Australian National University

PhD Exit Seminar. Selective secretion of large peripheral vesicle proteins in *Phytophthora*

Wednesday 6 March 2013 1pm

Weiwei Zhang, 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

In many species of *Phytophthora* and other oomycetes, motile biflagellate zoospores initiate plant infection. Within the zoospore cytoplasm, organelles, including three types of cortical vesicles, are distributed with a distinct polarity. Rapid exocytosis or migration of these vesicles during zoospore encystment indicates that the cortical vesicles may play important roles during early infection.

During encystment at the host surface, *Phytophthora* zoospores become immobile and firmly attached to the plant epidermis. Within the first 2 minutes of this process, the contents of ventral and dorsal cortical vesicles are secreted, delivering adhesives and a putative protective coating onto the surface of the cysts. By contrast, the third category of cortical vesicles, the large peripheral vesicles, move away from the plasma membrane, become randomly distributed within the cyst cytoplasm and ultimately degraded. Unexpectedly, we found that PnCcp, a 12 kDa protein component of the large peripheral vesicles is somehow selectively secreted during encystment.

Enzyme-linked immunosorbent assays suggest that the secretion of PnCcp occurs within 3 minutes after induction of encystment. Double immunolabelling studies have shown that PnCcp is differentially synthesized comparing to PnLpv, a high molecular weight glycoprotein also resident in the large peripheral vesicles. In hyphae, the large peripheral vesicles sometimes contain only PnLpv and quantitative analysis suggests that during vesicle development, PnCcp is added to large peripheral vesicles after PnLpv. Quantitative, real-time RT-PCR shows that expression of *PnLpv* precedes that of *PnCcp* and that *PnCcp* but not *PnLpv* is expressed in zoospores. PnCcp was also found to be differentially compartmentalised within the vesicles. Treatment of zoospores with a dynamin inhibitor causes the secretion of both PnCcp and PnLpv from large peripheral vesicles. We propose that a kiss-and-run mechanism is responsible for the selective secretion and retention of proteins in large peripheral vesicles in *Phytophthora*.

Presented by

Research School of Biology

ANU College of Medicine, Biology & Environment

E claire.anderson@anu.edu.au T 02 612 56966
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