

Additional file 7: Correction of APC activator sequences. Gray boxes: The conserved APC interacting motifs C-box, CSM, IR-tail, CBM. Differences are boxed in yellow.

Before EST support: Activators CDC20 and CCS52

OsCDC20_2	-----MDA-GSHSISSEKSSRYVAPRQP---LQEAGSR-PYMPSLSTASRNPSA-	44
OsCDC20_3	-----MDA-GSHSISSEKS-HGLAPRPP---LQEAGSR-PYMPSLSTASRNPSA-	43
OsCDC20_1	-----MEAPGSGSVPTAKR-RRLVPRPPPVPLEVAGARGPYMPPLCIKSKNPSA-	48
PtCDC20_4	-----	
AtCDC20_3	-----MDSGMRATCTVPEHFLPRKLS-	21
AtCDC20_4	-----MDS---DTCTVPDHFLPRKLS-	18
AtCDC20_5	-----	
AtCDC20_6	-----MMK-	3
AtCDC20_1	-----MDAGLN-----RCPLQEHLPRKNS-	20
AtCDC20_2	-----MDAGMNTSSHYKTQARCPLQEHLPRKPS-	30
PtCDC20_1	-----MDAGSINSSSSSLKAQSRFPLQQQFLPRMNS-	30
PtCDC20_3	-----MDAGSMNTSSSLKAQSRFPLQQQFLPRMNS-	30
PtCDC20_2	-----MDAGSLNSSSYMKAQSRFPLQEQLHRKNS-	30
PtCDC20_5	-----	
AtCCS52A1	---MEEEDPTASNVTNSNSSSMRNLSPAMNTPVVSLESR---INRLINANQSQSPSP-	52
AtCCS52A2	---MEEDESTTP---KKKSDSQLNLPPSMNRPTVSLESR---INRLIDSNHYHSPS--	47
PtCCS52A1	-----PSPSSSEH---VNRLINSNHYISPS--	22
PtCCS52A1_2	-----TPSPSSSKH---VNRLINSNHYISPS--	23
OsCCS52A1	MDHHHHHLPPPPRSPMENSASSKPPTPASTPSSRLAAAP---SSRVSSAAPHPSPSSS	56
PtCCS52B	---MDSTPRRKSG---LNLPSGMNETSLRLETFSSSSFRAVTCVSSPRAISSLSPPSKT	54
PtCCS52B_2	---MDSTPRRKSG---LNLPSGMNETSLRLETFSSSSFRAVTCVSSPRAISSLSPPSKT	54
AtCCS52B	---MASPQSTKTG---LNLPAQMNQTSRLRLETFSSS-----FRGISLSLSPSK-	42
OsCCS52B	---MATDASPKPAPRLNVPPAMAG-GLRLDPAVASP-----ARLLLDVPKTPSPSK-	48
OsCDC20_2	-----KCYGDRFIPDRSAMDMDMAHYLLTE-----PRKDKEN-AAA	79
OsCDC20_3	-----KCYGDRFIPDRSAMDMDMAHYLLTE-----PKKDKEN-AAA	78
OsCDC20_1	-----KCYGDRFIPDRSAMDMDMAHYLLTE-----PKKEKENTDML	84
PtCDC20_4	-----LDRFIPNRSAMDMDFAHYMLTE-----GRKAKES----	29
AtCDC20_3	-----KQNLDRFIPNRSAKDFDFANYALTQ-----GSKRN-LDEV	56
AtCDC20_4	-----KQNLDRFIPNRSAMDMDFAHYALTQ-----GRKRN-VDEIT	53
AtCDC20_5	-----MDFDFANYALTQ-----GRKRN-VDEV	22
AtCDC20_6	-----SIALALCLTHHSPMVLSIVDYGDSQ-----EKTIDSLWKKP	39
AtCDC20_1	-----KENLDRFIPNRSAMNFDYAHFALTEERK-----G-KDQS-ATVS	57
AtCDC20_2	-----KENLDRFIPNRSAMNFDYAHFALTEGRK-----G-KDQT-AAVS	67
PtCDC20_1	-----KENLDRFIPNRSAMDMDYAHFMLTEGRK-----G-KENP--TVN	66
PtCDC20_3	-----KENLDRFIPNRSAMDMDYARFMLTEGRK-----G-KENP--TVN	66
PtCDC20_2	-----KDNLDRFIPNRSAMDLDYAHYMLTQGRK-----GGKENPTATVN	69
PtCDC20_5	-----	
AtCCS52A1	--SSLRSRISYSDRFIPSRSGSNFALFDLSPSPS-----KDGKEDGAGSYA	95
AtCCS52A2	-----KPIYSDRFIPSRSGSNFALFDLASSPNK-----KDGKEDGAGSYA	88
PtCCS52A1	-----RPIYSDRFIPCRSSSNFALFNISLSPSATAGSSPG-----DGGKEDNPNAYA	70
PtCCS52A1_2	-----RPIYSDRFIPCRSSSNFALFNISFPQPSATAGISPG-----CGGKEDNPSAYA	71
OsCCS52A1	APTPASRTVYSDRFIPSRAGNLDLAPSPSHHDAAAAAASPGAPPSPGSTPASSPYC	116
PtCCS52B	-----SSCSDRFIPCRSSSRLHTFGLVEKG-----SPVKEGGNEAYA	91
PtCCS52B_2	-----SSCSDRFIPCRSSSRLQTFGLIEKG-----SPVKEGGNEAYA	91
AtCCS52B	-----STCSDRFIPCRSSSRLHAFDLQDKEPT-----TPVKEGGNEAYS	81
OsCCS52B	-----TTYSDRFIPCRSSSRLHNFALLDRDRA-----SPSSTTDDAPYS	87
OsCDC20_2	SPAKEYR---KLLAEKILNNRT-----RILSFRNKPPPEPESILTE-L	118
OsCDC20_3	SPSKEVYR---RLLAEKLLNNRT-----RILAFRNKPPEPENVS---A	115
OsCDC20_1	SPAEEAYK---RLLAEKLLNNRS-----RILAFRNKPPEPEGIVQQLL	124
PtCDC20_4	PPSQSLYQ---KLLAEAFNMNGR-----RILAFKNKPPTLVDPPI--L	67
AtCDC20_3	SASRKAY---MTQLAVVMNQNR-----RILAFRNKPKS---LLSTN	92
AtCDC20_4	SASRKAY---MTQLAVVMNQNR-----RILAFRNKPKA---LLSSN	89
AtCDC20_5	SASRKAY---MTQLAEAMNQNR-----RILAFRNKPKA---LLSSN	58
AtCDC20_6	HGSDLTWSG---FSRVGVTEAYFAV-----PVDHFLTNPSPS---LRLS-	76
AtCDC20_1	SPSKEAYR---KQLAETMNLNHT-----RILAFRNKPQAPVELLPSNH	97
AtCDC20_2	SPSKEAYR---KQLAETMNLNHT-----RILAFRNKPQAPVELLPSNH	107
PtCDC20_1	SPSREAYR---KQLAESLNMNRT-----RILAFKNKPPAPVELMPQDH	106
PtCDC20_3	SPSREAYR---KQLADSLNMNRT-----RILAFKNKPPAPVELMPQDH	106
PtCDC20_2	SPSREAYR---KQLAEALNLNRT-----RILAFKNKPPTVELIPRDH	109
PtCDC20_5	-----	
AtCCS52A1	TLLRAAMFGPETPEKRDI--GFSSS-----RNIFRFTKTETH--RSLN--SF	136
AtCCS52A2	SLLKTALFGPVTPEKSDVVGFSPPS-----GNIFRFTKTETQ--RSLN--LY	130
PtCCS52A1	ALLRNALFGPQTPDKKDWGTGAAG-----RNIFRYKTETR--QSMH--SL	111
PtCCS52A1_2	ALLRNALFGPQTPDKKDWGAGAAG-----QNIFRYKMETR--QSLH--SL	112
OsCCS52A1	ALLRAALFGPTTPDRVASSASCSSSSSAGASPVGSPATGNIFRFAKEVP--RNAKRALF	174
PtCCS52B	RLLKSELFGSDFGS-FSSPAGGQGGLS-----PNKNMLRFKTDHS--GPNSPFSP	139
PtCCS52B_2	RLLKSELFGSDFGS-FSSPAGGQGGLS-----PSKNMLRFKTDHS--GPNSPYSP	139
AtCCS52B	RLLKSELFGSDFASPLLSFAGGQSSASP-----MSPECTNMLRFKTDRSNSPSSPFSP	135
OsCCS52B	RLLRAEIFGPDSPS----PAPSS-----PNTNLFRTKTDHP--SPKSPFAA	127

