Abstract

Potassium is one of the essential elements necessary for plant growth. It is involved in many plant processes, such as osmoregulation, enzymes activaton, etc. These functions are very often closely related to its transport in the cell and the whole plant. Although potassium is abundant in earth´s crust, the mount of plant-available form is often insufficient. Potassium deficiency manifests itself on many levels and also contributes to the reduction of yield and quality of agricultural crops.

There are many of potassium-transporting proteins in the plant. One of the important families of potassium transporters is the KT/HAK/KUP family. This family includes, among others, the high-affinity transporter HAK5, which is key for the uptake of potassium from the environment with low-potassium availability. One of the not very characterized transporters from the KT/HAK/KUP family is the KUP5 transporter, which I deal with in my diploma thesis. The aim of this work is to analyze the phenotypic manifestations of *kup5* T-DNA insertion mutants and to characterize the functions of the transporter KUP5 in *Arabidopsis thaliana* plants. I analyzed the growth of *kup5* insertion mutants in various environmental conditions and performed plant transformation to determine the localization of the KUP5 transporter in the cell and to localize the expression of the *KUP5* gene in the plant.

According to my observations, *kup5* mutant plants was larger than wild-type plants. This observation could suggest that KUP5 might be involved in the regulation of potassium homeostasis and thus the regulation of turgor during cell growth. *Kup5* mutant plants do not differ in sensitivity to potassium deficiency, salinity or drought and do not show defects in root hair growth. Localization of KUP5:GFP was observed in the endoplasmic reticulum. Thus, it can be concluded that the KUP5 transporter does not appear to be important for potassium uptake from the environment at low availability. It rather plays a role in maintaining cell potassium homeostasis than in potassium transporting across the plasma membrane. These conclusions will need to be further verified in subsequent experiments.

Key words: potassium, high-affinity transport, KT/HAK/KUP family, plant growth