

Additional file 8

**Alignment of EF-hand regions of plant Nox, NoxC, Nox5, and Duox**

Gray-boxes indicate EF-hand motifs. EF-I to EF-IV shown above the alignment correspond to the number of the four EF-hands of Nox5. *Underlines* represent a “helix-loop-helix (HLH)” region of Duox orthologs, and *Bold letters* represent the loop region of the “HLH” region. The letters X, Y, Z, -Y, -X, and -Z indicate the six residues that participate in calcium-binding. The 1<sup>st</sup> transmembrane domains (the 2<sup>nd</sup> for Duox) were indicated as TM1 (or TM2 for Duox) above the alignment. To describe species of the genes, we use the same abbreviations as in Additional file 4.

	-EF-I	
	X	
human-Nox5alpha	QTGPEGCRGTMSAEEDARWLRWVTQQFKTIAGE	41
dog-Nox5	-----MSTEEDAKWLQVWTHQFETIAEK	36
cow-Nox5	-----MNAEEDAKWLQVWTHQFKTIAGE	41
chicken-Nox5	-----MGTAEDAARWLRWVTERFQSIAGH	32
frog-Nox5	-----MSTEDDSKWLEWVTKQFENIAGD	24
opossum-Nox5	-----MNADDDAKRLEWVSFQFE-IAGE	
fugu-Nox5	-----	
medaka-Nox5	SSGCSGVSCIMSVEEDARWLEWVTKQFESIAGD	44
Sp-Nox5A	LAFSSVCGNAQPADEDSQWLSWAEEKQFCQIAGE	42
Sp-Nox5B	-----MAGMQEKDEKWLVKLEKHFQEVAGD	25
fruit fly-Nox5	---SHLTNSRPRTGFDKSSSLARLEQLFRTTVGN	90
mosquito-Nox5	---SNLTNSRPRTGFDKSSLERLEQLFIKTVGN	89
honeybee-Nox5	---SNISDTRPLAGFDKRSLEWLEKIFKQTVGN	88
Mg-NoxC	---TAAASPNDHVKIEPSTKDKGEDKPKAADA	50
Fg-NoxC	-----	
At-rbohF	LRKQRAQLDRTRSS-AQRALRGLRFISNKQKNV	DGWN 97
At-rbohI	LSQRPTRPNRDGSG-TERAIHGLKFISSKENG	VDWN 186
At-rbohC	PRP--AKLDRTKSA-ASQALKGLKFI SKTDGG	AGWS 158
At-rbohG	PR----LDRSKST-AGQALKGLKI SKTDGN	AAWT 108
At-rbohA	PRPQLAKLRRSKSR-AELALKGLKFI TKTDGV	TGWP 153
At-rbohD	PSPAVRRFDRTSSA-AIHALKGLKFIATKT	AAWP 183
At-rbohB	-----RLDRSKSFGAMFALRGLRFIAKNDAVG	RGWD 104

