

BIOCHEMICAL ROLE OF THE PLASTID GLUCOSE
TRANSPORTER FROM ARABIDOPSIS

Soon-Won Hong, Jang-Wook Lee, Seong Hee Bhoo,
Jong-Seong Jeon, Youn-Hyung Lee, Tae-Ryong Hahn

Plant Metabolism Research Center & Graduate School of
Biotechnology, Kyung Hee University, Suwon 449-701, Korea.

Glucose is exported from the Arabidopsis chloroplast through a glucose transporter (pGlcT) as one of the starch degradation products at night. To study the role of chloroplastic glucose transporter in carbohydrate metabolism, we characterized transgenic plants with a knock-out mutant of the pGlcT and with double knock-out mutants of pGlcT/triose phosphate phosphate translocator (TPT), pGlcT/cytosolic fructose-1,6-phosphatase (cFBPase) and maltose transporter (MT)/TPT. As compared to the wild type, all mutant lines displayed higher starch accumulation and all mutants, except for the pGlcT /cFBPase double mutant, contained higher levels of maltose. Sucrose levels of the pGlcT knock-out mutant were higher than those in wild-type during the light period, suggesting possible supplementation via maltose transport pathway at night to maintain proper carbohydrate partitioning in plant leaves. The pGlcT knock-out mutant plants did not show drastic phenotype changes as shown in *mex1* mutant plants, implying that maltose transporter plays a more central role than glucose transporter in carbohydrate partitioning at night. Double mutants pGlcT/TPT, MT/TPT and pGlcT/cFBPase plants showed slow growth rate and low chlorophyll contents.