BTI Discovery & Innovation in the Life Sciences

BOYCE THOMPSON INSTITUTE

Post-doctoral position
Biosensors and phosphate imaging in AM symbiosis

Description:
A postdoctoral position is available to join a collaborative project involving the use of biosensors to image inorganic phosphate (Pi) at the cellular and subcellular levels in root cells during AM symbiosis. A comprehensive understanding of symbiotic Pi acquisition requires knowledge of Pi concentrations in the cytosol and subcellular compartments of living plant cells. To achieve these goals, we have developed transgenic lines that express FRET-based biosensors specifically during AM symbiosis. Efficacy of these biosensors has been demonstrated in the cytosol and plastids of plant cells [1,2]. Initial experiments with the biosensors during AM symbiosis are very promising and these resources now provide a unique opportunity for *in vivo* imaging of phosphate during symbiosis, in both wild type and phosphate transport mutants [3-5]. Use of the sensors will contribute to the broader goals of obtaining a mechanistic understanding of phosphate transport, sensing and downstream signaling events in AM symbiosis.

Requirements and Application: Applicants must have a Ph.D. in plant science or other relevant discipline, a strong publication record and demonstrated expertise with imaging and confocal microscopy. A background in plant mineral nutrition, plant physiology or protein biochemistry is advantageous. Experience with any of the following is beneficial: plant-fungal symbioses, plant-microbe interactions, image analysis.
Applicants should submit a CV, a statement of research interests and relevant experience, and the names of three references to Maria Harrison, (mjh78@cornell.edu.).

Literature cited.

1. Mukherjee, P. et al. Live Imaging of Inorganic Phosphate in Plants with Cellular and Subcellular Resolution. Plant Physiol. 167, 628-638, doi:10.1104/pp.114.254003 (2015).
2. Banerjee, S., Garcia, L. R. & Versaw, W. K. Quantitative Imaging of FRET-Based Biosensors for Cell- and Organelle-Specific Analyses in Plants. Microscopy and Microanalysis 22, 300-310, doi:10.1017/s143192761600012x (2016).
3. Harrison, M. J., Dewbre, G. R. & Liu, J. A phosphate transporter from *Medicago trunca*tula involved in the acquisition of phosphate released by arbuscular mycorrhizal fungi. Plant Cell 14, 2413-2429 (2002).
4. Javot, H., Penmetsa, R. V., Terzaghi, N., Cook, D. R. & Harrison, M. J. A *Medicago truncatula* phosphate transporter indispensable for the arbuscular mycorrhizal symbiosis. Proceedings of the National Academy of Sciences, USA 104, 1720-1725 (2007).
5. Breuillin-Sessoms, F. et al. Suppression of Arbuscule Degeneration in *Medicago truncatula* phosphate transporter4 Mutants Is Dependent on the Ammonium Transporter 2 Family Protein AMT2;3. Plant Cell 27, 1352-1366 (2015).

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