

Séminaire de 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 20 janvier 2011
Amphi 208 (Cœur d'Ecole) à 14h00**

Joe Morrissey

((Génomique, Environnementale et Evolutive - Paris))

Use of ionomics to identify genes that play a role in Arabidopsis metal homeostasis.

Understanding trace element homeostasis in plants has a direct impact on global health. Elucidating the mechanisms of uptake and availability of trace elements could speed the breeding of more nutritious crops that exclude the uptake of toxic metals. Our approach to identify the genes that control metal homeostasis is ionomics, which utilizes high-throughput elemental analysis of mutant lines and ecotypes. From several ionomic screens we identified and characterized genes that play a role in nickel tolerance, iron accumulation in seeds, and natural variation of cobalt accumulation.

By analyzing Arabidopsis ecotypes for variation in cobalt accumulation, we found that several cobalt accumulating ecotypes contained mutations in the *FPN2* gene. Arabidopsis *FPN2* and its paralog *FPN1* are related to animal ferroportin protein, the sole iron efflux transporter in vertebrates. Our characterization of the Arabidopsis ferroportins revealed that they efflux both iron and cobalt, playing a role in iron homeostasis, in addition to controlling cobalt localization and tolerance.

From additional screens for altered metal accumulation in shoots and seeds of Arabidopsis, we identified ionomic phenotypes controlled by genes previously unknown to play a role in metal homeostasis. We found that the disruption of *SQD2* and the sulfolipid biosynthesis pathway alters sulfur metabolism, resulting in nickel and cadmium tolerance. Additionally, we identified two fast neutron mutants with altered iron accumulation in the seeds: one mutant is able to thrive and accumulate seed iron under

iron limiting conditions; while the other mutant shows increased sensitivity to iron limitation and cannot set seed when grown on alkaline soil. Ultimately, these results demonstrate that ionomics is an effective approach to identify genes that control metal homeostasis.

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Séminaires à venir :

Jeudi 27 janvier : Bertrand Muller LEPSE (contact muller@supagro.inra.fr)

Jeudi 3 février Tony Schäffner (contact Lionel Verdoucq verdoucq@supagro.inra.fr)

Jeudi 10 février : séminaire interne

Jeudi 17 février : séminaire interne

Jeudi 24 février : Sandrine Ruffel (contact ruffel@supagro.inra.fr)