

## Publication

## Are small GTPases signal hubs in sugar-mediated induction of fructan biosynthesis?

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External sugar initiates biosynthesis of the reserve carbohydrate fructan, but the molecular processes mediating this response remain obscure. Previously it was shown that a phosphatase and a general kinase inhibitor hamper fructan accumulation. We use various phosphorylation inhibitors both in barley and in Arabidopsis and show that the expression of fructan biosynthetic genes is dependent on PP2A and different kinases such as Tyr-kinases and PI3-kinases. To further characterize the phosphorylation events involved, comprehensive analysis of kinase activities in the cell was performed using a PepChip, an array of <1000 kinase consensus substrate peptide substrates spotted on a chip. Comparison of kinase activities in sugar-stimulated and mock(sorbitol)-treated Arabidopsis demonstrates the altered phosphorylation of many consensus substrates and documents the differences in plant kinase activity upon sucrose feeding. The different phosphorylation profiles obtained are consistent with sugar-mediated alterations in Tyr phosphorylation, cell cycling, and phosphoinositide signaling, and indicate cytoskeletal rearrangements. The results lead us to infer a central role for small GTPases in sugar signaling.

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