4th UPSC-INRA (UPRA) bilateral meeting

26 - 28 March 2012

Umeå Plant Science Centre

Chemical Biological Centre (KBC)

Umeå, Sweden

Meeting book with abstracts

Umeå Plant Science Centre
a centre of excellence

INRA

The Chemical Biological Centre – KBC at Umeå University

Six departments and two research units at Umeå university (UmU) and the Swedish University of Agricultural Sciences (SLU) are forming one large multidisciplinary research centre: The Chemical Biological Centre (KBC- Kemiskt Biologiskt Centrum). Around 600 people are collaborating in a positive and creative environment in research and teaching. The KBC research school is organizing a graduate program for around 250 PhD students and each department offers a large varity of courses for bachelor and master students.

www.kbc.umu.se

Picture: Mattias Pettersson, Umeå University

Welcome to the 4th UPSC-INRA (UPRA) bilateral meeting!

The 4th UPSC-INRA (UPRA) b 26 - 28 March 2012, Umeå Plant Science Centre Chemical Biological Centre (KBC) Umeå University, Sweden

The 2012 bi-annual UPRA meeting will be held in Umeå during the 26th to 28th of March, hosted by the Chemical Biological Centre at Umeå University..

The Umeå Plant Science Center (UPSC, Sweden) and the National Institute for Agricultural Research (INRA, France) have signed a cooperation agreement in 2005 and created a "European Open Laboratory" called UPRA. The dedicated complementarities of both Research Centres in different topics of experimental plant biology and plant genomics has naturally led to the creation of this European open laboratory. One mission of this partnership is to join common efforts on research projects on Plant Biology. A special emphasis is the transfer of knowledge and tools on a model genetic species, Arabidopsis thaliana, and the main tree Populus. A second mission is to build a European joined structure to take over the training of young scientists through short or long terms exchanges between France and Sweden. The Universities associated to UPRA laboratories are therefore expected to benefit from this privileged cooperation.

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Umeå University, March 2012

The organizing committee
Catherine Bellini (Catherine.Bellini@plantphys.umu.se) and
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http://www.kbc.umu.se/events/upra-meeting.html

Regulation of root aquaporins in response to abiotic stimuli – a proteomic approach

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Aquaporins are water channels that facilitate the transport of water across plant cell membranes and play a critical role in the regulation of plant water status in response to changing environments. We used a proteomic approach to address the mechanisms involved in the response of root water permeability in Arabidopsis to 7 representative stimuli including water and ionic stresses, nutrient availability, sucrose, reactive oxygen and nitrogen species, and a bacterial elicitor.

The effects of stimuli on the root hydraulic conductivity (Lpr) were described with emphasis on kinetic responses. All treatments induced a decrease in Lpr, within minutes (hydrogen peroxide, nitric oxide), hours (salt, mannitol) or days (nitrate or phosphate deprivation; prolonged night i.e. sucrose starvation). Whereas a resupply of nitrate did not change Lpr, phosphate or sucrose resupply induced a partial recovery of Lpr.

A single procedure allowing the combined fractionation of non-modified peptides and the purification of phosphopeptides was used by combining off-line Strong Cation eXchange and Titanium Dioxyde chromatographies. For the quantitative approach, large scale semi-quantitative proteomics and phospho-proteomics was performed by label-free comparison of liquid chromatography (LC)-MS profiles (nanoLC-QTOF). This integrated workflow allowed the identification of 1383 proteins (21 out of 35 aquaporins), including 389 phosphoproteins with 706 phosphosites of which 66% were novel (16 aquaporin phosphosites of which 7 were novel). Extensive analysis of aquaporin proteomic data revealed that, over the 7 physiological contexts investigated, Lpr is not correlated to the total abundance of aquaporins. The data rather suggest that environmental regulation of Lpr results from multifactorial mechanisms including the phosphorylation of the C-terminal part of PIP2;1/2;2/2;3 and of the N-terminal part of PIP1;1/1;2. In the case of tonoplast aquaporin TIP2;3, a dramatic post-translational regulation in response to salt stress and a role in root hydraulics were uncovered.