At-rbohE	KRKEDAKLQRSTSS-AQRALKGLQFINKTTRGNSC-----VCDWDCDCDQMWK	201
At-rbohH	KKTGPQRVERTTSS-AARGLQSLRFLDRTVTGRE-----RDAWR	127
At-rbohJ	KRPGPQRVERTTSS-AARGLQSLRFLDRTVTGRE-----RDSWR	137
Dd-NoxC	NNNNNNNNNNNNNNYNNNIDNNNNNNNNNNNNINNCNNNNINNDNNNNNNNDNNDNNIN	273
mouse-Duox1	-----FRHLFSQVLDINQADAGTLPLDSS-----	792
mouse-Duox2	-----FRQLFAQVLDINQADAGTLPLDSSQ-----	796
rat-Duox1	-----FRHLFSQVLDINQADAGTLPLDSS-----	788
dog-Duox1	-----FRHLFSQVLDIDQADAGTLPLDSSQ-----	792
human-Duox1	-----FRHLFSQVLDINQADAGTLPLDSSQ-----	792
dog-Duox2	-----FRYLFAQVLDIDQADAGTLPLNSSQ-----	555
human-Duox2	-----FRHLFAQVLDINQADAGTLPLDSSQ-----	796
rat-Duox2	-----FRQLFAQVLDINQADAGTLPLDSSQ-----	796
chicken-Duox	-----FRHLFARMLDIDKTDAGELNFESSQ-----	764
frog-Duox1	-----IRHLSHVIDINKEHAGTT--QGG-----	759
frog-Duox2	-----FRQSFAQVHLITQSDN-MG--SSD-----	759
tetraodon-Duox	-----IRHAFSKVLEIDKCDAGDMSDVSrk843	
fugu-Duox	-----IRHAFSKVLEIDKCDAGDMSGVSRK-----	769
zebrafish-Duox	-----FKHAFSKVLDIDKSDAGDLSRTR-----	769
medaka-Duox	-----FSKVLEIQKCDAGDMSGVSPRRARE-----	800
Ci-Duox-B	-----LRQTFAEALNIDDAVEQNSKAKYRH-----	773
Ci-Duox-A	-----FKAALIAVSSIKVEDGDMSDVINSR-----	749
Ci-Duox-C	-----FRTALSQVA-MNIESEDL-DRPKRK-----	686
Ci-Duox-D	-----SMALTSVVLQSMRMEFG--IQISS-----	702
Sp-Duox	-----FLMAFSQAFKLDLDFPENLESLNKTK-----	919
fruit fly-Duox	-----FREAYALTFGLRPGERRRRSDASSDG-----	770
mosquito-Duox	-----FREAYALTFGLRPGERRRRSDASLDG-----	771
honeybee-Duox	-----FREAYALTFGLRPGERRRRSEDSDSG-----	775
Celeg-Duox2	-----FREAYAKAFND---SELQDSETSFD-----	802
Celeg-Duox1	-----FREAYAKAFND---SELQDSETSFD-----	794

	--EF-I--	-EF-II-	
	Z-Y-X -Z	X Y Z-Y	
human-Nox5alpha	-----DGEISLQEFKAALHVKES--FFAERFFALFDSDRSGT-----		76
dog-Nox5	-----DREINLQQFKTALNVKEAI-LFAERFFTLFDSDGSGT-----		72
cow-Nox5	-----DGEINLQDFKALKVKEASSFFAERFFVLFDSDGSGT-----		78
chicken-Nox5	-----DEEIGLEEFKAALQVKES--FFAERFFALFDVDGSGT-----		67
frog-Nox5	-----DKEIDLEEFKTKALKVKES--FFAERFFALFDSDGSGS-----		59
opossum-Nox5	-----DREIDLQEFKALKVKES--FFAERFFALFDSDGSGT-----		57
fugu-Nox5	-----DKEINLQDFKALKVKES--FFAERFFALFDSDGSSS-----		17
medaka-Nox5	-----DKEINLCEFKTALKVKES--FFAERFFALFDSDGSGS-----		79
Sp-Nox5A	-----DRQIDEDEFKMLNIKKS--FFAERFFHLFDQDGSGY-----		77
Sp-Nox5B	-----DNLIDLDEFINALNVKKS--FFAERFFELIDTDQSGS-----		60
fruit fly-Nox5	-----EQEIRREEFKKIIVTSKNP--FFTERVFQIFDKDNSGS-----		125
mosquito-Nox5	-----EKEIRREEFKKIIVTSKNP--FFTERVFQIFDKDNSGS-----		124
honeybee-Nox5	-----EKEIRREEFNKIIVTSKNP--FFTDRVFQIFDKDNSGT-----		123
Mg-NoxC	-----RDDGSEAEARADQHPEKPAQANGPETADGDHHPFANS-----		87
Fg-NoxC	-----KSVAADHPVRSSQ-----		21
At-rbohF	DVQSNFEKFEK--NGYIYRSDFACIGMKD---SKEFALELFDALSRRLKVEK---		247
At-rbohI	DVQNNFAHLSK--DGYLFKSDFAHCIGLENEN--SKEFALELFDALCRRRRIMVDK---		238
At-rbohC	AVEKRFNQITATTGGLLRKTFGECIGMT---SKDFALELFDALARRRNITGEV---		209
At-rbohG	VVEKRYLKITANTDGLLRKTFGECIGMN---SKEFALELFDALARSHLKGDV---		159
At-rbohA	EVEKRFYVMTTNGLLHRSRFGECIGMK---STEFALALFDALARRENVSGDS---		204
At-rbohD	AVDQRFDKLSADSNGLLSAKFWECLGMNKE--SKDFADQLFRALARNNVSGDA---		236
At-rbohB	EVAMRFDKLAV--EGKLPKSKFGHCIGMVE---SSEFVNELFEALVRRRGTSSS---		154

