1.0 INTRODUCTION

Over 2000 different fungi do exist and yet less than 24 species infect man (Perfect, 2005). Among the human mycotic diseases, four genera viz., *Blastomycoses dermatitidis*, *Coccidioides* spp., *Cryptococcus neoformans* and *Histoplasma capsulatum* represent agents that occur in the environment but cause opportunistic infection in animals, including man (Casadevall *et al.*, 2003). One among these opportunistic infections is the basidomycetous yeast *Cryptococcus neoformans* that causes fatal mycoses in man. Although 19 species have been described for this genus *C. neoformans* (Sanfelice) Vuillemin was found to cause cryptococcal meningitis in a majority of the patients (Mitchell and Perfect, 1995). The species complex *C. neoformans* is distinguishable into two varieties and sibling species that include five serotypes based on capsular antigens (Lin and Heitman, 2006). Of the four serotypes, serotypes A, AD and D are pathogenic to man while the variety *gattii* (serotype B / C) occurs as an environmental agent.

The lifecycle of this heterobasidomycetous yeast involves two distinct forms: asexual and sexual budding yeasts (Hull and Heitman, 2002). The infectious form to humans is the budding, encapsulated yeast. In 1976 (from Mitchell and Perfect, 1995), Kwon Chung demonstrated that this asexual anamorphic form of the yeast had two mating types, designated as mating type ‘α’ and ‘α’ with the majority of the clinical isolates belonging to α- mating type. Her successful mating experiments resulted in the formation of the filamentous sexual form, *Filobasidiella neoformans*. This yeast has suddenly assumed aggressive proportions over the last couple of decades coincident with the rising populations of immunocompromised individuals. However, it has been found that majority of the adults possess the antibody (asymptomatic to *C. neoformans*, with children
acquiring it before the age of 10 (Goldman et al., 2001). Thus this pathogen offers a fascinating study in host pathogen interactions spanning infections in immunocompetent individuals to those severely immunocompromised.

In 2005, according to the WHO report more than 40 million people worldwide suffer from HIV infection / AIDS and about 3 million people die every year from the disease. About 70-90% of AIDS patients also suffered from neuropathological conditions with cryptococcal meningitis being the third most common fungal infection of central nervous system (Del Valle, 2006). The prevalence of cryptococcosis in HIV infected individuals receiving highly active anti retroviral therapy has declined, but cryptococciosis remains epidemic in Africa and Southeast Asia, where it affects up to 30% of AIDS patients (Casadevall, 1998).

Opportunistic infections caused by the hetrobasidiomycetous yeast, Cryptococcus spp is life threatening and has been reported from most countries all over the world. In India, several reports of the detection of this yeast from patients and from the environment have been made (Banerjee, 2005; Gugnani et al., 2005; Khan et al., 2007; Saluja 2007 and many others). Studies on the prevalence of this pathogen in HIV patients at New Delhi showed an increased incidence of 49% in 2000-2004 (Banerjee, 2005). The majority of the infections were recorded to be of serotype A (var grubii) while few reports on serotype B (var gatti) infections were reported.

The first extensive study on the molecular epidemiology of Cryptococcus neoformans strains from India was reported in 2005 (Jain et al.). Fifty Seven clinical isolations of the pathogen were made from individuals examined over a one year period and this included 49% of them being HIV positive. Apart from their microscopy and cultural characteristics, these were typed using mating type
analysis, minisatellite RAPD patterns, presence of TCN-1 transposons and the URA 5 sequences. Majority of the isolates were *C neoformans* var *grubii* serotype A, while one was *C neoformans* var. *neoformans* serotype D. Several case reports over the years have been recorded including one from a 3 ½ year infant (Nirwan *et al.*, 2003) and an albino mutant, infectious form of the yeast (Mandal *et al.*, 2005). Incidence of Cryptococcosis from Pondicherry (Khyriem, 2006; 2003, Shashikala, *et al.*, 2004), Hyderabad (Lakshmi *et al.*, 2007); and Bangalore (Satishchandra *et al.*, 2000) have been recorded in these past few years from the southern part of India. In these studies, isolation of the yeast, its microscopy and cultural characteristics helped identify the pathogen. (Saha *et al.*, 2008) compared the conventional culture test and microscopy with enzyme immunoassay detection for 127 samples from 87 cases and reported that the immunoassay was better than the others.