Supplementary Table S1. Measurements of cytosolic Na^+, K^+ and Cl^- concentration either directly from mature cells or meristematic cells with very small vacuoles and no chloroplasts, or from protoplasts using cytosol-specific SBF1 dye. External NaCl refers to the rooting medium in which the plants were grown, or in the case of protoplasts and cell cultures, the solution in which they were suspended. Square brackets indicate data from the more salt tolerant cultivar or species.

Species	**Tissue or cell type**	**$[NaCl]_{ext}$ (mM)**	**Ion concentration (mM)**			**Method of analysis**	**Reference**
			Na^+	**K^+**	**Cl^-**		
Barley (2 cvs, salt tolerant, salt sensitive	Root cortical cells (10-20 mm from tip)	200	19 [2]# 19 [28]#	63[59]# 39[59]#	- -	Triple-barrelled H^+, K^+ and Na^+ -selective microelectrodes, also has V_m	Carden et al., 2003
Arabidopsis	Root hairs (5 mM Ca^{2+} added to medium)	30 90	1 15	-	-	Fluorescent dye SPF1 and PBF1	Halperin & Lynch, 2003
Cotton	Root tip (1 mm)	1 150	10 25	80 110	-	Extract*	Zhong & Läuchli, 1994
Atriplex amnicola	Root tip (1 mm)	25 200 400	5 30 50	150 120 100	- -	Extract*	Jeschke et al., 1986
Barley (2 cvs)	Shoot apex (reproductive meristem; 2 - 3 mm)	1 100 175	6 [5] 42 [44] 17 [22]	150 [165] 133 [154] 133 [155]	13 [12] 17 [19] 19 [15]	Extract*	Munns & Rawson, 1999
Wheat (2 cvs)	Shoot apex (reproductive meristem; 2 - 3 mm)	1 100 175	4 [2] 18 [4] 76 [9]	141 [143] 143 [182] 147 [175]	5 [8] 25 [14] 30 [16]	Extract*	Munns & Rawson, 1999
Lettuce	Shoot meristem (10 µm)	10 80	15 25	55 30	15 15	X-ray microanalysis	Lazof & Läuchli, 1991
Rice (2 cvs)	Mesophyll and root protoplasts	5 50 100	2 [4] 7 [13] 15 [25]	- - -	- - -	Fluorescent dye SBF1	Kader & Lindberg, 2005
Rice (2 cvs)	Cells cultured from grain	1 150	2 [5] 25 [80]	-	-	Fluorescent dye SBF1	Anil et al., 2007
Arabidopsis	Mesophyll protoplasts	1 100	2 7	-	-	Fluorescent dye SBF1	Morgan et al., 2022

#Activities (mM), *Hot water extraction of tissues.

Supplementary Table S2. Measurements of [Na^+] (mM) in chloroplasts from plants grown in low or high NaCl. Data are from aqueous extraction of chloroplasts or by X-ray microanalysis of snap-frozen leaves *in situ*. Also shown is the contrast between chloroplasts and the bulk [Na^+] in the leaves from which chloroplasts were isolated. Rhodes grass (*Chloris gayana*) is a C_4 halophyte and *M. crystallinum* is a facultative CAM plant.

Species	**Low salt**			**High salt**			**Method**	**References**
	Added NaCl	chloroplast	Leaf *(vacuole)*	**External NaCl (mM)**	chloroplast	leaf		
Glycophytes								
Mungbean, 2 cvs	**none**	13	*(8)*	**75**	30	*(10)*	Cryo SEM X-ray	Iqbal et al., 2024
Arabidopsis	**none**	2	2	**150**	4	28	Isolated chloroplasts	Müller et al., 2014
Wheat	**none**	3	7	**-**	-	-	Protoplasts	Robinson & Downton, 1984
Barley	**none**	5	9	**-**	-	-	Protoplasts	*ibid.*
Pea	**none**	41	16	**-**	-	-	Isolated chloroplasts	*ibid.*
Halophyte related								
Sugarbeet	**none**	71	28	**-**	-	-	Isolated chloroplasts	*ibid.*
Spinach	**none**	96	9.5	**200**	165	345	Isolated chloroplasts	Robinson et al., 1983
Spinach	**none**	72	7	**-**			Isolated chloroplasts	Robinson & Downton, 1984
Spinach	**none**	7	2	**300**	22	405	Isolated chloroplasts	Schroppel-Meier & Kaiser, 1988
Halophytes								
Rhodes grass:								
mesophyll	**none**	30	*(34)*	**200**	90	*(307)*	Cryo SEM X-ray	Oi et al., 2022
bundle sheath	**none**	10	*(20)*	**200**	34	*(195)*	Cryo SEM X-ray	*ibid.*
S. australis	**none**	106	10	**350**	115	650	Isolated chloroplasts	Robinson & Downton, 1985
S. maritima	**-**	-	-	**340**	75-93	565	Cryo SEM X-ray	Harvey et al., 1981
S. maritima	**none**	28	-	**340**	84	-	Cryo SEM X-ray	Hajibagheri et al., 1984
M. crystallinum	**20 mM**	99-148	97	**400**	156-234	498	Isolated chloroplasts	Demmig & Winter, 1986
M. crystallinum	**none**	15	-	**400**	110	-	Isolated chloroplasts	Cosentino et al., 2010