At-rbohE	KVEKRFESLSK--NGLLARDDFGECVGMVD---SKDFAVSVFDALARRRRQKLEK----	251
At-rbohH	SIENRFNQFSV--DGKLPKEKFGVCIGMGD----TMEFAAEVYEALGRRRQIETENG----	178
At-rbohJ	SIENRFNQFAV--DGRLPKDKFGVCIGMGD----TLEFAAKVYEALGRRRQIKTENG----	188
Dd-NoxC	TVDNHDDDIINNSNFNKNEYSPSSNISPISPKSSISSFPTNLNNSINNTGSMVSDSLSSC	333
mouse-Duox1	-----KVREALTCELSRAEFADSLGLKPQD-MFVESMFSLADKDGNGY-----	834
mouse-Duox2	-----QVREALTCELSRAEFADSLGLKPQD-MFVESMFSLADKDGNGY-----	838
rat-Duox1	-----KVREALTCELSRAEFADSLGLKPQD-MFVESMFSLADKDGNGY-----	830
dog-Duox1	-----KVQEALTCELSRAEFAESLGLKPQD-MFVESMFSLADKDGNGY-----	834
human-Duox1	-----KVREALTCELSRAEFAESLGLKPQD-MFVESMFSLADKDGNGY-----	834
dog-Duox2	-----KVREALTCELSRAEFAESLGLKPQD-MFVESMFSLADKDGNGY-----	597
human-Duox2	-----KVREALTCELSRAEFAESLGLKPQD-MFVESMFSLADKDGNGY-----	838
rat-Duox2	-----QVREALTCELSRAEFADSLGLKPQD-MFVESMFSLADKDGNGY-----	838
chicken-Duox	-----KARESLTCELSRAEFAEALGLKVNS-MFVDSMFSLADKDGNGY-----	806
frog-Duox1	-----NFRDVLQCELSREEFADSLGLNPNA-QFVESMFSMADKDHNGY-----	801
frog-Duox2	-----KVKEALKCELSRTEFAESLGLKPQS-MFVESMFSLADEDGNGY-----	831
tetraodon-Duox	-----KAKEVLQCELTAGEFADALGLKPDS-LFVDSMFTLADKDGNGY-----	885
fugu-Duox	-----KAKEVLQCELTAAEFADALGLKADS-LFVDSMFTLADKDGNGS-----	810
zebrafish-Duox	-----EALQCELTAEFASVGLKSDS-LFVESMFTLADKDGNGY-----	808
medaka-Duox	-----VLQCELTASEFADALCLKPDS-LFVDSMFTLADKDGNGY-----	836
Ci-Duox-B	-----KTMEVADCELTQMELAETMGMPDS-LFVTQMFQLADTDHSGY-----	815
Ci-Duox-A	-----EARKFIHVELSKKEFADYLKLPNS-LFVDQMFSSADSDGSGA-----	791
Ci-Duox-C	-----TLKDLMKVNI TKSEFAEYLKLEDKDS-LFVEQMFLVADSDDEDGT-----	728
Ci-Duox-D	-----FPENLVDIKLSQEEFASLLQMKSSS-LFVQHIFTTADEDQDGF-----	744
Sp-Duox	-----ETKDILECELTKEFADVLTMPKDS-LFVEQMFELVDQDNSGS-----	958
fruit fly-Duox	-----EVMTVMRTSLSKAEFAAALGMKPNP-MFVRKMFNIVDKDQDGR-----	812
mosquito-Duox	-----EVMTVMRTSLSKSEFAAALGMKQDD-MFVRKMFNIVDKDKDGR-----	813
honeybee-Duox	-----EVVTVMRTSLSKSEFASALGMRADA-VFVKKMFNIVDKDRDGR-----	817
Celeg-Duox2	-----SNDDILNETISREELASAMGMKANN-EFVKRMFAMTAKHNEDS-----	844
Celeg-Duox1	-----SNDDILNETISREELASAMGMKANN-EFVKRMFAMTAKHNEDS-----	836

