Production and treatment of heterogeneous omics data in order to study the cell wall plasticity in various Pyrenean altitudinal A. thaliana ecotypes

To cite this version:
Harold Duruflé, Vincent Hervé, Philippe Ranocha, Cécile Albenne, Josiane Chourré, et al.. Production and treatment of heterogeneous omics data in order to study the cell wall plasticity in various Pyrenean altitudinal A. thaliana ecotypes. Day of the Doctoral School SEVAB, Mar 2015, Toulouse, France. hal-03511721

HAL Id: hal-03511721
https://hal.inrae.fr/hal-03511721
Submitted on 5 Jan 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
Production and treatment of heterogeneous omics data in order to study the cell wall plasticity in various Pyrenean altitudinal *A. thaliana* ecotypes

Harold Duruflé 1, Vincent Hervé 2, Philippe Ranocha 1, Cécile Albenne 1, Josiane Choutré 3, Vincent Burlat 4, Thierry Ballieu 5, Michel Zivy 6, Monique Burrus 1, Nathalie Escaravage 1, Sébastien Déjean 5, Elisabeth Jamet 7, Philippe Besse 4, Christophe Dunand 4

1 Laboratoire de Recherche en Sciences Végétales, UMR 5546; 2 Plateforme d'Analyse Protéomique de Paris Sud-Ouest; 3 Laboratoire Évolution et Diversité Biologique, UMR 5174; 4 Institut de Mathématique de Toulouse (IMT), UMR 5219; Email addresses: harold.durufl@irye.u-pith.fr

**Context**

Molecular actors of **plant adaptation to climate changes** are not well known. Plant cell walls constitute an external barrier which is modified upon environmental changes and their structures and compositions can change1. By providing and combining omics data, the **WallOmics project** aims at understanding the **plant cell wall adaptation to global warming**2. Production of large sets of heterogeneous data will require the development of the existing **mixOmics** package in order to perform the integrative approach required for a **global analysis**.

**First study in two contrasted ecotypes**

Two contrasted ecotypes from Poland (Col) and Tajikistan (Sha) were grown at two different conditions (15 vs 22°C):

- The cell wall proteomics analysis allowed to discriminate the four samples:
  - Col 15°C
  - Col 22°C
  - Sha 15°C
  - Sha 22°C

Principal component analysis for all the cell wall proteome

**Selection of population**

29 natural populations of the annual plant *Arabidopsis thaliana* (L.) were collected at different altitudinal levels that cover all the Pyrenean mountains:

- Population structure after having been analyzed by **STRUCTURE** software:
  - 4 homogeneous populations at different altitudinal levels were selected for the WallOmics project

**WallOmics project**

4 homogeneous natural populations of Pyrenean mountains + Col (control)

- Col 200m
- Roc 696m
- Hrn 780m
- Gri 1190m
- Hos 1424m

**Expected results**

The integrative analysis with **mixOmics** (statistical integrative package developed by the Mathematics Institute of Toulouse) should allow us to draw a model regarding adaptation to climate changes and to identify proteins, genes or metabolic pathways potentially involved in cell wall plasticity in response to environmental changes.