

Séminaire Biologie des Plantes

Les séminaires ont lieu sur le Campus Montpellier SupAgro/INRA de La Gaillarde
(2, place P. Viala Montpellier)

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Jeudi 23 juin 2011
Amphi 2 (A gauche du bâtiment administratif) à 14h00

Roger A. Leigh

(Waite Research Institute, University of Adelaide, Glen Osmond, Australia)

Calcium beyond the cytosol; regulation of apoplastic and vacuolar calcium is required for plant productivity and stress tolerance

Calcium has key but diverse structural and signalling roles in plants. Structural roles include regulating cell wall stability, maintaining membrane integrity and contributing to turgor generation as a vacuolar osmoticum. Cytosolic calcium concentration ($[Ca^{2+}]_{cyt}$) is important in signal transduction pathways modulating developmental and environmental cues. Apoplastic and vacuolar repositories of Ca^{2+} are the major stores that shape $[Ca^{2+}]_{cyt}$ transients and $[Ca^{2+}]$ in these non-cytosolic compartments must also be controlled to maximise productivity and responses to abiotic and biotic stress. Vacuolar $[Ca^{2+}]$ is differentially stored in different leaf cell-types: in the epidermis in grasses and the mesophyll in most dicots. We have sought to understand the role of vacuolar calcium using *Arabidopsis* as a model. Using *in situ* PCR and cryo-SEM we demonstrated a role for the tonoplast-localised Ca^{2+}/H^{+} transporter CAX1 in this process. Furthermore, using a loss-of-function mutant of CAX1, we showed that compromising vacuolar calcium accumulation changed apoplastic $[Ca^{2+}]$ causing multiple leaf phenotypes including altered expression of cell wall modifying genes, expression of other Ca^{2+} -transporters, increased cell wall thickness, decreased wall extensibility and reduced stomatal aperture. All phenotypes were conditionally suppressed by growth in a sufficient but reduced Ca supply and this provides a tool for the study of processes that are regulated by apoplastic $[Ca^{2+}]$. Similar phenotypes and transcriptional responses occur following pathogen infection and using this mutant we can differentiate Ca^{2+} - and pathogen-

specific components. The importance of the tonoplast in controlling apoplastic $[Ca^{2+}]$ in general and in response to stress will be discussed.

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Séminaire à venir :

Jeudi 30 juin : Fabrice Roux (contact : gosti@supagro.inra.fr)