

PLANT CELL WALL IN PATHOGENESIS: HOW ITS STRUCTURE CAN INFLUENCE PLANT-PATHOGEN INTERACTIONS

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The cell wall represents the first physical barrier between the pathogen and the internal content of the plant cell. The ability of bacterial and fungal pathogens to produce cell wall degrading enzymes (CWDEs) is often related to a successful initiation of the infective process. In general, most virulence-associated CWDEs are involved in pectin digestion. Due to its cohesive and interacting properties pectin is critical for tissue integrity and accessibility to CWDEs. Enzymatic depolymerisation of pectin weakens the cell wall and exposes other polymers to degrading cellulases and hemicellulases. Pectin is synthesized in a highly methylesterified form and de-esterified in muro by pectin methylesterase (PME). Genetic and structural evidences indicate a critical role of pectin esterification in plant defense consistently with the concept that pectin structure may influence the outcome of host-pathogen interactions. It has been shown that PMEs play a role as susceptibility factor in plant response to fungal and bacterial pathogens, nematodes as well as in the systemic spread of tobacco mosaic virus. PME activity is regulated by specific proteinaceous inhibitors (PMEIs). The recent findings about the role of PMEIs in improving plant resistance to fungal and bacterial pathogens open new perspectives to reduce plant susceptibility to pathogens.