Table S3. Na^+ permeating transporters and channels and other transport linked to Na^+ at the plasma membrane and tonoplast.

Plasma membrane				
Gene Name	**Gene Expression Localisation**	**Effect of high NaCl**	**Na^+ current characteristics**	**Reference**
AtGLR1;1	Roots, stem, petioles. Leaf mesophyll	Downregulated	Low affinity. K^+:Na^+ selectivity = 1:0.8- to 1:0.4 (pore domain expressed in oocytes)	eFP Browser; Roy et al., 2008; Tapken & Hollmann, 2008
AtGLR1;4	Root, stem, petioles. Leaf mesophyll, guard cells	Not affected	Low affinity. Selectivity not reported (oocyte-expressed pore domain)	eFP Browser; Roy et al., 2008; Tapken & Hollmann, 2008
AtGLR3;7	Roots, stem, petioles, leaf epidermis, mesophyll, guard cells	Downregulated	Low affinity (oocytes). Selectivity not reported	eFP Browser; Roy et al., 2008
AtCNGC1	Roots, especially cortical cells & stele .Leaf mesophyll, guard cells	Upregulated	Low affinity. K^+:Na^+ selectivity = 1:1 (HEK293 cells, oocytes)	Balagué et al., 2003; eFP Browser; Hua et al., 2003; Leng et al., 2002; Talke et al., 2003
AtCNGC3	Root: epidermis, cortex, hairs. Leaf: mesophyll, vascular bundle	Transiently upregulated	Low affinity K^+ & Na^+ (yeast). Selectivity not reported	Balagué et al., 2003; eFP Browser; Hua et al., 2003; Leng et al., 2002; Talke et al., 2003
AtCNGC4	Leaf mesophyll cells. Not in roots	Not affected	Low affinity. K^+:Na^+ selectivity = 1:1 (oocytes)	Balagué et al., 2003; eFP Browser; Talke et al., 2003
AtCNGC10	Preferentially in roots. Leaf mesophyll, guard cells	Not affected	Low affinity (HEK293 cells, yeast) . Selectivity not reported	Christopher et al., 2007; eFP Browser; Guo et al., 2008; Talke et al., 2003
AtPIP2;1	Roots, leaves	Downregulated	Low affinity. K^+:Na^+ selectivity = 1:0.5 to 1:0.65 (oocytes)	Boursiac et al., 2005; eFP Browser; Qiu et al., 2025
OsPIP2;4	Root exodermis, endodermis, sclerenchyma, pericycle	Not reported	Low affinity. K^+:Na^+ selectivity = 1:1. K_m = 28 mM (oocytes)	Tran et al., 2025
HvPIP2;8	Roots, shoots, leaves	Root: no change. Shoots: transient increase	Low affinity. K^+:Na^+ selectivity = 1:1. (oocytes)	eFP Browser; Shibasaka et al., 2012; Tran et al., 2020
AtHKT1;1	Root & leaf xylem parenchyma & phloem. Root epidermis, cortex.	Expression peaks at 30 mM Na^+ or expression unaffected by Na^+	Na^+ selective (oocytes). Regulates vascular [Na^+]. Contributes to root Na^+ uptake (*in planta*)	Berthomieu et al., 2003; Rus et al., 2001; Sunarpi et al., 2005; Wang et al., 2015; Zhang et al., 2008
OsHKT1;1	Root epidermis, exodermis, cortex, stele (mainly phloem). Leaf bulliform cells, vascular tissues	Roots: upregulated. Shoots: downregulated	Na^+ selective. K_m = 20 µM & 1 mM (yeast, oocytes)	Garciadeblás et al., 2003; Horie et al., 2001; Imran et al., 2020; Jabnoune et al., 2009; Khan et al., 2020; Wang et al., 2015

