Breakpoint: Cell wall and glycoproteins and their crucial role in the phytopathogenic fungi infection

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The cell wall that surrounds fungal cells is essential for their survival, provides protection against physical and chemical stresses, and plays relevant roles during infection. In general, the fungal cell wall is composed of an outer layer of glycoprotein and an inner skeletal layer of ?-glucans or ?-glucans and chitin. Chitin synthase genes have been shown to be important for septum formation, cell division and virulence. In the same way, chitin can act as a potent elicitor to activate defense response in several plant species; however, the fungi can convert chitin to chitosan during plant infection to evade plant defense mechanisms. Moreover, ?-1,3-Glucan, a non-degradable polysaccharide in plants, represents a key feature in fungal cell walls formed in plants and plays a protective role for this fungus against plant lytic enzymes. A similar case is with ?-1,3-and ?-1,6-glucan which are essential for in-fection, structure rigidity and pathogenicity during fungal infection. Cell wall glycoproteins are also vital to fungi. They have been associated with conidial separation, the increase of chitin in conidial cell walls, germination, appressorium formation, as well as osmotic and cell wall stress and virulence; however, the specific roles of glycoproteins in filamentous fungi remain unknown. Fungi that can re-spond to environmental stimuli distinguish these signals and relay them through intracellular signaling pathways to change the cell wall composition. They play a crucial role in appressorium formation and penetration, and release cell wall degrading enzymes, which determine the outcome of the interaction with the host. In this review, we highlight the interaction of phypatophogen cell wall and signaling pathways with its host and their contribution to fungal pathogenesis.

Cell wall-degrading enzymes

Fungi cell wall

Glycoproteins

Phytopathogen

Signaling pathways

Virulence factor