**Remodelling of grape cell wall upon infection with biotrophic and necrotrophic pathogens**

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**Objectives:** Molecular, cellular and metabolic characterization of grape cell wall metabolism in response to fungal pathogens

**Methodology:**

The plant cell wall constitutes a dynamic barrier which is modified in structure and composition in response to pathogen invasion. Reinforcement of the cell wall is an early response to perception of many pathogens but little is known concerning the underlying molecular and cellular mechanisms. On the other hand, cell wall is often the first obstacle encountered by pathogens, and to penetrate this barrier microbes have evolved an arsenal of wall degrading enzymes which are key virulence factors. Despite the undoubted importance of cell walls in plant defense there are many aspects that are poorly understood in particular in grape response against fungal pathogens.

During the PhD it will be analyzed RNAseq data of resistant and susceptible cultivars of grape infected with Botrytis cinerea and Erysiphe necator which are among the most relevant fungi in viticulture. This data will be used to select genes associated with synthesis and modification of pectins, lignin, hemicelluloses, and cellulose to be further analyzed by qPCR. Furthermore, expression of genes coding for wall degrading enzymes of pathogens will be studied. This data will be combined with targeted metabolic profiling of cell wall components obtained using GC–MS, infra-red spectroscopy and Carbohydrate Microarray Polymer Profiling technology at Stellenbosch University and with cell wall structural studies conducted with Transmission Electron Microscopy and immunolocalization with antibodies targeted to specific epitopes of cell wall polysaccharides.

Altogether the data will provide mechanistic insights on the role of grape cell wall on immunity against fungal pathogens.

**Type of fellowship:** Mixed