Table S1: The Arabidopsis ABC superfamily: new nomenclature and pre-existing synonyms

Family and subfamily	New systematic name	Name in Sánchez-Fernández et al. (2001)[a]	Synonyms	AGI code	Length (aa)	Domain	Ref
Subfamily A [b]							
AOH[c]; ABCA[d]	AtABCA1_1 AtABCA1_2	AtAOH	ABC1	At2g41700.1 At2g41700.2	1882 1846	(TMD-NBD)2	2,3
ATH[c]; ABCA[d]	AtABCA2	AtATH1		At3g47730.1	983	TMD-NBD	
	AtABCA3	AtATH2		At3g47740.1	947		
	AtABCA4	AtATH3		At3g47750.1	944		
	AtABCA5	AtATH4		At3g47760.1	872		
	AtABCA6	AtATH5		At3g47770.1	900		
	AtABCA7	AtATH6		At3g47780.1	935		
	AtABCA8	AtATH7		At3g47790.1	901		
	AtABCA9	AtATH11		At5g61730.1	940		
	AtABCA10	AtATH14		At5g61740.1	848		
	AtABCA11	AtATH15		At5g61690.1	954		
	AtABCA12	AtATH16		At5g61700.1	888		
Subfamily B							
MDR[c]; DPL(PGP)[d]	AtABCB1	AtMDR1	AtPGP1	At2g36910.1	1286	(TMD-NBD)2	5-Mar
	AtABCB2	AtMDR2	AtPGP2	At4g25960.1	1273		3
	AtABCB3	AtMDR3	AtPGP3	At4g01820.1	1229		3
	AtABCB4	AtMDR4	AtPGP4	At2g47000.1	1286		3
	AtABCB5	AtMDR5	AtPGP5	At4g01830.1	1230		3
	AtABCB6	AtMDR6	AtPGP6	At2g39480.1	1407		3
	AtABCB7	AtMDR7	AtPGP7	At5g46540.1	1248		3
	AtABCB8	AtMDR22	AtPGP8	pseudogene[e]	1241		3
	AtABCB9	AtMDR9	AtPGP9	At4g18050.1	1281		3
	AtABCB10	AtMDR10	AtPGP10	At1g10680.1	1227		3
	AtABCB11	AtMDR8	AtPGP11	At1g02520.1	1278		3
	AtABCB12	AtMDR16	AtPGP12	At1g02530.1	1273		3
	AtABCB13	AtMDR15	AtPGP13	At1g27940.1	1245		3
	AtABCB14	AtMDR12	AtPGP14	At1g28010.1	1247		3
	AtABCB15	AtMDR13	AtPGP15	At3g28345.1	1240		3
	AtABCB16	AtMDR18	AtPGP16	At3g28360.1	1158		3

	AtABCB17	AtMDR19	AtPGP17	At3g28380.1	1240		3
	AtABCB18	AtMDR20	AtPGP18	At3g28390.1	1225		3
	AtABCB19	AtMDR11	AtPGP19 AtMDR1	At3g28860.1	1252		3,6
	AtABCB20	AtMDR14	AtPGP20	At3g55320.1	1408		3
	AtABCB21	AtMDR17	AtPGP21	At3g62150.1	1292		3
	AtABCB22	AtMDR21	AtPGP22	At3g28415.1	1221		3
ATM[c]; DPL(HMT)[d]	AtABCB23	AtATM1	STA2	At4g28630.1	678	TMD-NBD	7
	AtABCB24	AtATM2		At4g28620.1	680		
	AtABCB25	AtATM3	STA1	At5g58270.1	728		7
TAP[c]; DPL(TAP)[d]	AtABCB26	AtTAP1		At1g70610.1	700	TMD-NBD	
	AtABCB27	AtTAP2	ALS1	At5g39040.1	644		8
	AtABCB28_1 AtABCB28_2 AtABCB28_3	AtNAP8	reassigned by [2]	At4g25450.1 At4g25450.2 At4g25450.3	714 618 545		2
DPL(LLP)[d]	AtABCB29	AtATH12	reassigned by [2]	At5g03910.1	634	TMD-NBD	2
Subfamily C							
MRP[c]; OAD(MRP)[d]	AtABCC1_1 AtABCC1_2	AtMRP1	AtMRP1	At1g30400.1 At1g30400.2	1622 1622	(TMD-NBD)2	3,9
	AtABCC2	AtMRP2	AtMRP2	At2g34660.1	1623		3,9
	AtABCC3_1 AtABCC3_2 AtABCC3_3	AtMRP3	AtMRP3	At3g13080.1 At3g13080.2 At3g13080.3	1514 1489 1120		3,9
	AtABCC4	AtMRP4	AtMRP4	At2g47800.1	1516		3,9
	AtABCC5	AtMRP5	AtMRP5	At1g04120.1	1514		3,9
	AtABCC6	AtMRP8	AtMRP6	At3g13090.1	1466		3,9
	AtABCC7	AtMRP7	AtMRP7	At3g13100.1	1493		3,9
	AtABCC8	AtMRP6	AtMRP8	At3g21250.1	1294		3,9
	AtABCC9	AtMRP9	AtMRP9	At3g60160.1	1490		3,9
	AtABCC10	AtMRP14	AtMRP10	At3g59140.1	1453		3,9
	AtABCC11	AtMRP12	AtMRP11	At1g30420.1	1495		3,9
	AtABCC12	AtMRP13	AtMRP12	At1g30410.1	1495		3,9

