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Exploring border cells by shotgun proteomic analyses - Research of new defence mechanisms deployed by *Glycine Max* (soybean) roots

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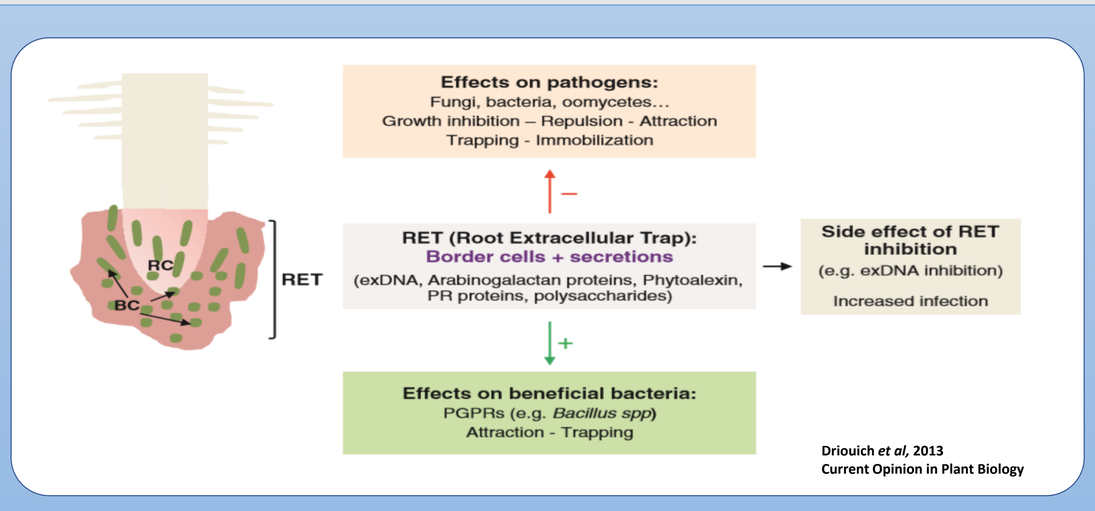
Introduction

As part of the process of reducing pesticides, biocontrol agents are currently developed. They consist mainly of natural molecules or beneficial organisms allowing to improve plant defence mechanisms. The work presented here aims at a better understanding of the root extracellular trap (RET, see figure on the right), with an ultimate goal of the characterization of root defence under biocontrol agents exposure.

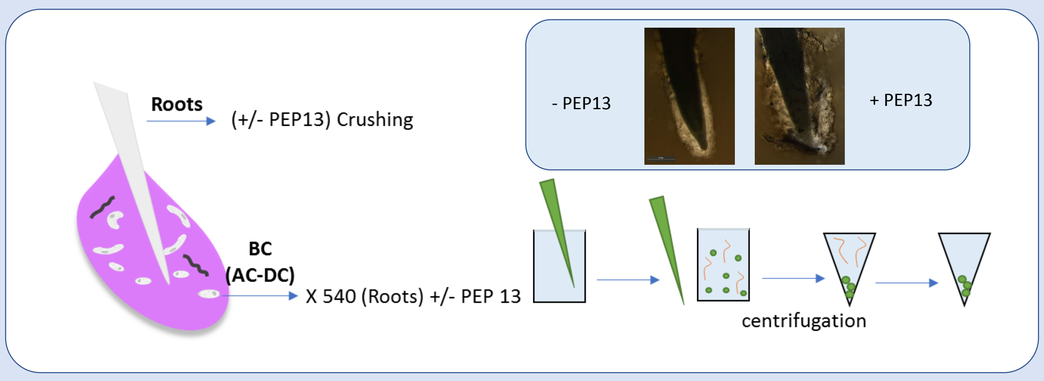
Objective

Notwithstanding their importance as regards the RET, no high throughput proteomic study on border cells is available yet. In this preliminary analysis, we compare *Glycine max* **Roots** and border cells **(BC)** by shot gun proteomic analysis exposed to a MAMP (PEP13) versus control conditions.

