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Characterization of two K^+/Na^+ transporters of family 2 from *durum* wheat involved in salt stress tolerance

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Salinity stress limits the growth and productivity of agricultural crops in many regions of the world. The ion Na^+ is a small molecule that is easily absorbed into root tissues of higher plants and transported throughout plant organs. Over-accumulation of sodium in the cytosol causes ion damage, osmotic stress and inhibition of biochemical and physiological processes. Salt tolerance of plants depends on HKT transporters (High-affinity K+ Transporter), which mediate Na^+-specific transport or Na^+-K^+ co-transport. The family of membrane transporters named HKT is permeable either to K^+ and Na^+ or to Na^+ only has been shown to play important roles in these functions. Contrary to *Arabidopsis* that possesses a single *HKT* transporter, cereals possess a much larger number of HKT genes, nine genes in rice (*Oryza sativa*) and five to 11 in the different wheat genomes. Here, we isolated two transporters (HKT 2.1 and HKT 2.3) cDNAs from a salt-tolerant *durum* wheat (*Triticum turgidum L*. subsp. *durum*) cultivar, Om Rabia3. At amino acid sequence level, the TdHKT2;1 and TdHKT2;3 have 99% identity to those published in Gene Bank. The two transports have been isolated and cloned in the pGEM-easy vector. Since the alignment of the protein sequence of TdHKT2;1 and TdHKT2;3 also showed the presence of glycine in the first pore domain, which made it possible to conclude that this transporter should be permeable to K^+ and also to Na^+. Also, we investigated the regulation of the gene TdHKT2.1 of *Triticum durum*. A 500-bp genomic fragment upstream of the *TdHKT2.1* translated sequence has been isolated, cloned, and designated as the "PrTdHKT12.1" promoter. Sequence analysis of "PrTdHKTt2.1" revealed the presence of cis-regulatory elements which could be required for abiotic stress, abscisic acid (ABA) and jasmonic acid (JA) responsiveness