



Cell wall modifications during maturation and germination of the conidia in the opportunistic fungus *Scedosporium apiospermum*

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Introduction:

Recent prevention measures led to an increase in life expectancy of cystic fibrosis (CF) patients; however, this progress remained jeopardized by various microbial infections. *Scedosporium apiospermum* is the second most frequent filamentous fungus found in the respiratory tract of CF patients. Unlike other infectious agents, the pathogenic mechanisms of this fungus are far less studied. We aim through this project to study the life cycle and the cell surface composition in order to set the basis for understanding the adherence mechanisms of *S. apiospermum* inside a human host.

Results:

So far, we have studied the cell wall modifications during maturation and germination of spores. Germination was studied in yeast peptone dextrose (YPD) broth and malt medium at different temperatures (20 C, 25 C and 37 C). The highest percentage of germination was obtained in YPD at 37 C, conditions which were selected for further experiments. The comparison of spores collected from 5-, 9- or 14 day-old cultures showed that spores from 9 day-old cultures exhibited the highest percentage of germination, capacity to bind concanavalin A (Con A) and cell-surface hydrophobicity (CSH), and the lowest electrostatic charge. Electron microscopy showed that the cell wall of *S. apiospermum* conidia is composed of two layers (electron-dense outer layer and electron transparent inner layer). Germination resulted in a thinner and fibrillar outer layer that was occasionally detached upon elongation of the filament. These ultra-structural changes were substantiated with fluorescent microscopy; the hyphal part was intensely labeled by Con-A and wheat germ agglutinin (WGA) in contrast to the mother cell. Furthermore, germination resulted in a remarkable decrease in the surface electronegativity and CSH.

Conclusion:

We demonstrated that *S. apiospermum* spores undergo maturation. Spores isolated from cultures of different age differ in their capacity to germinate, their surface accessibility to Con A and their surface physical properties (CSH and electronegativity). Upon germination, a thinning of the outer cell wall layer is observed, rendering the inner layer more accessible to lectins (Con A and WGA) and resulting in a reduced CSH and electronegative charge. All these results point out that the cell wall in *S. apiospermum* is a dynamic structure and the variability in its properties and composition might affect its adherence to the host tissues.

Résumé en anglais

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