



ABSTRACT

"Into the unknown: Dynamic phosphoproteomics in identifying novel functions for a plant receptor kinase"

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Growth and development of plants depends on uptake and assimilation of nutrients. Many assimilation products of macronutrients are not only essential for plant growth but also have signaling functions. Similarly to hormones they can trigger and control various metabolic, physiological and developmental processes. The nutrient and sugar induced signal transduction events upstream of transcription are less well understood. Since signaling pathways involve protein phosphorylation, modification-dependent changes in protein abundance and activity can be important features in signaling networks. Therefore, the analysis of phosphorylation events of membrane proteins under different nutrient regimes, and their dynamics was analyzed with the aim to identify proteins involved in early nutrient signaling processes. Using systems biology approaches such as clustering of time-course data and respective network reconstruction we are able to identify candidate proteins as key players in the plant signalling networks. Based on the network model, we generate new biological hypotheses on novel protein functions that we experimentally verified in tailored physiological and cell biological experiments. An example of a novel function for a plant receptor kinase in context of sucrose-induced responses will be discussed.