	AtABCC13	AtMRP11	AtMRP13	At2g07680.1	1194		3,9
	AtABCC14	AtMRP10	AtMRP14	At3g62700.1	1539		3,9
	AtABCC15	AtMRP15	AtMRP15	At3g60970.1	1037		3,9
Subfamily D							
PMP[c]; FAE[d]	AtABCD1	AtPMP2	AtPXA1 CTS PED3 ACN2	At4g39850.1	1337	(TMD-NBD)2	13-Oct
	AtABCD2	AtPMP1		At1g54350.1	706	TMD-NBD	
Subfamily E							
RLI[c,d]	AtABCE1	AtRLI1	AthaRLI1	At3g13640.1	603	NBD-NBD	14
	AtABCE2	AtRLI2	AthaRLI2	At4g19210.1	605		
	AtABCE3	AtNAP15 (reassigned by [2])	AthaRLI3	At4g30300.1	181		2,14
Subfamily F							
GCN[c]; ART(REG)[d]	AtABCF1	AtGCN1		At5g60790.1	595	NBD-NBD	
	AtABCF2	AtGCN2		At5g09930.1	678		
	AtABCF3	AtGCN3		At1g64550.1	715		
	AtABCF4	AtGCN4		At3g54540.1	723		
	AtABCF5	AtGCN5		At5g64840.1	692		
Subfamily G							
WBC[c]; EPD(WHITE)[d]	ABCG1	AtWBC1		At2g39350.1	740	NBD-TMD	
	ABCG2	AtWBC2		A2g37360.1	755		
	ABCG3	AtWBC3		At2g28070.1	730		
	ABCG4	AtWBC4		At4g25750.1	577		
	ABCG5	AtWBC5		At2g13610.1	649		
	ABCG6	AtWBC6		At5g13580.1	727		
	ABCG7_1 ABCG7_2 ABCG7_3 ABCG7_4	AtWBC7		At2g01320.1 At2g01320.2 At2g01320.3 At2g01320.4	725 727 728 725		
	ABCG8	AtWBC8		At5g52860.1	589		
	ABCG9	AtWBC9		At4g27420.1	639		
	ABCG10	AtWBC10		At1g53270.1	590		
	ABCG11	AtWBC11	COF1, DSO,	At1g17840.1	703		15-18

