Australian National University

PhD Exit seminar Characterisation of the *Phytophthora nicotianae* zoospore secretome

Wednesday 27 February, 2013 1pm

Victoria Ludowici Hardham Lab - Plant pathogen interactions
Division of Plant Science, Research School of Biology

Slatyer Seminar Room R.N. Robertson Building, Bldg. 46, Linnaeus Way, ANU

Phytophthora species are a group of fungal-like plant pathogens from the Class Oomycetes. This group causes millions of dollars damage to agriculture and threaten natural ecosystems across the globe. Because of their dissimilarities to fungi, chemical control of these pathogens is difficult and a greater understanding of the molecular and cellular mechanisms of host infection could lead to novel control methods. During initial plant infection, motile *Phytophthora* zoospores encyst and the contents of three peripheral vesicles undergo regulated secretion. The timing of synthesis of four proteins (Cpa, Lpv, PnCcp and Vsv) found in these vesicles was investigated during asexual sporulation. The results showed differences in the time at which Cpa, Lpv, PnCcp and Vsv were synthesised. In addition, the timing of expression of *Lpv, PnCcp* and *Vsv* genes was examined in sporulating hyphae, zoospores and 3h germinated cysts. It was found that these genes had different expression patterns. In preparation for the identification and characterisation of *P. nicotianae* transformants in which one of these secreted proteins, namely *PnCcp*, was silenced, assays for screening and analysing transformants were developed. While sequence motifs in PnCcp and Vsv indicate that these two proteins are likely to have adhesive properties, their function has not been directly demonstrated. An RNAi gene silencing approach was used to investigate the function of PnCcp.

Secondly, proteomic and bioinformatic approaches were used to investigate proteins secreted during zoospore encystment. This analysis led to the identification of a number of proteins in extracts solubilised from encysted zoospores and 29 of these were predicted to have N-terminal secretion signals by SignalP. The majority of these proteins had unknown functions, highlighting the need for more research in this area. Other putative secreted proteins were involved in carbohydrate and protein metabolism. Together, the research reported in this thesis sheds new light on the synthesis and secretion of zoospore vesicle proteins and provides a foundation for further research aimed at characterising the function of these proteins.

Presented by

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