TITLE: PHYLOGENETIC COMPARISONS AIMING TO IDENTIFY SPECIFIC SIGNATURES FOR EARLY STAGES OF *ASPERGILLUS FUMIGATUS* CONIDIAL GERMINATION

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ABSTRACT:
Aspergillus fumigatus is a major opportunistic fungal pathogen of immunocompromised and immunocompetent hosts. *A. fumigatus* belongs to the section *Fumigati*, which is composed by many different *Aspergillus* fungal strains that present variable pathogenicity levels. Some studies have indicated that the increased virulence of this species when compared to other phylogenetically closer species is related to the ability to grow at higher temperatures and under nutrient-limiting conditions. In addition to these characteristics, the ability to produce specific secondary metabolites also favors its pathogenicity and helps the survival inside the human host.
The asexual spore (conidium) surface contains mainly proteins, polysaccharides and secondary metabolites, but little is known about determinants uniquely expressed in *A. fumigatus* conidia. In order to understand it, we comparatively analysed *A. fumigatus* with *A. fischeri* and *A. oerlinghausenensis*, the two species most closely related to *A. fumigatus*, not known to be pathogenic, and *A. lentulus*, distantly related but known as pathogenic.
Initially, the current project has compared different strains of these four *Aspergillus* species in different growth conditions, using liquid and solid media, testing different carbon sources and stressing conditions (temperature, hypoxia, starvation) to analyze their performance in different and adverse conditions, similar to those found in the host colonization process.
Radial growth and dry weight analyzes show that *A. fumigatus* tolerates higher temperatures than the other species in diverse media, and also shows a better growth performance when tested in nutrient poor medium. In hypoxia conditions, *A. fumigatus* shows increased growth rates than the other three species. Biofilm formation analysis indicate that *A. fumigatus* produces more biofilm than some of the other related species, which could contribute to a better adhesion to substrate, improving its viability and virulence traits when colonizing a new host.
Taken together, these results suggest that *A. fumigatus* is able of surviving in a wide range of conditions and has evolved a controlled nutritional flexibility to efficiently scavenge nutrients from the environment , which may also be the reason why this specie is the main opportunistic fungal pathogen in Invasive Pulmonary Aspergillosis.

Keywords: Aspergillus fumigatus, *Fumigati*, virulence, pathogenicity, conidium.

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