	ABCG12	AtWBC12,	CER5	At1g51500.1	687		19
	ABCG13	AtWBC13		At1g51460.1	678		
	ABCG14	AtWBC14		At1g31770.1	648		
	ABCG15	AtWBC15, AtWBC22		At3g21090.1	691		
	ABCG16	AtWBC16		At3g55090.1	720		
	ABCG17	AtWBC17		At3g55100.1	662		
	ABCG18	AtWBC18		At3g55110.1	708		
	ABCG19	AtWBC19		At3g55130.1	725		
	ABCG20	AtWBC20		At3g53510.1	739		
	ABCG21	AtWBC21		At3g25620.1	467		
	ABCG22_1 ABCG22_2 ABCG22_3	AtWBC23		At5g06530.1 At5g06530.2 At5g06530.3	751 751 691		
	ABCG23	AtWBC24		At5g19410.1	624		
	ABCG24	AtWBC25		At1g53390.1	1109		
	ABCG25	AtWBC26		At1g71960.1	662		
	ABCG26	AtWBC27		At3g13220.1	685		
	ABCG27	AtWBC28		At3g52310.1	737		
	ABCG28	AtWBC29		At5g60740.1	1061		
PDR[c]; EPD(PDR)[d]	ABCG29	AtPDR1	AtPDR1	At3g16340.1	1416	NBD-TMD-NBD-TMD	20,21
	ABCG30	AtPDR2	AtPDR2	At4g15230.1	1326		20,21
	ABCG31	AtPDR3	AtPDR3	At2g29940.1	1426		20,21
	ABCG32	AtPDR4	AtPDR4	At2g26910.1	1420		20,21
	ABCG33	AtPDR5	AtPDR5	At2g37280.1	1413		20,21
	ABCG34	AtPDR6	AtPDR6	At2g36380.1	1453		20,21
	ABCG35	AtPDR7	AtPDR7	At1g15210.1	1442		20,21
	ABCG36	AtPDR8	AtPDR8 PEN 3	At1g59870.1	1469		20,21,22
	ABCG37	AtPDR9	AtPDR9 (AtPDR12 in [3])	At3g53480.1	1450		20,21
	ABCG38	AtPDR10	AtPDR10	At3g30842.1	1406		20,21
	ABCG39	AtPDR11/ AtPDR13	AtPDR11	At1g66950.1	1454		20,21
	ABCG40	AtPDR12	AtPDR12 (AtPDR9 in [3])	At1g15520.1	1423		20,21
	ABCG41		AtPDR13	At4g15215.1	1390		20,21

	ABCG42	-	AtPDR14	At4g15233.1	1170		20,21
	ABCG43	-	AtPDR15	At4g15236.1	1388		20,21
Subfamily H							
DRI(YHIH)[d]	No members in plants						
Subfamily I							
CCM[d]	AtABCI1	NAP10	ccmA homologue	At1g63270.1	229	NBD	2
	AtABCI2	-	ccmB homologue[f]; orf206	Atmg00110.1	256	TMD	2,23,24
	AtABCI3	-	ccmC homologue[g]; orf256	Atmg00900.1	256	TMD	2,24,25
	AtABCI4	-	ccmC homologue[g]	At2g07681.1	256	TMD	
	AtABCI5_2	-	ccmC homologue[g]	At2g07771.2	256 256	TMD	
ISB[d]	AtABCI6	NAP7	SufC homologue	At3g10670.1	338	NBD	26
	AtABCI7	NAP6	SufD homologue	At1g32500.1	475	CYT	26
	AtABCI8	NAP1	LAF6, AtABC1 SufB homologue	At4g04770.1	557	CYT	27,28
	AtABCI9	-		At5g44316.1	470	CYT	
CBY(Y179)[d]	AtABCI10	NAP13		At4g33460.1	271	NBD	
	AtABCI11	NAP14		At5g14100.1	176	NBD	
	AtABCI12_1 AtABCI12_2	-	MIL23.15 (TAIR)	At3g21580.1 At3g21580.2	205 384	TMD	
MKL[d]; TGD	AtABCI13	NAP11	TGD3	At1g65410.1	345	NBD	29
	AtABCI14_1 AtABCI14_2 AtABCI14_3	n/a	TGD1	At1g19800.1 At1g19800.2 At1g19800.3	350 350 350	TMD	30,31
	AtABCI15_1 AtABCI15_2	n/a	TGD2	At3g20320.1 At3g20320.2	381 282	SSA	32

NO[d]	AtABCI16	-	ALS3; ybbM homologue	At2g37300.1	128	TMD	33
	AtABCI17	NAP3		At1g67940.1	263	NBD	
	AtABCI18	-		At1g03900.1	272	NBD	
NO(ADT)[d]	AtABCI19	NAP4		At1g03905.1	290	NBD	34
	AtABCI20	NAP9		At5g02270.1	328	NBD	34
	AtABCI21_1 AtABCI21_2 AtABCI21_3	NAP2	POP1	At5g44110.1 At5g44110.2 At5g44110.3	282 214 223	NBD	34
Others							
		NAP5	fragment of C subfamily[d]	At1g71330.1		NBD	2
		NAP12	fragment of G subfamily	At2g37010.1		NBD	

