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Differential selection of Na⁺ and K⁺ ions by two HKTs in *Arabidopsis* relative halophyte *Thellungiella Salsuginea*


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Cellular Na⁺ and K⁺ homeostasis are crucial for plant growth and development. However, the Na⁺/K⁺ selectivities of the of these transporters have not yet been studied in plant cells. Therefore, here we analyze two highly homologous HKT transporters, TsHKT1:1 and TsHKT1:2 from *Arabidopsis* relative extremophile *Thellungiella Salsuginea*. TsHKT1:2 is different from TsHKT1:1, having high affinity for K⁺ over Na⁺, and transport more K⁺ in the presence of high salt. On the other hand TsHKT1:1 lack this property, and can transport only Na⁺, same like AtHKT1 when expressed in yeast system. Alignment studies of TsHKT1:1, TsHKT1:2 and AtHKT1 with yeast ScTRK1 shows that ScTRK1 and TsHKT1:2 contain conserved aspartic acid side in the 2nd pore loop domain where as on the same position TsHKT1:1 and AtHKT1 contain asparagine residues. Alteration of this amino acid from asp to asn in TsHKT1:2 show loss of K⁺ selection of this transporter. We consider maintenance of K⁺—uptake through the TsHKT1:2 under salt stress an important component supporting the halophytic lifestyle of *T. salsuginea*.

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