HvHKT1;1	Roots, stele, parenchyma cells, epidermis, senescent leaves	Upregulated	Na^+ selective. Inhibited by high $[K^+]_{ext}$ (yeast, oocytes)	Han et al., 2018; Tian et al., 2024; Zhu et al., 2024
OsHKT1;3	Root cortex, stele, vasculature. Leaf vasculature, bulliform & mesophyll. On Golgi membrane	Upregulated	Na^+ selective. K_m = 3.5 mM (oocytes)	Jabnoune et al., 2009; Khan et al., 2020; Kobayashi et al., 2017; Rosas-Santiago et al., 2015
HvHKT1;3	Roots, leaves. Golgi membrane	Shoot: downregulated. Root: upregulated	Na^+ selective (oocytes)	Rosas-Santiago et al., 2015; Tian et al., 2024
OsHTK1;4	Leaf sheaths	Upregulated	Na^+ selective (oocytes)	Cotsaftis et al., 2012; Khan et al., 2020; Suzuki et al., 2016
HvHKT1;4	Leaf epidermis	Up & downregulation reported	Na^+ selective (oocytes)	Tian et al., 2024; Zhu et al., 2024
TmHKT1;4-A1	Roots, leaves	Roots: weak affect. Leaves: upregulated	Na^+ selective. High $[K^+]_{ext}$ enhances Na^+ current. K_m = 3 mM (oocytes)	Ben Amar et al., 2014; Tounsi et al., 2021
TmHKT1;4-A2 Nax1	Roots. Leaf sheaths, vascular tissue	Weak affect	Na^+ selective. Na^+ current enhanced by high $[K^+]_{ext}$. K_m = 12 mM (oocytes)	Ben Amar et al., 2014; Huang et al., 2006; James et al., 2011; Munns et al., 2012; Tounsi et al., 2016, 2021
OsHKT1;5	Root & shoot parenchyma	Upregulated	Na^+ selective (oocytes)	Cotsaftis et al., 2012; Garciadeblás et al., 2003; Khan et al., 2020; Kobayashi et al., 2017; Ren et al., 2005
HvHKT1;5	Root epidermis, parenchyma, pericycle, stele	Roots: upregulated. Shoots: downregulated	Na^+ selective. Inhibited by high $[K^+]_{ext}$ (oocytes)	Huang et al., 2020; Tian et al., 2024; Zhu et al., 2024
TmHKT1;5-A Nax2	Roots, parenchyma, pericycle	Not affected	Na^+ selective. Dual affinity: $[Na^+]_{ext}$ < 100 µM, K_m = 18 µM, $[Na^+]_{ext}$ > 100 µM, K_m = 1 mM. High affinity abolished when $[K^+]_{ext}$ > $[Na^+]_{ext}$. (oocytes)	Byrt et al., 2014; James et al., 2011; Munns et al., 2012; Xu et al., 2018, 2020
TaHKT1;5-D Kna1	Roots, xylem parenchyma, pericycle	Not affected	Na^+ selective. Dual affinity: $[Na^+]_{ext}$ < 100 µM, K_m = 15 µM. $[Na^+]_{ext}$ > 100 µM, K_m = 4 mM. High affinity abolished when $[K^+]_{ext}$ > $[Na^+]_{ext}$. (oocytes)	Byrt et al., 2014; Xu et al., 2018, 2020
OsHKT2;1	Root: epidermis, endodermis, exodermis, cortex, stele (mainly phloem). Leaf: vascular tissues, bulliform & mesophyll cells	Downregulated in roots	High affinity Na^+-K^+ co-transport, low affinity Na^+ uniport. K_m = 9.5 µM & 2.2 mM (oocytes), 11 mM (yeast) 14 µM (tobacco BY2 cells)	Garciadeblás et al., 2003; Haro et al., 2005; Horie et al., 2001, 2007; Jabnoune et al., 2009; Malagoli et al., 2008; Oomen et al., 2012; Yao et al., 2010

