The Roles of SUS and TCP in Arabidopsis G-Protein Signaling Pathway

In Klopffleisch et al's 2011 Arabidopsis interactome paper, researchers performed yeast two hybrid screening to discover the interaction of SUS1 and SUS4 with the G signaling negative regulator protein, RGS1. The function of SUS as a sucrose synthase has been long known, though its regulation and possible role in the G signaling pathway is less understood. The same study additionally identified 4 transcription factor interactions with GPA1.1 TCP 3, 14, 16, and 18 were found to interact with GPA1 in the tobacco leaf. These newly discovered interactions elicit new questions regarding the role and further effectors of these proteins. To understand both SUS and TCP protein's role and relation in the G signaling pathway, investigation of phenotypic effects, including rosette leaf diameter, flowering time, and ROS response of mutants were compared to wildtype and G mutants. Sus mutants were found to display similar physiological responses of rgs1-2 mutants, including larger rosette leaf diameter and increased ROS burst, but opposite responses of G mutants. This suggests an RGS1 and SUS complex that represses G signaling in plants. Additionally, TCP 18 mutants were found to display a much larger rosette leaf diameter than wildtype, while G protein mutants displayed much smaller rosette leaves. This indicates TCP 18 as a negative regulator of rosette leaf diameter which is inhibited by G protein activity.