OsCDC20_2	RA-----DAASIQAQPAKQRRYIPQSAERT-----	143
OsCDC20_3	AD-----TASTHQAKPAKQRRYIPQSAERT-----	140
OsCDC20_1	YE-----TLTSSQTKPARKCRHIPQSSERT-----	149
PtCDC20_4	FS-----SSSVHSSKPKVKPQRHIPQRPEMT-----	92
AtCDC20_3	HS-----DSPHQNPVKPKPRRYIPQNSERV-----	117
AtCDC20_4	HS-----DSPHQNPVKPKPRRYIPQNSERV-----	114
AtCDC20_5	HS-----DPPHQQPISVKPKPRRYIPQNSERV-----	83
AtCDC20_6	QT-----IYCRRGSSYVETEKVEEEDRDDF-----	101
AtCDC20_1	S-----ASLHQQPKSVKPKPRRYIPQTSERT-----	121
AtCDC20_2	S-----ASLHQQPKSVKPKPRRYIPQTSERT-----	131
PtCDC20_1	-----SHHHHQPKTAKPRRHIPQTSERT-----	129
PtCDC20_3	-----SHHHHQPKTAKPRRHIPQTSERT-----	129
PtCDC20_2	LS-----SSLHYQAQPKPKPRRYIPQTSERT-----	134
PtCDC20_5	-----	
AtCCS52A1	SPFGVD---DDSPGVSHSGPVKAPRKVPRSPYKV-----	167
AtCCS52A2	PPFDS---VVS-GVSPS-PVKSPRKILRSPYKV-----	159
PtCCS52A1	SPFGFD---GLSGPGVSNVAIKAPRKVSRSPYKV-----	142
AtCCS52A1_2	SPFGFD---DMSDLGVSNVAIKPRKVSRSFYKV	168
OsCCS52A1	SDGDDE---GVLFPGVFTTRGTGPRKIPRSPYKV-----	205
PtCCS52B	SILGHD----SGISSESSTPPKPPRKVPKTPHKV-----	169
PtCCS52B_2	SILGHD----SGISSESSTTPKPPRKVPKTPHKV-----	169
AtCCS52B	SILGND----NGHSSDSSPPKPPRKVPKTPHKV-----	165
OsCCS52B	SAAATAGHYDCTAGSAESSTPRKPPRKVPKTPHKV-----	162

OsCDC20_2	-----LDAPELVDDYYLNLLDWGSSNVLSIALGNSVYLWDATNSSTSELVTVDE	192
OsCDC20_3	-----LDAPDLVDDYYLNLLDWGSKNVLSIALGDTVYLWDASSGSTSELVTVDE	189
OsCDC20_1	-----LDAPGIVDDFYLNLLDWGCKNVMSIALGNTLYLWNSADGSIMDLVTIDE	198
PtCDC20_4	-----LDAPDIVDDFYLNLLDWGNNVLAIALGTTVYLWNASNSSISEVTVDE	141
AtCDC20_3	-----LDAPGLRDDFSNLLLDWGSANVLAIALGDTVYLWDASSGSTSELVTIDE	166
AtCDC20_4	-----LDAPGLMDDFYLNLLDWGSANVLAIALGDTVYLWDASSGSTSELVTIDE	163
AtCDC20_5	-----LDAPGIADDFYLNLLDWGSSNVLAIALGDTVYLWDASSGSTYKLVTVDE	132
AtCDC20_6	-----LKQVWFLTDNLVFFVVDIEEYIVIEQLGDTVYLWDASSCYTSKLVTVDD	150
AtCDC20_1	-----LDAPDIVDDFYLNLLDWGSANVLAIALDHTVYLWDASTGSTSELVTIDE	170
AtCDC20_2	-----LDAPDIVDDFYLNLLDWGSANVLAIALDHTVYLWDASTGSTSELVTIDE	180
PtCDC20_1	-----LDAPDLVDDFYLNLLDWGSSNVLAIALGSTVYLWDASDGSTSELVTVDD	178
PtCDC20_3	-----LDAPDLVDDFYLNLLDWGSSNVLAIALGSTVYLWDASDGSTSELVTVDD	178
PtCDC20_2	-----LDAPDLVDDFYLNLLDWGSKNVLAIALENTVYLWDASNGSTSELVTVGD	183
PtCDC20_5	-----	
AtCCS52A1	-----LDAPALQDDFYLNLLVDWSAQNVLAIVGLGNCVYLWNACSSKVTKLCDLGA	216
AtCCS52A2	-----LDAPALQDDFYLNLLVDWSAQNVLAIVGLGNCVYLWNACSSKVTKLCDLGV	208
PtCCS52A1	-----LDAPALHDDFYLNLLVDWSSHNVLAVGLGTCVYLWNACSSKVTKLCDLGN	191
PtCCS52A1_2	LLIDPAFCFYVLDAPALQDDFYLNLLVDWSSHNVLAVGLGNCVYLWNACSSKVTKLCDLGN	228
OsCCS52A1	-----LDAPALQDDFYLNLLVDWSSHNILAVGLGNCVYLWNACSSKVTKLCDLGV	254
PtCCS52B	-----LDAPSLQDDFYLNLLVDWSSQNVLAIVGLGTCVYLWTASNSKVTRLCDLGP	218
PtCCS52B_2	-----LDAPSLQDDFYLNLLVDWSSQNVLAIVGLGTCVYLWTASNSKVTRLCDLGP	218
AtCCS52B	-----LDAPSLQDDFYLNLLVDWSSQNVLAIVGLGTCVYLWTASNSKVTKLCDLGP	214
OsCCS52B	-----LDAPSLQDDFYLNLLVDWSSQNTLAVGLGNCVYLWASNSCKVTKLCDLGP	211