	EF-II-	EF-III
	-X -Z	X
human-Nox5alpha	-----ITLQELQEALTLLIHGSPMDKLFQVYDI	107
dog-Nox5	-----ITLQELLEALTLLIHGNPMDKLFQVYDV	103
cow-Nox5	-----ITLQELQKALTLLIHGSPMDKLFQVYDV	109
chicken-Nox5	-----ISLAELHGALALLRGTAAADKLRFQVYDV	98
frog-Nox5	-----ISLDELLKALNLLIHGNETDKLRFLQVYDV	90
opossum-Nox5	-----ITLQELLGALNLLIHGNTMDKLFQVYDV	88
fugu-Nox5	-----ISLDELLKALDLLIHGSETDKLRFLQVYDV	48
medaka-Nox5	-----ISLDELLKALDLLIHGTETDKLRFLQVYDV	110
Sp-Nox5A	-----ISLDELMEGLYLLTKGDPVDKLRFLFSVYDV	108
Sp-Nox5B	-----ISLKELIGALRLLVNGTEQEKLHFLQVYDV	91
fruit fly-Nox5	-----ISLQEFIDAIHQFSGQSADDKIRFLFKVYDI	156
mosquito-Nox5	-----ISLQEFIDAIHQFAGQSPEDKIKFLFKVYDI	155
honeybee-Nox5	-----ISLQEFVDAMHQFAGKSPDDKIKFLFKVYDI	154
Mg-NoxC	-----YQVDSARAADPNVYLRDDEIETFLDELHDH	118
Fg-NoxC	-----NVEFLTDKEISDFLDDLHDH	40
At-rbohF	-----INHDELYEYWSQINDESFDRLQIFFDIVDK	278
At-rbohI	-----INLQELYEFWYQITDESFDRLQIFFNMYCY	269
At-rbohC	-----IDGDLKKEFWEQINDQSFDSRLKTFDMVVK	240
At-rbohG	-----ITETELKKFWEQINDKSFDSRLITFFDLMDK	190
At-rbohA	-----ININELKEFWKQITDQDFDSRLRTFFAMVVK	235
At-rbohD	-----ITKEQLRIFWEQISDESFDAKLQVFFDMVVK	267
At-rbohB	-----ITKTELFEFWEQITGNSFDDRLQIFFDMVVK	185

