive invasion with this organism has been reported with various intermediary conditions depending on susceptibility and immunocompetence of the host [123]. Other species that have been associated with aspergillosis include *A. flavus, A. nidulans, A. niger, A. terreus, A. oryzae,* and *A. ochraceous* [6,123,124,180,236]. Being identified as the most common etiologic agent among the species of *Aspergillus* related human diseases it is of particular clinical importance. *A. fumigatus* induced obstructive airway diseases may be due to colonization of bronchial airway epithelium by the fungus. Allergy or hypersensitivity to *Aspergillus* antigens depends on the mode and frequency of exposures to the organism as well as on the host immune responses. Patients with cystic fibrosis are often reported to have complication of ABPA due to *A. fumigatus* colonization in the lung [89]. The immune responses to fungal colonization are mainly mediated by exaggerated polyclonal antibody responses against the microorganism and an intense eosinophilic infiltration of the airways [114,220].

Most of the biological functions related to pathogenicity and virulence reside in the fungal cell wall, since as the outer most part of the cell; the cell wall is structure that mediates the host-fungus interplay [50]. This includes the triggering and modulation of host immune responses. To combat the fungal infections there are a number of antifungals available in the market. Unfortunately, none of these have broad spectrum of activity and are not free of side effects. To develop such a broad spectrum antifungal there has been a constant effort to understand the pathogenesis of the causal organism, the role of metabolites, the structural composition such as proteins, lipids, enzymes etc. in the drug interaction.

New drugs are especially required in the case of treatment of aspergillosis because of the high incidence of therapeutic failure in the
treatment of invasive aspergillosis [234]. The presently available antifungal drugs have been targeted mainly to the inhibition of ergosterol synthesis [87]. However, the recent clinical launch of Cancidas, a β-(1,3)-glucan synthase inhibitor, has confirmed that the development of new drugs can indeed be based on inhibition of cell-wall biosynthetic enzymes [2] besides it other antifungals such as echinocandins and glycolipid papulacandin, with which inhibition of cell wall glucan biosynthesis leads to cessation of growth and cell lysis [125]. The identification and characterization of cell wall immunodominant proteins eliciting potent immune responses during aspergillosis could have important repercussions for developing novel diagnostic, prophylactic, and therapeutic techniques for aspergillosis.

The main recognized functions of antibodies in fungal infections include: prevention of adherence, toxin neutralization, opsonization, and antibody-dependent cellular cytotoxicity [43]. However, the absence of an association between deficiencies in antibodies and susceptibility to fungal infections and the presence of specific antibodies in patients with progressive fungal infections [43] have provided evidence against a protective role of antibodies in fungal infections. Recent advances in the field indicate that the amount, specificity, isotype and idiotype of antibodies have marked effects on protective efficacy [43], antibodies specific for a mannan adhesion fraction passively transfer protection against candidiasis in mice [59], idiotype-specific antibody or single chains thereof have broad fungicidal activity and therapeutic efficacy in experimental infections [46,140]. Recent studies have highlighted the therapeutic potential of killer antiidiotypic antibodies in several fungal infections [141]. Antiidiotypes to a monoclonal antibody (MAb) specifically reacting with killer toxins (KT) from Pichia anomala and Williopsis mrakii are characterized by a broad antimicrobial spectrum [200] and are lethal to pathogenic microorganisms expressing specific cell wall receptors (KTR). Polyclonal antibodies, MAbs, or single-chain recombinant killer antiidiotypic antibodies appear to have fungicidal activity in vitro and to confer active and passive protection in vivo in mice with candidiasis or pneumocystosis [21,201,235].

A number of studies on MAbs against Aspergillus antigens have been directed towards the specific diagnosis of the disease [78,83,121,239].
whereas very limited work has been carried out on the use of MAbs for the treatment of aspergillosis [49,183] compared to candidiasis [45,93,94,168,229]. The β-glucans, besides contributing with chitin to the strength and shape of the cell wall, are endowed with potent immunomodulatory activity [263] mediated by interaction with pattern recognition receptors on different cells [118,173]. It has been observed that K10 MAb, similar to KT [230,267], appears to recognize β-glucans in the fungal cell wall and has direct activity on it. Selective antibodies directed against specific epitopes are protective against local and systemic infection and may form the basis for immunotherapy. These antibodies can be used alone or in combination with other antifungal agents [150]. Proteomic analysis revealed that the cell wall contains many proteins but the body produces antibodies against selective antigens in response to the particular infection. Monoclonal antibodies produced against these selective antigens and checked in animal model for their therapeutic value may be one of the approaches for immunotherapy.

In the present study, 2-dimensional gel electrophoresis for generating proteome map of *A. fumigatus* cell wall proteins was used and the immunodominant proteins were identified on 2-D immunoblot using sera of patients suffering from aspergillosis. These immunogenic proteins were characterized by peptide mass fingerprinting using MALDI-TOF-MS technique. Monoclonal antibodies were produced against the cell wall antigens of *A. fumigatus*, characterized and their therapeutic efficacies were determined in vitro and also against murine model of aspergillosis. Peptide sequences were designed from the sequences obtained by reverse transcription and cDNA sequencing of hybridoma line showing the most protective response.