OsCDC20_2	DNGPVTSVSWAPDGRHIAVGLNSSDVQLWDTSSNRLRLRTMRGVHDSRVGSLAWNNNILT	252
OsCDC20_3	DSGPITSVSWAPDQGHVAVGLNSSDIQLWDTSSNRLRLRTLGRVHESRVGSLAWNNNILT	249
OsCDC20_1	DDGPITSVSWSCDQGWIAVGLNSSDIQLWDTSSNRLRLTLHGTVHDSRVGSLAWNNNILT	258
PtCDC20_4	EDGPVTSISWAPDGRHLAVGLDNNSVQLWDSATNQMLRTLGRGHRRLRVTSGLAWNNHLLT	201
AtCDC20_3	DKGPVTSINWTQDGLDLAVGLDNSEVQLWDCVSNRQVRTLGRGGHESRVGSLAWNNHILT	226
AtCDC20_4	DKGPVTSINWTQDGLDLAVGLDNSEVQLWDFVSNRQVRTLIGGHESRVGSLAWNNHILT	223
AtCDC20_5	EEGPVTSINWTQDGLDLAIGLDNSEVQLWDCVSNRQVRTLGRGGHESRVGSLAWNNHILT	192
AtCDC20_6	ENGPVTSINWTQDGLDLAVGLDNSEVQVWDCVSNRHVRTLRGGHESRVGSLAWNNHILT	210
AtCDC20_1	EKGPVTSINWAPDGRHVAVGLNNSEVQLWDSASNRQLRTLKGGHESRVGSLAWNNHILT	230
AtCDC20_2	EKGPVTSINWAPDGRHVAVGLNNSEVQLWDSASNRQLRTLKGGHESRVGSLAWNNHILT	240
PtCDC20_1	EDGPITSVNWAPDGRHIAIGLNNSHIQLWDSASNRQLRTLKGGHESRVGSLAWNNHILT	238
PtCDC20_3	EDGPVTSVNWAPDGRHIAIGLNNSHIQLWDSASNRQLRTLKGGHESRVGSLAWNNHILT	238
PtCDC20_2	EVGPVTSVNWAPDGLHLAIGLNNNSVQLWDSASCKQLRNLRGCHRSRVGSLAWNNHILT	243
PtCDC20_5	-----	
AtCCS52A1	EDS-VCSVGWALRGTHLAVGTSTGKVQIWDASRCKRTRTMEG-HRLRVGALAWGSSVLSS	274
AtCCS52A2	DET-VCSVGWALRGTHLAIGTSSGTQIWDVLRCKNIRTMEG-HRLRVGALAWSSSVLSS	266
PtCCS52A1	DDG-VCSVGWAHRGTHLAVGTSSNGKVQIWDASRCKRIRIMEG-HRLRVGALAWSSSMLSS	249
PtCCS52A1_2	DDG-VCSVGWAHRGTHLAIGTSSNGKVQIWDASRCKRIRIMEG-HRLRVGALAWSSSMLSS	286
OsCCS52A1	DDN-VCSVGWAQRGTHLAVGTNQGVQVWDATRCKRIRTMES-HRMRVGALAWNSSLLSS	312
PtCCS52B	NDS-VCSVQWTRREGSYISVGTSLGQVQVWDGTQCKRVRTMGG-HQTRTGVLAWNSRTLAS	276
PtCCS52B_2	NDS-VCSLQWTRREGSYISIGTSLGQVQVWDGTQCKRVRTMGG-HQTRTSVLAWNSRTLAS	276
AtCCS52B	NDS-VCSVQWTRREGSYISIGTSHGQVQVWDGTQCKRVRTMGG-HQTRTGVLAWNSRILSS	272
OsCCS52B	RDS-VCVAVHWTREGSYLAIGTSLGVDQIWDSSRCKRIRNMGG-HQTRTGVLAWSSRILSS	269