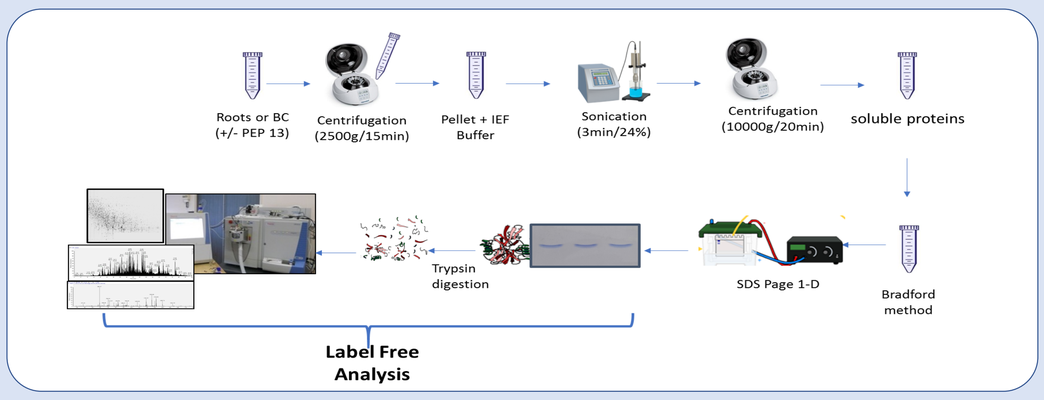


The RET is a complex network consisting of border cells (BCs), glycomolecules and extracellular DNA

Methods



Collection of border cells

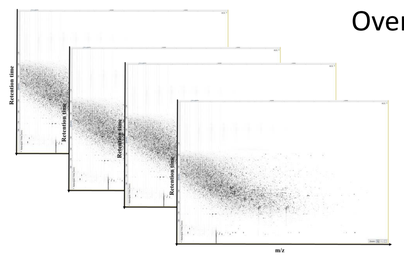


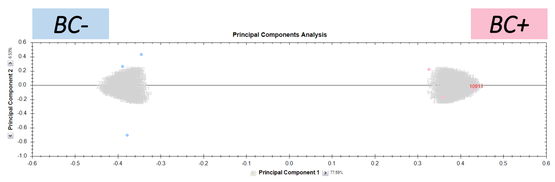
Protein extraction

Results

Impact of elicitation in BC

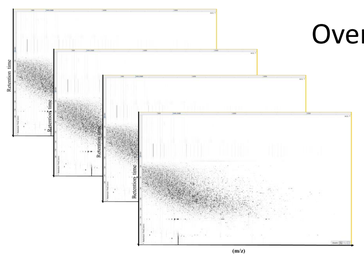
Over 1000 proteins identified

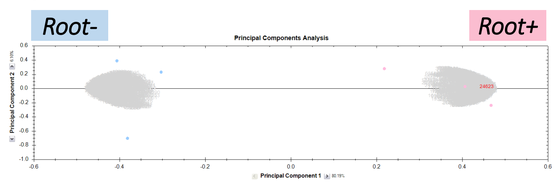




Impact of elicitation in Roots

Over 1100 proteins identified



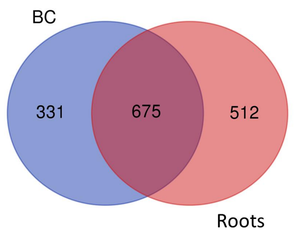


Exemples of proteins with differential abundance

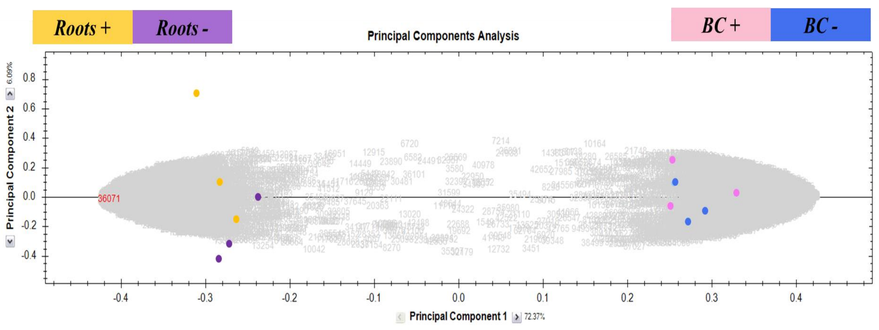
BC (+/-PEP13)
- Phosphoenolpyruvate carboxylase: Response to stress
- Phospholipase D: Development & response to stress

