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## **Fructokinase is required for carbon partitioning to cellulose in aspen wood**

Melissa Roach, Björn Sundberg, and Totte Niittylä

### **ABSTRACT**

Sucrose is the main transported form of carbon in several plant species including the model tree aspen. Sucrose metabolism in developing wood is therefore central for the regulation of carbon partitioning to stem biomass. Half of the sucrose-derived carbon is in the form of fructose, but metabolism of fructose has received little attention as a factor in carbon partitioning to wood cell walls. We have identified a fructokinase isoform (FRK2), which is important for fructose phosphorylation and carbon flux to cellulose in aspen. RNAi mediated reduction of FRK2 activity in developing wood led to accumulation of soluble neutral sugars and a decrease in hexose phosphates and UDP-glucose indicating that carbon flux to the cell wall polysaccharide precursors was decreased. Reduced FRK2 activity also led to thinner fiber and vessel cell walls with a reduction in the proportion of cellulose, while having no major effect on hemicelluloses. No pleiotropic effects on stem height or diameter growth were observed. The results establish a central role for the FRK2 activity in carbon flux to wood cellulose.