OsCDC20_2	GGMDGKIVNNDVIRIRNHVVQTYQGHHQEVCGLKWSGSGQQQLASGGNDNLLHIWD-VSMAS	311
OsCDC20_3	GGMDGNIVNNDVIRIRNHVVQTYQGHSQEVCGLKWSGSGQQQLASGGNDNLLHIWD-VSMAS	308
OsCDC20_1	GGMDGNIVNNDVIRIRNHVVQTYQGHHEDEVCGLRWSGSGQQQLASGGNDNLLVHIWD-VSMAS	317
PtCDC20_4	GGKDAKVINNDVIRIRESHIVESYEGRHQEVCGLKWSASGQQQLASGGNDNLLFIWD-RFMS	260
AtCDC20_3	GGMDGKIVNNDVIRIRSSIVETYLGHTEEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSLAS	285
AtCDC20_4	GGMDGKIVNNDVIRIRSSIVGTYLGHTTEEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSVAS	283
AtCDC20_5	GGMDGKIVNNDVIRIRSSIVETYLGHTEEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSVAS	252
AtCDC20_6	GGMDGKIVNNDVIRIRSSIVGTYVGHTEEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSLAS	269
AtCDC20_1	GGMDGLIINNDVIRIRSPIVETYRGHTQEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSVAS	289
AtCDC20_2	GGMDGLIINNDVIRIRSPIVETYRGHTQEVCGLKWSGSGQQQLASGGNDNVVHIWD-RSVAS	299
PtCDC20_1	GGMDGQIINNDVIRIRSHIVETYRGHTQEVCGLKWSASGQQQLASGGNDNLIHIWD-RSTAL	297
PtCDC20_3	GGMDGQIINNDVIRIRSHIVETYRGHTQEVCGLKWSASGQQQLASGGNDNLIHIWD-RSTAL	297
PtCDC20_2	GGMDGKIINNDVIRIRSHIVETYRGHQEVCGLKWSASGQQQLASGGNDNIIHIWD-RSVAS	302
PtCDC20_5	-----	
AtCCS52A1	GSRDKSILQRDIRCQEDHVS KL AGHKSEVCGLKWSYDNRELASGGNDNRLFVWN---QHS	331
AtCCS52A2	GSRDKSILQRDIRTQEDHVS KL GKHKSEICGLKWSYDNRELASGGNDNKL FVWN---QHS	323
PtCCS52A1	GSRDKSILQRDIRAQEDFVSKLSGHKSEVCGLKWSYDNRELASGGNDNRLFVWN---QHS	306
PtCCS52A1_2	GSRDKSILQRDIRAQEDFVSKLSGHKSEVCGLKWSYDNRELASGGNDNRLFVWN---QHS	343
OsCCS52A1	GSRDKSILHHDIRAQDDYISRLAGHKSEVCGLKWSYDNRELASGGNDNRLYVWN---QHS	369
PtCCS52B	GSRDRHILQHDLRISSDYVSKLIGHKSEVCGLKWSHDDRELASGGNDNQLLVWN---QHS	333
PtCCS52B_2	GSRDRNIIQLHDLRVSSDYVSKLIGHKSEVCGLKWSHDDRELASGGNDNQLLVWN---QHS	333
AtCCS52B	GSRDRNIIQLHDIRVQSDVSKLVGHKSEVCGLKWSHDDRELASGGNDNQLLVWN---NHS	329
OsCCS52B	GSRDNKILQHDIRVPSDYISKFSGHRSEVCGLKWSHDDRELASGGNDNOLLVWN---ORS	322

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OsCDC20_2	YLPFKLTNIALNRLLITCLVVILQ	SPDGLTVASAAADETLRFWNVFG-APEAPKTATK--	488
OsCDC20_3	-----	SPDGCTVASAAADETLRFWNVFG-SPEAPKPAK--	455
OsCDC20_1	-----	SPDGFTVASVAADETLRLWKIFE-TSEDAKPVFKTF	445
PtCDC20_4	-----	SPDGYTVASAAGDETLRFWNVFG-NPKAAK-----	400
AtCDC20_3	-----	SPNGCTVASAAGDENLRLWNVFGEPKTTKKAAS--	430
AtCDC20_4	-----	SPNGCTVASAAGDENLRLWNVFGEPKTTKKAAS--	428
AtCDC20_5	-----	SPDGCTVASAAGDETLRLWNVFGEPKTTKKAAS--	397
AtCDC20_6	-----	SPDGCTVASAAGDETLRLWNVFGEPKTTKKAAS--	414
AtCDC20_1	-----	SPDGCTVASAAGDETLRFWNVFG-VPETAKKAAP--	433
AtCDC20_2	-----	SPDGCTVASAAGDETLRFWNVFG-VPETAKKAAP--	443
PtCDC20_1	-----	SPDGCTVATAAGDETLRFWNVFG-VPEVAAKAAP--	441
PtCDC20_3	-----	SPDGCTVATAAGDETLRFWNVFG-VPEIAAKAAP--	441
PtCDC20_2	-----	SPDGCTVATAAGDETLRFWNVFG-VPEVAK-----	442
PtCDC20_5	-----	SPDGCTVATAAGDETLRFWNVF-----	120
AtCCS52A1	-----	SPDGQITVTGAGDETLRFWNVFP-SPKSQNTD----	469
AtCCS52A2	-----	SPDGQITVTGAGDETLRFWNVFP-SPKSQSRE----	461
PtCCS52A1	-----	SPDGQITVTGAGDETLRFWNVFP-SPKSQNTD----	444
PtCCS52A1_2	-----	SPDGQITVTGAGDETLRFWSVFP-SPKSQNTD----	481
OsCCS52A1	-----	SPDGQITVTGAGDETLRFWNVFP-SPKSQSSDSL--	509
PtCCS52B	-----	SPDGQITVTGAGDETLRFWNVFP-SMKTQTPV----	471
PtCCS52B_2	-----	SPDGQITVTGAGDETLRFWNVFP-SMKTQTPV----	471
AtCCS52B	-----	SPDGQITVTGAGDETLRFWNVFP-SVKMQTPV----	467
OsCCS52B	-----	SPDGQITVTGAGDETLRFWNIFP-SMKTQAPV----	464

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OsCDC20_2	-----	GSHTGMFNNSNHIHIR-----	504
OsCDC20_3	-----	ASHTGMFNSFNHLR-----	469
OsCDC20_1	VLVFQDNVRVGPWGTDCSYFQDLIALVVMTMTGSQKL	-----	482
PtCDC20_4	-----	-----	
AtCDC20_3	-----	KKYPELFSHVNSLR-----	444
AtCDC20_4	-----	KNYLELFSHVNSLRWCLVSFASGIDVLGKSNIHNSCD	466
AtCDC20_5	-----	KKYTDPPFAHVNHIR-----	411
AtCDC20_6	-----	KKYTEPFAHVNHIR-----	428
AtCDC20_1	-----	KAVAEPPFSHVNRIR-----	447
AtCDC20_2	-----	KAVSEPPFSHVNRIR-----	457
PtCDC20_1	-----	KANPEPFSHLNRLR-----	455
PtCDC20_3	-----	KANPEPFSHLNRLR-----	455
PtCDC20_2	-----	-----	
PtCDC20_5	-----	-----	
AtCCS52A1	-----	SEIGSSFFGRTTIR-----	483
AtCCS52A2	-----	SEIGALSFGRTTIR-----	475
PtCCS52A1	-----	SEIGASSLGRTTIR-----	458
PtCCS52A1_2	-----	SEIGASSLGRTTIR-----	495
OsCCS52A1	-----	SSIGATSFVRSYIR-----	523
PtCCS52B	-----	KDTGLWSLGRQTQIR-----	485
PtCCS52B_2	-----	KDTGLWSLGRQTQIR-----	485
AtCCS52B	-----	KDTGLWSLGRQTQIR-----	481
OsCCS52B	-----	RDIGLWSFSRSHIR-----	478