HvHKT2;1 Eight isoforms	Root cortex. Leaf blades, sheaths	Downregulated in leaf sheaths & roots. Upregulated in leaf blades	Low $[Na^+]_{ext}$: high affinity Na^+-K^+ co-transport. High $[Na^+]_{ext}$: low affinity Na^+ transport. K_m = 7 mM (oocytes)	Haro et al., 2005; Mian et al., 2011; Tian et al., 2024; Wang et al., 1998; Zhu et al., 2024
OsHKT2;2	Roots	Low Na^+: upregulated. High Na^+: downregulated	Low $[Na^+]_{ext}$: Na^+-K^+ co-transport (1:1) (oocytes, tobacco BY2 cells). High $[Na^+]_{ext}$: Na^+-selective (oocytes, BY2 cells). K_m = 77 µM (BY2 cells)	Horie et al., 2001; Jabnoune et al., 2009; Oomen et al., 2012; Yao et al., 2010
OsHKT2;2/1 (pseudo-gene)	Roots	Decreased expression	High & low affinity Na^+-K^+ co-transport (oocytes, yeast)	Oomen et al., 2012
HvHKT2;2	Roots & shoot, low expression	Roots: downregulated. Leaf: up & downregulation reported	High affinity Na^+-K^+ co-transport, low affinity Na^+ uniport (assumed from structure)	Tian et al., 2024; Zhu et al., 2024
TaHKT2;1 (at least six isoforms)	Root cortical cells. Leaf vasculature, sheaths	Upregulated in roots & leaf sheaths. Downregulated in leaf blades	High affinity Na^+-K^+ co-transport at low $[Na^+]_{ext}$. Low affinity Na^+ transport at high $[Na^+]_{ext}$. Inhibited by high $[K^+]_{ext}$ (oocytes)	Almeida et al., 2013; Ariyarathna et al., 2014; Gassmann et al., 1996; Laurie et al., 2002; Riedelsberger et al., 2021; Rubio et al., 1995; Schachtman & Schroeder, 1994
OsHKT2;3	Roots, leaf blade & sheath	Not reported	High affinity Na^+-K^+ co-transport, low affinity Na^+ uniport (assumed from structure)	Hamamoto et al., 2015
OsHKT2;4	Root vasculature, hairs. Leaf blade, sheath, epidermis	Not reported	High affinity Na^+-K^+ co-transport, low affinity Na^+ uniport (yeast, oocytes)	Horie et al., 2011; Lan et al., 2010
TaLCT1	Roots, leaves	Upregulated in roots	Low affinity. Na^+ & K^+ transport. Selectivity: Na^+ > Rb^+ (yeast)	Amtmann et al., 2001; Schachtman et al., 1997
HvHAK1	Roots	Not reported	Low affinity Na^+ uptake in yeast	Santa-María et al., 1997
OsHAK2	Ubiquitous	Not reported	Na^+ selective in *E. coli*. Oocytes: K^+ & Na^+ transport not detected	Gupta et al., 2008; Horie et al., 2011; Morita et al., 2023; Okada et al., 2018
OsHAK4	Vegetative stage: minimal expression. Reproductive stage: high expression in phloem, peduncle, rachis	Not affected	Na^+/H^+ symport. Na^+ selective. Dual affinity: $[Na^+]_{ext}$ < 5 mM, K_m = 180 µM. $[Na^+]_{ext}$ > 10 mM, linear current response (oocytes)	Che et al., 2024
OsHAK12	Root vasculature, hairs, exodermis, cortex, endodermis. Shoot: stems, leaf mesophyll	Upregulated	Na^+-selective (yeast)	Zhang et al., 2021

