Cell wall modifications during conidial maturation of the human pathogenic fungus Pseudallescheria boydii

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Résumé en anglais	Progress in extending the life expectancy of cystic fibrosis (CF) patients remains jeopardized by the increasing incidence of fungal respiratory infections. Pseudallescheria boydii (P. boydii), an emerging pathogen of humans, is a filamentous fungus frequently isolated from the respiratory secretions of CF patients. It is commonly believed that infection by this fungus occurs through inhalation of airborne conidia, but the mechanisms allowing the adherence of Pseudallescheria to the host epithelial cells and its escape from the host immune defenses remain largely unknown. Given that the cell wall orchestrates all these processes, we were interested in studying its dynamic changes in conidia as function of the age of cultures. We found that the surface hydrophobicity and electronegative charge of conidia increased with the age of culture. Melanin that can influence the cell surface properties, was extracted from conidia and estimated using UV-visible spectrophotometry. Cells were also directly examined and compared using electron paramagnetic resonance (EPR) that determines the production of free radicals. Consistent with the increased amount of melanin, the EPR signal intensity decreased suggesting polymerization of melanin. These results were confirmed by flow cytometry after studying the effect of melanin polymerization on the surface accessibility of mannose-containing glycoconjugates to fluorescent concanavalin A. In the absence of melanin, conidia showed a marked increase in fluorescence intensity as the age of culture increased. Using atomic force microscopy, we were unable to find rodlet-forming hydrophobins, molecules that can also affect conidial surface properties. In conclusion, the changes in surface properties and biochemical composition of the conidial wall with the age of culture highlight the process of conidial maturation. Mannose-containing glycoconjugates that are involved in immune recognition, are progressively masked by polymerization of melanin, an antioxidant that is commonly thought to allow fungal escape from the host immune defenses.
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