After EST support: Activators CDC20 and CCS52

AtCDC20_1	-----MDAGLN-----RCPLQEHFLPRKNS	20
AtCDC20_2	-----MDAGMNTSSHYK-----TQARCPQEHFLPRKPS	30
PtCDC20_1	-----MDAGSLNSSSYMK-----AQSRLFPLQEQFLHRKNS	30
PtCDC20_5	-----	
PtCDC20_2	-----MDAGSINSSSSLK-----AQSRLFPLQQQFLPRMNS	30
PtCDC20_3	-----MDAGSMNTSSSLK-----AQSRLFPLQQQFLPRTNS	30
AtCDC20_3	-----MDSG-----MRATCTVPEHFLPRKLS	21
AtCDC20_4	-----MDS-----DTCTVPDHFLPRKLS	18
AtCDC20_5	-----MMNTSSHLK-----AQASCPLVEHFLRRKLS	26
AtCDC20_6	-----MMKS-----IALALCLTHHSPMVL	20
PtCDC20_4	-----MDSSSSSTTR-----MFHPRSALENPQRKKS	28
OscCDC20_1	-----MDA-GSHSISSEKSHG-LAPRPP---LQEAGSR-PYMPSLST	36
OscCDC20_2	-----MDA-GSHSISSEKSSRYVAPRQP---LQEAGSR-PYMPSLST	37
OscCDC20_3	-----MEAPGSGSVPTAKRRR-LVPRPPPVPLEVAGARGFYMPPLCI	41
AtCCS52A1	-----MEEEDPTASNVITNSNSSMRNLS PAMNTPVVSLESR---INRLINANQSQSP	50
AtCCS52A2	-----MEEDESTTP---KKKSDSQLNLPPSMNRPTVSLESR---INRLIDSNHYHSP	46
PtCCS52A1	-MADPMISQSTQSKLNIAASTTPRHHHHLHLENPTSPSSSKH---VNRLINSNHYISP	55
PtCCS52A1_2	-MADPTMSPPNQSQLNVAASTQRRQHHLNLESLAPSPSSSEH---VNRLINSNHYISP	55
OscCCS52A	MDHHHHHLPPPPPRSPMENSASSKPPTPASTPSSRLAAPSSR---VSSAAPHPSPSSS	56
PtCCS52B	-----MDSTPRRKSG---LNLPSGMNETSLRLETFSSSSSFRAVTCVSSPRAISSLSP	51
PtCCS52B_2	-----MDSTPRRKSG---LNLPSGMNETSLRLETFSSSSSFRAVTCVSSPRAISSLSP	51
AtCCS52B	-----MASPQSTKTG---LNLPAQMNQTSRLLETFSSS-----FRGISSLSP	40
OscCCS52B	-----MATDASPKPAPRLNVPPAMAG-GLRLDPAVASP-----ARLLLDVPKTPSP	46

AtCDC20_1	KENL-----DRFIPNR-SAMNFDYAHFALTEERKG-----KDQS-ATVSSPSKE	62
AtCDC20_2	KENL-----DRFIPNR-SAMNFDYAHFALTEGRKG-----KDQT-AAVSSPSKE	72
PtCDC20_1	KDNL-----DRFIPNR-SAMDLDYAHYMLTQGRKGG-----KENPTATVNSPSRE	74
PtCDC20_5	-----	
PtCDC20_2	KENL-----DRFIPNR-SAMDMDYAHFMLETEGRKG-----KENP--TVNSPSRE	71
PtCDC20_3	KENL-----DRFIPNR-SAMDMDYARFMLETEGRKG-----KENP--TVNSPSRE	71
AtCDC20_3	KQNL-----DRFIPNR-SAKDFDFANYALTQGSKR-----NLDEVTSASRK	61
AtCDC20_4	KQNL-----DRFIPNR-SAMDFDFANYALTQGRKR-----NVDEITSASRK	58
AtCDC20_5	KENF-----DRFIPNRSAMMDDFANYALTQGRKR-----NVDEVTSASRK	67
AtCDC20_6	-----IVDYGDSQEKID---SLWKKP-----HGSDLTWSG--	48
PtCDC20_4	YENVSLQNYILDRFIPNR-SAMDMDFAHYMLTEGRKA-----KESPPSQS	72
OscCDC20_1	ASRNPSAKCYGDRFIPDR-SAMDMDMAHYLLTEPKKD-----KEN-AAASPSKE	83
OscCDC20_2	ASRNPSAKCYGDRFIPDR-SAMDMDMAHYLLTEPRKD-----KEN-AAASPAKE	84
OscCDC20_3	KSKNPSAKCYGDRFIPDR-SAMDMDMAYFLLTEPKKE-----KENTDMLSPAEE	89
AtCCS52A1	SPSSLSRSIYSDRFIPSR---SGSNFALFDLSPSPS-----KDGKEDGAG	92
AtCCS52A2	S-----KPIYSDRFIPSR---SGSNFALFDLASSPNK-----KDGKEDGAG	85
PtCCS52A1	S-----RPIYSDRFIPCR---SSSNFALFNISFPQPSATAGISPG-----CGGKEDNPS	101
PtCCS52A1_2	S-----RPIYSDRFIPCR---SSSNFALFNISLPSPSATAGSSPG-----DGGKEDNPN	101
OscCCS52A	APTPASRTVYSDRFIPSR---AGSNLALFDLAPSPSHHDAASAPGAPPPSGSTPASS	113
PtCCS52B	SKT----SSCSDRFIPCR---SSSRLHTFGLVEKG-----SPVKEGGNE	88
PtCCS52B_2	SKT----SSCSDRFIPCR---SSSRLQTFGLIEKG-----SPVKEGGNE	88
AtCCS52B	SK----STCSDRFIPCR---SSSRLHAFDLQDKEPT-----TPVKEGGNE	78
OscCCS52B	SK----TTYSDRFIPCR---SSSRLHNFALLDRDRA-----SPSSTDDA	84

