The role of chitin and chitooligomers in the capsular architecture of *Cryptococcus neoformans*

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It has been demonstrated that molecules composed of *N*-acetylglucosamine (GlcNAc) or its de-acetylated form play key role as components of the surface envelope of the human pathogen *Cryptococcus neoformans*. GlcNAc is the monomeric unit of chitin and chitooligomers, which were shown to be required for anchoring of capsular polysaccharides to the cryptococcal cell wall. In this study, we evaluated the expression of GlcNAc-containing structures in *C. neoformans* under different conditions and the role of these molecules in the assembly of the cryptococcal capsule. The expression of GlcNAc-containing molecules in *C. neoformans* was modulated during animal infection, as inferred from the differential reactivity of yeast cells with the wheat germ lectin in infected brain and lungs. In *C. neoformans* cultures, chitooligomers formed soluble complexes with glucuronoxylomannan (GXM), the major cryptococcal capsular component, and interfered with capsular assembly, as concluded from the observation of aberrant capsules with apparently defective connections with the cell wall and altered reactivity with a monoclonal antibody to GXM. Cultivation of *C. neoformans* in the presence of an inhibitor of glucosamine 6-phosphate synthase, a key enzyme in the biosynthetic processes of GlcNAc-containing molecules, resulted in an altered expression of cell wall chitin. In these cells, the capsules were loosely connected to the cryptococcal wall and contained fibers with decreased diameters and altered monosaccharide composition. These results suggest a key role for chitin and related molecules in the architecture of *C. neoformans* capsular components.

Key words: *Cryptococcus neoformans, capsule architecture, chitin*
Supported by: CAPES, CNPQ and FAPERJ