At-rbohE	-----ITKDELHDFWLQISDQSF DARLQIFFDMA	282
At-rbohH	-----IDKEQLKLFWEDMIKKDLDCRLQIFFDMDK	209
At-rbohJ	-----IDKEQLKLFWEDMIKKDLDCRLQIFFDMDK	219
Dd-NoxC	RNSISSSSIDSSVASIPITIQSIDFEDKNIKSDQFKIISKSNIENTIETNP IPPFNQTN	393
mouse-Duox1	-----LSFREFLDILVVFMKGSPEEKSRMLFRMYDF	865
mouse-Duox2	-----ISFREFLDILVVFMKGSSEDKSRMLFTMYDL	869
rat-Duox1	-----LSFREFLDILVVFMKGSPEEKSRMLFRMYDF	861
dog-Duox1	-----LSFREFLDILVVFMKGSPEEKSRMLFRMYDF	865
human-Duox1	-----LSFREFLDILVVFMKGSPEEKSRMLFRMYDF	865
dog-Duox2	-----LSFREFLDILVVFMKGSPEDKSRMLFTMYDL	628
human-Duox2	-----LSFREFLDILVVFMKGSPEDKSRMLFTMYDL	869
rat-Duox2	-----ISFREFLDILVVFMKGSPEKSRMLFTMYDL	869
chicken-Duox	-----ISFREFLDILVVFMKGSSEKSKLMFRMYDI	837
frog-Duox1	-----LSFEFCFICSLIKGSAEDKLFIFSMHDV	832
frog-Duox2	-----LSFREFLNILVIFMTGTPKEKSELMFKMYDV	862
tetraodon-Duox	-----LSFQEFLDVIVIFMKG-----	901
fugu-Duox	-----LSFQEFLDVIVIFMKGSSSEKSSLMFMSNDI	841
zebrafish-Duox	-----LSFQEFLDVIVIFMTGTSEEKSKLLFSTHDI	839
medaka-Duox	-----LSFQEFLDVMVIFMKGSPEEKSKLMFMSNDV	869
Ci-Duox-B	-----LSFREFADLIILLMNGSPEQKAKMLFDMDV	846
Ci-Duox-A	-----ISFREFLDIMVLFTKGSPEEKAKLMFNMYDL	822
Ci-Duox-C	-----ISFREFLDIIVLFTKGTPEKAQLMFNMYDL	759
Ci-Duox-D	-----ISFHDFRKIIVLVFKGSPNEKLRLLFDMFDL	775
Sp-Duox	-----ISFREFLDVIVVFAKQPEDKLLMFNMYDI	989
fruit fly-Duox	-----ISFQEFLDTVLLFSRGKTDDKLRIIFDMCDN	843
mosquito-Duox	-----ISFQEFLDTVLLFSRGKTDDKLRIIFDMCDN	844
honeybee-Duox	-----ISFQEFLDTVLLFSRGKTEDKLRIIFDMCDK	848
Celeg-Duox2	-----LSFNEFLTIVLREFVNAPQKQKLQTLFKMCDL	875
Celeg-Duox1	-----LSFNEFLTIVLREFVNAPQKQKLQTLFKMCDL	867

-	-	
Y		
human-Nox5alpha	D-----	108
dog-Nox5	DGWARQGGVCRYRVGPSTRP-----	123
cow-Nox5	DVCARQGAFASTEGAGAG-----	127
chicken-Nox5	D-----	99
frog-Nox5	DIWCLCPPTGSRTDSEWNSRHTVH-----	114
opossum-Nox5	DGLCYRSYSPS-TGSQWSLGKCSS-----	111
fugu-Nox5	D-----	49
medaka-Nox5	D-----	111
Sp-Nox5A	D-----	
Sp-Nox5B	D-----	
fruit fly-Nox5	D-----	157
mosquito-Nox5	D-----	156
honeybee-Nox5	D-----	155
Mg-NoxC	N-----	119
Fg-NoxC	D-----	41
At-rbohF	N-----	279
At-rbohI	Q-----	270
At-rbohC	D-----	241
At-rbohG	D-----	191
At-rbohA	D-----	236
At-rbohD	D-----	268
At-rbohB	N-----	186