AtCDC20_1	AYRKQLAETMNLN-----HTRILAFRNKPQAPVELLP	94
AtCDC20_2	AYRKQLAETMNLN-----HTRILAFRNKPQAPVELLP	104
PtCDC20_1	AYRKQLAEALNLN-----RTRILAFKNKPPTPVLELIP	106
PtCDC20_5	-----	
PtCDC20_2	AYRKQLAESLNMN-----RTRILAFKNKPPAPVELMP	103
PtCDC20_3	AYRKQLADSLNMN-----RTRILAFKNKPPAPVELMP	103
AtCDC20_3	AYMTQLAVVMNQN-----RTRILAFRNKPKS---LL	89
AtCDC20_4	AYMTQLAVVMNQN-----RTRILAFRNKPKA---LL	86
AtCDC20_5	AYMTQLAEAMNQN-----RTRILAFRNKPKA---LL	95
AtCDC20_6	--FSRVGVTEAYF-----AVPVDHFLTNPSPS---LR	74
PtCDC20_4	LYQKLLAEAFNMN-----GRRILAFKNKPPTLVDPPI	104
OscCDC20_1	VYRRLLAEKLLNN-----RTRILAFRNKPPEPENVS-	114
OscCDC20_2	AYRKLLAEKILNN-----RTRILSFRNKPEPEESILT	116
OscCDC20_3	AYKRLLAEKLLNN-----RSRILAFRNKPPEPEGIVQ	121
AtCCS52A1	SYATLLRAAMFGPETPEKRIT-GFSSS-----RNIFRFKTETH--RSLN-	134
AtCCS52A2	SYASLLKLTALFGPVTPKESDVVNGFSPS-----GNIFRFKTETQ--RSLN-	128
PtCCS52A1	AYAALLRNALFGPQTPDKKDWGAGAAG-----QNIFRYKMETR--QSLH-	143
PtCCS52A1_2	AYAALLRNALFGPQTPDKKDWGTGAAG-----RNIFRYKMETR--QSMH-	143
OscCCS52A	PYCALLRAALFGPTTPDRVASSASACSSSSSAGASPVGSPATGNI FRFKAIEVP--RNAKR	171
PtCCS52B	AYARLLKSELFGSDFGS-FSSPAGGQGLSS-----PNKNMLRFKTDHS--GPNSP	136
PtCCS52B_2	AYARLLKSELFGSDFGS-FSSPAGGQGLGS-----PSKNMLRFKTDHS--GPNSP	136
AtCCS52B	AYSRLKSELFGSDFASPLLSFAGGQSASSP-----MSPCTNMLRFKTDHSNSSPSSP	132
OscCCS52B	PYSRLRAELIFGPDSPS----PAPSS-----PNTNLF RFKTDHP--SPKSP	124

AtCDC20_1	SNHS-----ASLHQPKSVKPRRYIPQTSERTLDAPDIVDDFYLNLLDWGSANV	143
AtCDC20_2	SNHS-----ASLHQPKSVKPRRYIPQTSERTLDAPDIVDDFYLNLLDWGSANV	153
PtCDC20_1	RDHLS-----SSLHYQAKPTKPRRYIPQTSERTLDAPDLVDDFYLNLLDWGSKNV	156
PtCDC20_5	-----	
PtCDC20_2	QDH-----SHHHHQPKTAKPRRHIPQTSERTLDAPDLVDDFYLNLLDWGSSNV	151
PtCDC20_3	QDH-----SHHHHQPKTAKPRRHIPQTSERTLDAPDLVDDFYLNLLDWGSSNV	151
AtCDC20_3	STNHS-----DSPHQNPVKPRRYIPQNSERVLDAPGLRDDFYLNLLDWGSANV	139
AtCDC20_4	SSNHS-----DSPHQNPKSVKPRRYIPQNSERVLDAPGLMDDFYLNLLDWGSANV	136
AtCDC20_5	SSNHS-----DPPHQQPISVKPRRYIPQNSERVLDAPGIADDFYLNLLDWGSSNV	145
AtCDC20_6	LS-QT-----IYCRRGSSSYVETEKVEEEDRDDFLKQVWFLTDNLVFFVVDIEEYI	123
PtCDC20_4	LFS-----SSSVHSSKPKVQRHQPQRPEMTLDAPDIVDDFYLNLLDWGNINV	152
OsCDC20_1	--AAD-----TASTHQAKPAQRRYIPQSAERTLDAPDLVDDYYLNLLDWGSKNV	162
OsCDC20_2	E-LRA-----DAASIQAKPAQRRYIPQSAERTLDAPELVDDYYLNLLDWGSSNV	165
OsCDC20_3	QLLYE-----TLTSSQTKPARKCRHIPQSSERTLDAPGIVDDFYLNILDWGCKNV	171
AtCCS52A1	-SFSPFGVD----DSDPGVSHSGPVKAPRKVPRSPYKVLDPALQDDFYLNLDVWSAQNV	189
AtCCS52A2	-LYPPFDS----VVS-GVSPS-PVKSPRKILRSPYKVLDPALQDDFYLNLDVWSAQNV	181
PtCCS52A1	-SLSPFGFD----DMSDLGVSNVAIKAPRKVSRSPYKVLDPALQDDFYLNLDVWSHNV	198
PtCCS52A1_2	-SLSPFGFD----GLSGPGVSNVAIKAPRKVSRSPYKVLDPALHDDFYLNLDVWSHNV	198
OsCCS52A	ALFSDGDDE----GVLFPGVTTTRGTGPRKIPRSPYKVLDPALQDDFYLNLDVWSHNI	227
PtCCS52B	FSPSILGHD----SGISSESSTPPKPPRKVPKTPHKVLDPASLQDDFYLNLDVWSQNV	191
PtCCS52B_2	YSPSILGHD----SGISSESSTPPKPPRKVPKTPHKVLDPASLQDDFYLNLDVWSQNV	191
AtCCS52B	FSPSILGND----NGHSSDSSPPKPPRKVPKTPHKVLDPASLQDDFYLNLDVWSQNV	187
OsCCS52B	FAASAAATAGHYDCTAGSAESSTPRKPPRKVPKTPHKVLDPASLQDDFYLNLDVWSQNT	184

