

Ad hoc support : Redox control of root architecture

Redox regulation according to the architecture of the root system and its adaptation to environmental constraints

ABSTRACT

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Flagship project : no

Project leader : Christophe Belin

Project leader's institution : UPVD

Project leader's RU : LGDP

Budget allocated : 40000 €

Total budget allocated (including co-financing) : 40000 €

Funding : Labex

GOAL

Describe the redox homeostasis and its impact in root development and in responses to water stress

ACTION

roGFP lines (reporter of glutathione redox status) have been analysed during root development and novel transgenic lines better adapted to roots (other promoters) have been engineered. Detailed in silico analysis of TRX and GRX gene expression in *Arabidopsis thaliana*, focusing on roots and stress responses.

Identification of putative candidates involved in root architecture regulation.

Phenotypic analysis of mutant lines for these candidates : root development under normal growth conditions, but also in water-stress conditions (ABA, mannitol, NaCl).

Generation of transgenic lines allowing complementation of roxy 19 mutant (ProROXY19:ROXY19-GFP)

RESULTS

11 TRX and GRX genes have been identified as putative candidates to regulate *Arabidopsis* root architecture.

Among them, 4 look defectuous in root system development under normal growth conditions.

ROXY19 is important for main root growth and differential lateral root elongation according to the position of the lateral root along the main root (Figure).

No mutant has revealed any problem in response to water stress-related conditions (ABA, mannitol,

NaCl).

PERSPECTIVES

Better investigate the phenotype of mutants displaying defects in root development. Try other stress conditions, especially nutrient-related stresses (N, P, ... deprivation or high concentrations)

Understand the function of ROXY19 in controlling the root system development and its adaptation to environmental factors.

New important pathways controlling root architecture adaptation to the environment are expected to be revealed.