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Insights: Publications

The Arabidopsis sugar-insensitive mutants sis4 and sis5 are defective in abscisic acid synthesis and response

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Although soluble sugar levels affect many aspects of plant development and physiology, little is known about the mechanisms by which plants respond to sugar. Here we report the isolation of 13 sugar-insensitive (sis) mutants of Arabidopsis that, unlike wild-type plants, are able to form expanded cotyledons and true leaves when germinated on media containing high concentrations of glucose or sucrose. The sis4 and sis5 mutants are allelic to the ABA-biosynthesis mutant aba2 and the ABA-insensitive mutant abi4, respectively. In addition to being insensitive to glucose and sucrose, the sis4/aba2 and sis5/abi4 mutants also display decreased sensitivity to the inhibitory effects of mannose on early seedling development. Mutations in the ABI5 gene, but not mutations in the ABI1, ABI2 or ABI3 genes, also lead to weak glucose- and mannose-insensitive phenotypes. Wild-type and mutant plants show similar responses to the effects of exogenous sugar on chlorophyll and anthocyanin accumulation, indicating that the mutants are not defective in all sugar responses. These results indicate that defects in ABA metabolism and some, but not all, defects in ABA response can also alter response to exogenous sugar.