AtCDC20_1	LAIALDHTVYLWDASTGSTSELVTIDEKGPVTSINWAPDGRHVAVGLNNSVQLWDSAS	203
AtCDC20_2	LAIALDHTVYLWDASTGSTSELVTIDEKGPVTSINWAPDGRHVAVGLNNSVQLWDSAS	213
PtCDC20_1	LAIALENTVYLWDASNGSTSELVTVGDEVGPVTSVNWAPDGLHLAIGLNNSVQLWDSAS	216
PtCDC20_5	-----	
PtCDC20_2	LAIALGSTVYLWDASDGSTSELVTVDDEDGPITSVNWAPDGRHIAIGLNNSHIQLWDSAS	211
PtCDC20_3	LAIALGSTVYLWDASDGSTSELVTVDDEDGPITSVNWAPDGRHIAIGLNNSHIQLWDSAS	211
AtCDC20_3	LAIALGDTVYLWDASSGSTSELVTIDEDKGPVTSINWTQDGLDLAVGLDNSEVQLWDCVS	199
AtCDC20_4	LAIALGDTVYLWDASSGSTSELVTIDEDKGPVTSINWTQDGLDLAVGLDNSEVQLWDFVS	196
AtCDC20_5	LAIALGDTVYLWDASSGSTYKLVITIDEEGPVTSINWTQDGLDLAIGLDNSEVQLWDCVS	205
AtCDC20_6	VIEQLGDTVYLWDASSCYTSKLVITIDENGVPVTSINWTQDGLDLAVGLDNSEVQVWDCVS	183
PtCDC20_4	LAIALGTTVYLWNASNSSISEVVTVDEEDGPVTSISWAPDGRHLAVGLDNNSVQLWDSAT	212
OsCDC20_1	LSIALGDTVYLWDASSGSTSELVTIDEDSGPITSVSWAPDQGHVAVGLNSSDIQLWDTSS	222
OsCDC20_2	LSIALGNSVYLWDATNSSTSELVTVDENGPVTSVSWAPDGRHIAVGLNSSDVQLWDTSS	225
OsCDC20_3	MSIALGNTLYLWNASDGSIMDLVTIDEDDGPITSVSWSCDQGWIAVGLNSSDIQLWDTSS	231
AtCCS52A1	LAVGLGNCVYLWNACSSKVTKLCDLGAEDS-VCSVGWALRGTHLAVGTSTGKVQIWDASR	248
AtCCS52A2	LAVGLGDTVYLWDASSGSTSELVTIDEDGVDDET-VCSVGWALRGTHLAIGTSSTGTVQIWDVLR	240
PtCCS52A1	LAVGLGNCVYLWNACSSKVTKLCDLGNDDG-VCSVGWAHRGTHLAIGTSNGKVQIWDASR	257
PtCCS52A1_2	LAVGLGTCVYLWNACSSKVTKLCDLGNDDG-VCSVGWAHRGTHLAVGTSNGKVQIWDASR	257
OsCCS52A	LAVGLGNCVYLWNACSSKVTKLCDLGVDDN-VCSVGWAQRGTHLAVGTNQGKVQVWDATR	286
PtCCS52B	LAVGLGTCVYLWTASNSKVTRLCDLGPNDG-VCSVQWTRREGSYISVGTGLGQVQVWDGTQ	250
PtCCS52B_2	LAVGLGTCVYLWTASNSKVTRLCDLGPNDG-VCSLQWTRREGSYISIGTHLGQVQVWDGTQ	250
AtCCS52B	LAVGLGTCVYLWTASNSKVTRLCDLGPNDG-VCSVQWTRREGSYISIGTSHGQVQVWDGTQ	246
OsCCS52B	LAVGLGNCVYLWASNSCKVTKLCDLGPNDG-VCAVHWTREGSYLAIGTSLGQVQIWDSSR	243

AtCDC20_1	NRQLRTLKGGHQSRVGSRAWNNHILTTGGMDGLIINNDVIRIRSPIVETYRGHTQEVCGLK	263
AtCDC20_2	NRQLRTLKGGHQSRVGSRAWNNHILTTGGMDGLIINNDVIRIRSPIVETYRGHTQEVCGLK	273
PtCDC20_1	CKQLRNLRGCHRSRVGSMANNHILTTGGMDGKIINNDVIRIRSHIVETYRGHQEQEVCGLK	276
PtCDC20_5	-----	
PtCDC20_2	NRQLRTLKGGHRSRVGSRAWNNHILTTGGMDGQIINNDVIRIRSHIVETYRGHTQEVCGLK	271
PtCDC20_3	NRQLRTLKGGHRSRVGSMANNHILTTGGMDGQIINNDVIRIRSHIVETYRGHTQEVCGLK	271
AtCDC20_3	NRQVRTLRGGHESRVGSRAWNNHILTTGGMDGKIVNNDVIRIRSSIVETYLGHTEEVCGLK	259
AtCDC20_4	NRQVRTLIGGHESRVGSRAWNNHILTTGGMDGKIVNNDVIRIRSSIVGTYLGHTEEVCGLK	256
AtCDC20_5	NRQVRTLRGGHESRVGSRAWNNHILTTGGMDGKIVNNDVIRIRSSIVETYLGHTEEVCGLK	265
AtCDC20_6	NRHVRTLGRGHESRVGSRAWNNHILTTGGMDGKIVNNDVIRIRSSIGTYVGHTEEVCGLK	243
PtCDC20_4	NQMLRTLGRGHRLRVTSRAWNNHLLTTGGKDAKVINNDVIRIREHIVESYEGHRQEVCGLK	272
OsCDC20_1	NRLRLTLRGVHESRVGSRAWNNHILTTGGMDGNIINNDVIRIRNHVVQTYQGHQEVCGLK	282
OsCDC20_2	NRLRLTRMGVHDSRVGSRAWNNHILTTGGMDGKIVNNDVIRIRNHVVQTYQGHQEVCGLK	285
OsCDC20_3	NRLRLTLHGHHQSRVGSRAWNNHILTTGGMDGNIINNDVIRIRSHVHIYRGHEDEVCGLR	291
AtCCS52A1	CKRTRTMEG-HRLRVGALAWSSSVLSSGSRDKSILQRDIRCEDHVS KL AGHKSEVCGLK	307
AtCCS52A2	CKNIRTMEG-HRLRVGALAWSSSVLSSGSRDKSILQRDIRTQEDHVS KL KGHKSEICGLK	299
PtCCS52A1	CKRIRTMEG-HRLRVGALAWSSSMLSSGSRDKSILQRDIRAREDFVSKLSGHKSEVCGLK	316
PtCCS52A1_2	CKRIRIMEG-HRLRVGALAWSSSMLSSGSRDKSILQRDIRAQEDFVSKLSGHKSEVCGLK	316
OsCCS52A	CKRIRTMES-HRMRVGALAWSSSLLSSGSRDKSILHHDIRAQDDYISRLAGHKSEVCGLK	345
PtCCS52B	CKRVRTMGG-HQTRTGVLAWNSRTLASGSRDRNHLQHDLRISDDYVSKLIGHKSEVCGLK	309
PtCCS52B_2	CKRVRTMGG-HQTRTGVLAWNSRTLASGSRDRNHLQHDLRVSSDHVSKLIGHKSEVCGLK	309
AtCCS52B	CKRVRTMGG-HQTRTGVLAWNSRILSSGSRDRNHLQHDIRVQSDFVSKLVGHKSEVCGLK	305
OsCCS52B	CKRIRNMGG-HQTRTGVLAWSSRILSSGSRDKNHLQHDIRVPSDYISKFSGRHSEVCGLK	302