OsHAK18	Root & shoot vasculature	Not reported	Uncertain. K^+ & Na^+ transport or K^+ selective. Does not transport Na^+ in yeast or have a Na^+ binding site	Peng et al., 2023; Saha et al., 2023; Shen et al., 2023
AtNRT1.1	Root: epidermis, conductive tissues. Leaf: mesophyll, guard cells	Downregulated	Low affinity. $[NO_3^-]_{ext}$-dependent Na^+ transport (*in planta*)	Alvarez-Aragón & Rodríguez-Navarro, 2017; Liu et al., 2020
AtNRT1.2	Root: epidermis, cortex, hairs. Leaf: mesophyll, guard cells	Root: no affect. Shoots: phosphorylated & downregulated by SOS2	Low affinity. $[NO_3^-]_{ext}$-dependent Na^+ transport (oocytes)	Huang et al., 1999; Liu et al., 2025b; Okamoto et al., 2003
AtCCC1	Roots: epidermis, pericycle, parenchyma. Shoots: stem, leaves, trichomes, hydathodes	Not affected	High affinity. Stoichiometry: 1 Na^+:1 K^+: 2 Cl^- or 1 K^+:1 Cl^- (oocytes)	Colmenero-Flores et al., 2007; eFP Browser; Henderson et al., 2015
OsCCC1	Roots, leaf, basal node	Not affected	High affinity. Stoichiometry: 1 Na^+:1 K^+: 2 Cl^- or 1 K^+:1 Cl^- (yeast)	Chen et al., 2016
AtNHX7 (AtSOS1)	Entire root. Leaf mesophyll, guard cells, parenchyma. More abundant in roots than shoots	Upregulated. Phosphorylated & activated by CBL4-CIPK24 (AtSOS3-AtSOS2)	Na^+ selective. K_m = 23 mM (PM vesicles)	eFP Browser; Qiu et al., 2002, 2003; Quintero et al., 2002; Ramakrishna et al., 2025; Shi et al., 2000, 2002, 2003
OsSOS1	Roots, leaves	Upregulated. Phosphorylated & activated by OsCIPK24 & OsCBL4	Na^+ selective. K_m = 29 mM (PM vesicles)	Martínez-Atienza et al., 2007
Tonoplast				
Gene Name	**Gene Expression Localisation**	**Expression under high NaCl**	**Na^+ current characteristics in heterologous systems**	**Reference**
AtNHX1	Entire root, especially vasculature. Leaf: epidermis, mesophyll, especially guard cells & vasculature. Stems, cortex	Upregulated	K^+:Na^+ selectivity: various. 1:1 (yeast liposomes) 1:0.78, 1:0.61, 1:3, 1:1.8 (isolated leaf vacuoles). K_m = 6 to 30 mM (isolated leaf vacuoles)	Apse et al., 1999, 2003; Bassil et al., 2011, 2019; Venema et al., 2002; Yamaguchi et al., 2003, 2005; Yokoi et al., 2002
AtNHX2	Entire root, especially stele. Leaf, especially guard cells. Stems	Upregulated	K^+:Na^+ selectivity = 1:1 (yeast liposomes). K_m = 18 mM (isolated leaf vacuoles)	Bassil et al., 2011, 2019; Venema et al., 2002; Yokoi et al., 2002
AtNHX3	Predominantly in roots. Leaf, especially guard cells. Stems	No response & upregulation reported	Na^+ selective. K_m = 15 mM (isolated leaf vacuoles)	Bassil et al., 2019; Liu et al., 2010; Yokoi et al., 2002
AtNHX4	Root, leaf, stems, guard cells	Upregulated in root	K^+ and Na^+ selectivity not reported. K_m = 16 mM (isolated leaf vacuoles)	Bassil et al., 2019; Li et al., 2009; Yokoi et al., 2002

AtNHX7 (AtSOS1)	As above	Increases at or redirected to tonoplast	As above	Liu et al., 2025a; Ramakrishna et al., 2025
AtTPC1	Root. Leaf mesophyll, guard cells. Stems	Shoots: transiently upregulated. Roots: no response	K^+:Na^+ selectivity = 1:1 (mesophyll vacuoles) Unidirectional to vacuole	Furuichi et al., 2001; Ivashikina & Hedrich, 2005; Jaślan et al., 2019; Ranf et al., 2008
AtTPK1	Roots. Leaf: mesophyll, guard cells, vasculature	No response at transcriptional level. Activated by CPK-mediated phosphorylation & 14-3-3s	K^+ only (mesophyll vacuoles)	Czempinski et al., 2002; Gobert et al., 2007; Latz et al., 2007, 2013; Schönknecht et al., 2002
AtNCL	Ubiquitously expressed	Upregulated	Na^+(K^+)/Ca^{2+} exchange. Affinity: Na^+ > K^+. Vacuolar Ca^{2+} sequestration & Na^+ release (mammalian CHO-K1 cells) or Na^+ vacuolar sequestration & Ca^{2+} release (yeast).	eFP Browser; Li et al., 2016; Wang et al., 2012

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