Abstract

Potassium is essential macroelement and large amount of potassium is taken up by plants, because it's the major osmotic of plant cell. Due to various potassium availability in different kinds of soil, plants have evolved transport system that can maintain sufficient K^+ uptake between several orders of magnitude of potassium concentration. In *Arabidopsis thaliana* mechanism of K^+ acquisition is well understood and it's known that AtHAK5 is mainly involved in K^+ uptake in its very low concentrations. AtHAK5 belongs to KT/HAK/KUP family that consist 13 members in *A. thaliana.* There's known function for some members for example in auxin transport in root tip (TRH1) or in K^+ efflux in stomatal closure (KUP6).

In this thesis possible involvement of yet unstudied transporters KUP5, KUP7, KUP9 and KUP10 in K^+ acquisition and homeostasis in *A. thaliana* was investigated. *In vitro* cultivation showed that *kup9* mutant has very short lateral roots in K^+ deficiency. On the other hand *kup5* mutant showed significantly higher dry weight in K^+ deficiency than Col-0. *Kup9* phenotype was successfully replicated in subsequent cultivations and anatomy of lateral root apical meristems was investigated. Root tips of *kup9* were differently organized in K^+ deficiency and they showed signs of early termination of meristems. To localize the expression of *KUP9* plants of *A. thaliana* were transformed with pKUP9::GUS construct, although it wasn't possible to evaluate the results yet.

When the plants were exposed to draught all lines showed decrease in relative water content of shoot moreover *kup9* had lower dry weight and fresh weight. These results may suggest that all transporters have function in K^+ homeostasis, although these results has to be checked deeper.

When cultivated with ^{134}Cs radioisotope *kup7* mutants showed reduced Cs^+ accumulation in roots, this may suggest that KUP7 is involved in K^+ uptake. In addition *hak5* mutant was studied and it also accumulated less Cs^+ in roots. If this result could be replicated it will be the final evidence of relevant involvement of HAK5 in cesium uptake from environment.

Key words: Cesium, KT/HAK/KUP, lateral roots, potassium, uptake