AtCDC20_1	WSGSGQQLASGGNDNVVHIWD-RSVASSNSTT---QWLHRLEEHTSAVKALAWCPFQANL	319
AtCDC20_2	WSGSGQQLASGGNDNVVHIWD-RSVASSNSTT---QWLHRLEEHTSAVKALAWCPFQANL	329
PtCDC20_1	WSASGQQLASGGNDNLIHIWD-RSVASSNSAT---QWFHRLEEHTSAVKALAWCPFQGNL	332
PtCDC20_5	-----HIWD-RSVASSNSAT---QWFHRLEEHTSAVKALAWCPFQGNL	339
PtCDC20_2	WSASGQQLASGGNDNLIHIWD-RSTALSNSAT---QWLHRLEDHTSAVKALAWCPFQGNL	327
PtCDC20_3	WSASGQQLASGGNDNLIHIWD-RSTALSNSAT---QWLHRLEDHTSAVKALAWCPFQGNL	327
AtCDC20_3	WSESGNKQASGGNDNVVHIWD-RSLASSKQTR---QWLHRFEEHTAAVRALAWCPFQASL	315
AtCDC20_4	WSESGKKLASGGNYNVVHIWDHRSVASSKPTR---QWLHRFEEHTAAVRALAWCPFQATL	313
AtCDC20_5	WSESGKKLASGGNDNVVHIWDHRSVASSNPTR---QWLHRFEEHTAAVRALAWCPFQASL	322
AtCDC20_6	WSESGKKLASGGNDNVVHIWD-RSLASSNPTR---QWLHRFEEHTAAVRALAWCPFQASL	299
PtCDC20_4	WSASGQQLASGGNDNLLFIWD-RFMASSNSPR---HWLHKLEDHTAAVKALAWCPFQSNL	328
OsCDC20_1	WSGSGQQLASGGNDNLLHIWD-VSMASSVPSAGRQWLHRLEDHTAAVKALAWCPFQSNL	341
OsCDC20_2	WSGSGQQLASGGNDNLLHIWD-VSMASSMPSAGRTQWLHRLEDHTAAVKALAWCPFQSNL	344
OsCDC20_3	WSGSGQQLASGGNDNLLVHIWD-VSMASSNLSLGHNRWLHREFGDLAAVKALAWCPFQSNL	350
AtCCS52A1	WSYDNRELASGGNDNRLFVWNQHSQTQ-----VLKYSEHTAAVKAIAWSPHVHGL	357
AtCCS52A2	WSSDNRELASGGNDNKLFLVWNQHSQTQ-----VLRFCEHAAAVKATAWSPHHFGL	349
PtCCS52A1	WSYDNRELASGGNDNRLFVWNQHSQTQ-----VLKYCEHTAAVKAIAWSPHLHGL	366
PtCCS52A1_2	WSYDNRELASGGNDNRLFVWNQHSQTQ-----VLKYCEHTAAVKAIAWSPHLHGL	366
OsCCS52A	WSYDNRELASGGNDNRLFVWNQHSQ-----VLKYTEHTAAVKAIAWSPHLHGL	395
PtCCS52B	WSHDDRELASGGNDNQLLVWNQHSQLP-----ILKLTEHTAAVKAIAWSPHQSGL	359
PtCCS52B_2	WSHDDRELASGGNDNQLLVWNQHSQLP-----VLTLTEHTAAVKAIAWSPHQSGL	359
AtCCS52B	WSHDDRELASGGNDNQLLVWNHNSQP-----ILKLTEHTAAVKAITWSPHQSSL	355
OsCCS52B	WSHDDRELASGGNDNQLLVWNQRSQP-----ILRLTEHTAAVKAIAWSPHQOGL	352

AtCDC20_1	PFSHVNR--IR	447
AtCDC20_2	PFSHVNR--IR	457
PtCDC20_1	PFSRFNR--IR	459
PtCDC20_5	PFSRFNR--IR	166
PtCDC20_2	PFSHLNR--LR	455
PtCDC20_3	PFSHLNR--IR	455
AtCDC20_3	LFSHVNS--LR	444
AtCDC20_4	LFSHVNS--LR	442
AtCDC20_5	PFAHVNH--IR	451
AtCDC20_6	PFAHVNH--IR	428
PtCDC20_4	PFANVSH--FR	455
OsCDC20_1	MFNSFNH--LR	469
OsCDC20_2	MFNNSNHIHIR	474
OsCDC20_3	MFNSFSH--IR	478
AtCCS52A1	SFFGRTT--IR	483
AtCCS52A2	LSFGRTT--IR	475
PtCCS52A1	SSLGRTT--IR	492
PtCCS52A1_2	SSLGRTT--IR	492
OsCCS52A	TSFVRSY--IR	523
PtCCS52B	WSLGRTQ--IR	485
PtCCS52B_2	WSLGRTQ--IR	485
AtCCS52B	WSLGRTQ--IR	481
OsCCS52B	WSFSRSH--IR	478

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