Roots (+/-PEP13)
- Lipoxygenase: Biotic and abiotic stress response
- Importin: Stress and resistance

Investigating Roots and BC proteomes

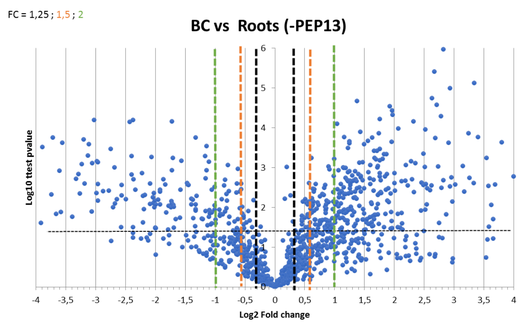


Venn Diagram from comparison of protein identification with Proteome Discoverer

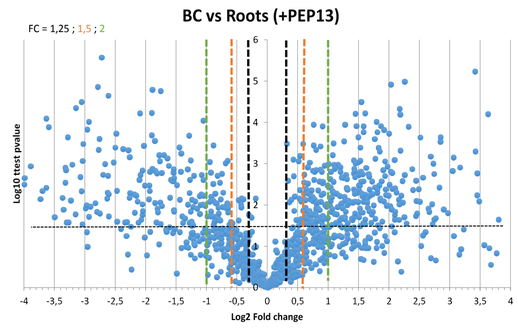


ACP with the differential components between the 4 populations of cells : roots and border cells, with or without elicitation

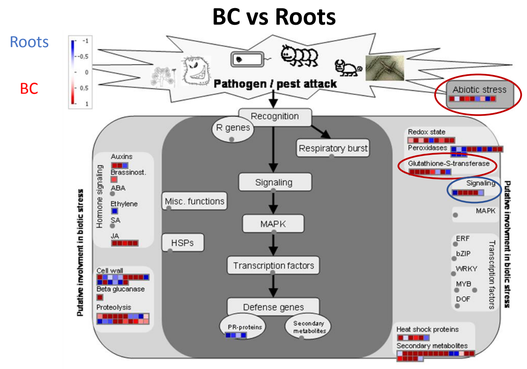
Overexpression of proteins and stress pathways with or without elicitation
(MapMan Software analyisis)



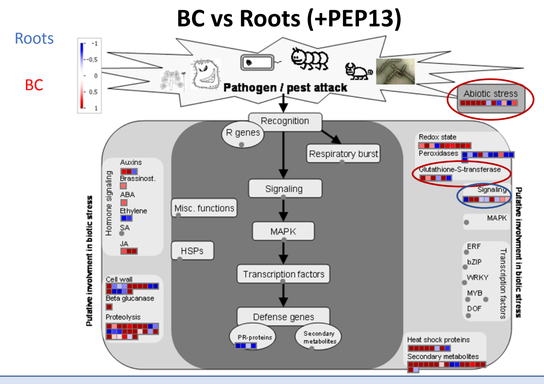
Volcano plots from quantitative data (XIC)



BC vs Roots



BC vs Roots (+PEP13)



Conclusion

- These results indicate that **BC proteome is highly specific** with regard to the root one. Thus, BC constitute a single tissue and is not a simple loss of cells from roots.
- **Elicitation with PEP13 highlight a specific set of proteins** which are currently under investigations. From our preliminary analysis, it appears that proteins implicated in response to stimulus or stress are importantly represented.

Acknowledgement

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