This inventory is based on The Arabidopsis Information Resource (TAIR) release 7 (http://www.arabidopsis.org/), incorporating alternative splicing models which are indicated by the suffix: underscore plus number. Note that there are no subfamily H ABC genes in Arabidopsis. "Others" indicates gene models which correspond to partial ABC proteins. The SMC (Structural maintenance of chromosomes) subfamily of Sánchez-Fernández et al. (2001) [1] is excluded from the current analysis since these proteins do not contain an intact ABC signature motif and their domain structure precludes optimal alignment with bona fide ABC proteins.

Footnotes:

a. Reference [1]

b. According to Garcia et al., 2004 (ref. [2]), ATH 8,9,10,13 are not considered to be related to ABC proteins and ATH12 is reassigned to subfamily B. This was

c. Subfamily assigned by Sánchez-Fernández et al. (2001); reference [1]

d. Family(subfamily) assigned by Garcia et al. (2004); reference [2]

e. Accession number: BAB02613

f. Encoded on the mitochondrial genome; reference [23,24]

g. Encoded on the mitochondrial genome [24], part of which is duplicated on Chromosome II in *Arabidopsis thaliana* [25]. Thus Arabidopsis has one mitochondrial gene

Abbreviations:

NBD: Nucleotide binding domain (ATP binding cassette domain); TMD: transmembrane membrane domain; SSA: substrate binding protein; CYT: conserved soluble protein which interacts with ABC domain; CCM: cytochrome C biogenesis family; ISB: iron sulphur centre biogenesis family; CBY: family similar to putative cobalt uptake systems; Y179: similar to *M.janaschii* Y179 protein subfamily; MKL: similar to *M.leprae* MKL protein family; TGD: trigalactosyldiacyl glycerol: *TGD1* ,*2* and *3* are components of a chloroplast phospholipid translocator [29-32]; NO: proteins of unknown function, apparently unrelated to existing families; ADT: proteins of unknown function, which form a homogeneous cluster

