Novel regulatory mechanisms of plant aquaporins revealed by interactomic

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Résumés dans l'ordre du programme

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Chloé Champeyroux[1], Jorge Bellati[1], Marie Barberon, Valérie Rofidal[1], Christophe Maurel[1], Véronique Santoni[1]
[1]BPMP, Univ Montpellier, CNRS, INRA, Montpellier SupAgro, Montpellier, France
[2]Department of Botany and Plant Biology, Quai Ernest-Ansermet 30 Sciences III CH-1211 Genève 4 Switzerland

The absorption of soil water by roots allows plants to maintain their water status. Water transport is regulated by the function of aquaporins (1) and can be affected at the endodermis by initial formation of a Casparian strip and further deposition of suberin lamellas (2). Proteins that molecularly interact with two majors root aquaporins (PIP1;2 and PIP2;1) were searched to get new insights into regulatory mechanisms of root water transport using a immuno-purification strategy coupled to protein identification and quantification by mass spectrometry. Such interactome revealed PIPs to behave as a platform for recruitment of a wide range of transport activities and provided novel insights into regulation of PIP cellular trafficking by osmotic and oxidative treatments. We also show that members of the receptor-like kinase (RLK) family can modulate PIP activity (3). Interestingly, 4 Casparian strip membrane domain proteinlike (CASPL) also co-purified with PIP2;1. We showed that 3 of them (CASPL1B1, CASPL1B2, and CASPL1D2) are exclusively expressed in suberized endodermal cells, suggesting a cellspecific role in suberization and/or water transport regulation. None of the mutants showed root hydraulic conductivity (Lp) rphenotype, whether in control or stress conditions. However, the data suggest a slight negative role for CASPL1D1 and CASPL1D2 in suberization under control or salt stress conditions. At the molecular level, CASPL1B1 was able to physically interact with PIP2;1 and potentially could influence the regulation of aquaporins by acting on their phosphorylated form (4). The overall work opens novel perspectives in understanding PIP regulatory mechanisms and their role in adjustment of plant water status.

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