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Surface architecture of fungal pathogens

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Surface components in fungal cells include cell wall molecules and, in certain cases, capsular structures (**Figure 1**) and extracellular matrix components. In pathogens, surface molecules are responsible for key events during interaction with the host (Nimrichter et al., 2005). These events include recognition of pathogens by the immune system and generation of damage to host cells and tissues (Roeder et al., 2004). The molecular diversity of surface structures in fungi is vast and may include (glyco) proteins, polysaccharides, lipids, and pigments (Nimrichter et al., 2005). Many of them have been associated with the antifungal immune response, as well as with steps of fungal adhesion and dissemination during interaction with host cells. For many fungal pathogens, surface composition and architecture are determinant for either disease progression or control (Roeder et al., 2004; Nimrichter et al., 2005; Latgé, 2010; Figueiredo et al., 2011). The diversity of the composition of the cell surface and its molecular architecture are believed to reveal targets for the action of new antifungals, as well as immunogens with potential to interfere with fungal diseases in favor of the host (Nimrichter et al., 2005).

In the Research Topic "Surface Architecture of Fungal Cells," many of the important aspects related to structure and function of surface components of fungi were covered. It was, of course, impossible to discuss the same research topic for each important fungal pathogen. In addition, surface architecture of some of the most important fungal pathogens has been extensively reviewed before (Cassone, 1989; Poulain and Jouault, 2004; Ruiz-Herrera et al., 2006; Chaffin, 2008; Nather and Munro, 2008; Latgé, 2010). We therefore selected a group of pathogens as prototypes for the topic, and this list included *Cryptococcus neoformans, Histoplasma capsulatum, Paracoccidioides brasiliensis, Sporothrix schenckii, Pseudallescheria boydii, Aspergillus nidulans, Aspergillus fumigatus*, and *Colletotrichum gloeosporioides*. Components of the cell surface that were discussed in this topic included cell wall and capsular polysaccharides (Frases et al., 2011; Rodrigues et al., 2011; Zaragoza, 2011), peptidopolysaccharides (Lopes-Bezerra, 2011), proteins (Figueiredo et al., 2011; Guimaraes et al., 2011; Puccia et al., 2011), pigments (Zaragoza, 2011), and glycolipids (Barreto-Bergter et al., 2011; Nimrichter and Rodrigues, 2011). In this context, articles in this topic were focused on (i) how fungal molecules are assembled at the cell surface (Guimaraes et al., 2011; Lopes-Bezerra, 2011; Nimrichter and Rodrigues, 2011; Puccia et al., 2011; Zaragoza, 2011), (ii) how they impact the immune response (Figueiredo et al., 2011; Guimaraes et al., 2011; Lopes-Bezerra, 2011; Nimrichter and Rodrigues, 2011; Puccia et al., 2011; Rodrigues et al., 2011), (iii) the role of surface components in fungal physiology (Guimaraes et al., 2011; Lopes-Bezerra, 2011; Nimrichter and Rodrigues, 2011; Puccia et al., 2011; Zaragoza, 2011), (iv) their potential to work as target for preventive or therapeutic agents (Figueiredo et al., 2011; Guimaraes et al., 2011; Lopes-Bezerra, 2011; Nimrichter and Rodrigues, 2011; Puccia et al., 2011; Rodrigues et al., 2011), and (v) how to study structure and function of these molecules (Barreto-Bergter et al., 2011; Frases et al., 2011). The extensive work of each contributor resulted in a clear notion that surface molecules of fungal cells are essential to fungal pathogenesis, physiology, and immune recognition. Essentially, these articles strongly indicate that knowledge on structure and functions of surface molecules in fungi can be translated soon into the discovery of new diagnostic, therapeutic, and preventive alternatives.

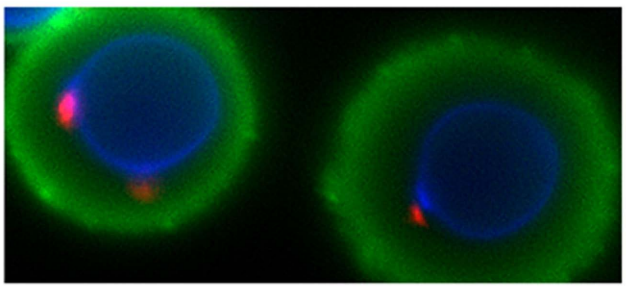

FIGURE 1 | Surface architecture of a fungal pathogen. This image illustrates how some of the surface components of the human pathogen *Cryptococcus neoformans* are distributed at the cell surface. Cell wall-associated chitin is stained in blue, chitooligomers are stained in red, and capsular polysaccharides are stained in green. Courtesy of Dr. Fernanda L. Fonseca.

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