References

1. Sánchez-Fernández, R. *et al* . (2001a) The *Arabidopsis thaliana* ABC protein superfamily: a complete inventory. *J. Biol. Chem* . 276, 30231-30244
2. Garcia, O. et al. (2004) Inventory and comparative analysis of rice and Arabidopsis ATP-binding cassette (ABC) systems. J. Mol. Biol. 343, 249-265
3. Martinoia, E. *et al* . (2002) Multifunctionality of plant ABC transporters- more than just detoxifiers. *Planta* 214, 345-355
4. Dudler, R. and Hertig, C. (1992) Structure of an mdr-like gene from Arabidopsis thaliana. Evolutionary implications. J. Biol. Chem. 267, 5882-5888
5. Thomas, C. *et al* . (2000) A role for ectophosphatase in xenobiotic resistance. *Plant Cell* 12, 519-533
6. Noh, B. *et al* . (2001) *Multidrug Resistance* -like genes of Arabidopsis required for auxin transport and auxin-mediated development. *Plant Cell* 13, 2441-2454
7. Kushnir, S. *et al* . (2001) A mutation of the mitochondrial ABC transporter *Sta1* leads to dwarfism and chlorosis in the Arabidopsis mutant *starik* . *Plant Cell* .
8. Larsen, P.B., *et al* . (2006) *Arabidopsis ALS1* encodes a root tip and stele localized half type ABC transporter required for root growth in an aluminium toxic
9. Kolukisaoglu, H.U., et al. (2002) Family business: the multidrug-resistance related protein (MRP) ABC transporter genes in Arabidopsis thaliana. Planta
10. Zolman, B.K. *et al* . (2001) The Arabidopsis *pxa1* mutant is defective in an ATP-binding cassette transporter-like protein required for peroxisomal fatty acid beta-
11. Footitt, S. *et al.* (2002) Control of germination and lipid mobilization by COMATOSE, the Arabidopsis homologue of human ALDP. *EMBO J* . 21, 2912-2922
12. Hayashi, M. *et al* . (2002) Ped3p is a Peroxisomal ATP-Binding Cassette Transporter that might Supply Substrates for Fatty Acid beta-Oxidation. *Plant Cell*
13. Hooks, M.A., *et al.* (2007) The Arabidopsis ALDP protein homologue COMATOSE is instrumental in peroxisomal acetate metabolism. *Biochem J* . 406, 399-
14. Braz, A.S. *et al* . (2004) A plant orthologue of RNase L inhibitor (RLI) is induced in plants showing RNA interference. *J. Mol. Evol.* 59, 20-30
15. Bird, D., *et al* . (2007) Characterisation of Arabidopsis ABCG11/WBC11, an ATP binding cassette (ABC) transporter that is required for cuticular lipid
16. Luo, B., *et al.* (2007) An ABC Transporter Gene of *Arabidopsis thaliana* , AtWBC11, is Involved in Cuticle Development and Prevention of Organ Fusion.
17. Panikashvili, D., *et al* . (2007) The Arabidopsis DESPERADO/AtWBC11 Transporter is Required for Cutin and Wax Secretion. *Plant Physiol.* 145, 1345-1360
18. Ukitsu, H., *et al* ., (2007) Cytological and Biochemical Analysis of *COF1* , an Arabidopsis Mutant of an ABC Transporter Gene.
Plant Cell Physiol. 48, 1524-1533
19. Pighin, J.A. *et al* . (2004) Plant cuticular lipid export requires an ABC transporter. *Science* 306, 702-704
20. van den Brûle, S. and Smart, C.C. (2002) The plant PDR family of ABC transporters. Planta 216, 95-106
21. Crouzet, J. *et al* . (2006) Organization and function of the plant pleiotropic drug resistance ABC transporter family. FEBS Lett. 580, 1123-1130
22. Stein, M. *et al* . (2006) Arabidopsis PEN3/PDR8, an ATP Binding Cassette transporter, contributes to nonhost resistance to inappropriate pathogens that enter by
23. Rayapurum, N., *et al* . (2007) AtCCMA interacts with AtCcmB to form a novel mitochondrial ABC transporter involved in cytochrome C maturation in
24. Unseld, M., *et al* ., (1997) The mitochondrial genome of *Arabidopsis thaliana* contains 57 genes in 366,934 nucleotides. *Nat. Genet* . 15, 57-61
25. Lin, X. *et al* . (1999) Sequence and analysis of chromosome 2 of the plant *Arabidopsis thaliana.*
Nature. 402, 761-768
26. Xu, X.M. and Møller, S.G. (2004) AtNAP7 is a plastidic SufC-like ATP-binding cassette/ATPase essential for Arabidopsis embryogenesis. Proc. Natl. Acad.
27. Møller, S.G. *et al.* (2001) A plastidic ABC protein involved in intercompartmental communication of light signaling. *Genes Dev* . 15, 90-103
28. Xu, X.M. *et al* . (2005) AtNAP1 represents an atypical SufB protein in Arabidopsis plastids. *J. Biol. Chem* . 280, 6648-6654
29. Lu, B., *et al* . (2007) A small ATPase protein of Arabidopsis, TGD3, involved in chloroplast lipid import. *J. Biol. Chem* . 49, 35945-35953
30. Xu, C. *et al* . (2003) A permease-like protein involved in ER to thylakoid lipid transfer in Arabidopsis. *EMBO J.* 22, 2370-2379
31. Xu, C. *et al* . (2005) Mutation of the TGD1 chloroplast envelope protein affects phosphatidate metabolism in Arabidopsis. *Plant Cell* . 17, 3094-3110
32. Awai K. *et al* . (2006) A phosphatidic acid-binding protein of the chloroplast inner envelope membrane involved in lipid trafficking. *Proc Natl Acad Sci USA* .
33. Larsen, P.B., *et al* . (2005) *ALS3* encodes a phloem-localized ABC transporter-like protein that is required for aluminum tolerance in Arabidopsis. *Plant J.* 41,
34. Marin, E. *et al* . (2006) Molecular characterization of three *Arabidopsis* soluble ABC proteins which expression is induced by sugars. *Plant Sci.* 171, 84-90