At-rbohE	N	-----	283
At-rbohH	N	-----	210
At-rbohJ	D	-----	220
Dd-NoxC	QCEVQLQSHSLPTILKQPHIYKSKSFSSINSNSKIKKIKKSRSEIESKINLFDVINHI		453
mouse-Duox1	D	-----	866
mouse-Duox2	D	-----	870
rat-Duox1	D	-----	862
dog-Duox1	D	-----	866
human-Duox1	D	-----	866
dog-Duox2	D	-----	629
human-Duox2	D	-----	870
rat-Duox2	D	-----	870
chicken-Duox	D	-----	838
frog-Duox1	N	-----	833
frog-Duox2	D	-----	863
tetraodon-Duox		-----	
fugu-Duox	G	-----	842
zebrafish-Duox	K	-----	840
medaka-Duox	G	-----	870
Ci-Duox-B	D	-----	847
Ci-Duox-A	D	-----	823
Ci-Duox-C	D	-----	760
Ci-Duox-D	N	-----	776
Sp-Duox	D	-----	990
fruit fly-Duox	D	-----	844
mosquito-Duox	D	-----	845
honeybee-Duox	D	-----	849
Celeg-Duox2	E	-----	876
Celeg-Duox1	E	-----	868

**--EF-III--**

Z-Y-X -Z

human-Nox5alpha	-----	GSGSIDPDELRTVLQSCLRESAISLPDEKLDQLTLA	144
dog-Nox5	-----	HSAASPLGTGSGSIDADELRTVLRSCMRESAISLPDEKLDQLTLA	168
cow-Nox5	-----	PQASSSPETGSGSIDADELRTVLQSCLYESAISLPKEKLDQLTLA	172
chicken-Nox5	-----	GSGSIDAAELLLVLRACLRESAISLPPQRLHDMARV	135
frog-Nox5	-----	WQCLEPFSFPGSGSIDPSELRTVLKSCRESAISLPEEKLDDLTLV	160
opossum-Nox5	-----	PLGHGNGSIDPDELRVVLQSCLKESAISLPEEKLDDLTLA	151
fugu-Nox5	-----	GSGSIDPDELRIVLKSCRESAISLPEEKLDDLTLV	85
medaka-Nox5	-----	ACFMMKVTGSGSIDPDELRTVLKSCLESASISLPEEKLDDLTLV	153
Sp-Nox5A	-----	GNGAIDHEELKVVLRACLCESSMTISEATIDAL TSA	95
Sp-Nox5B	-----	GSGFIDFDELKTVLRSC TAESAMTLCDETLTELTEI	78
fruit fly-Nox5	-----	GDGLIQHKELHDVIRHC IKENGMEFSEDQIEDL TSA	193
mosquito-Nox5	-----	GDGLIQHRELQHV MRACMEENGMRFS EDQIEDL TMA	192
honeybee-Nox5	-----	GDGLIQLRELEHVMRACLEENGIRFSEEQIEEL TMA	191
Mg-NoxC	-----	GDGCIDYSEVERKLDDEVHDELAPTAQPHHLHHD--S	153
Fg-NoxC	-----	NDGHINYEEVERKLDQEHANLVPKPSAHHVISTDHS	77
At-rbohF	-----	EDGRITEEEVKEIIMLSASANKLSRLKEQAE EYAAL	315
At-rbohI	-----	LSSNLVKHIDQHIIILSASANNLSRLRERAE EYAAL	306
At-rbohC	-----	ADGRLTEDEVREIISLSASANNLSTIQKRADEYAAL	277
At-rbohG	-----	SDGRLTEDEVREI IKLSSSANHLSCIQNKADEYAAM	227
At-rbohA	-----	SDGRLNEAEVREIITLSASANELDNIRRQADEYAAL	272
At-rbohD	-----	EDGRVTEEEV AEIISLSASANKLSNIQKQAE EYAAL	304
At-rbohB	-----	LDGRITGDEVKEI IALSASANKLSKIKEN VDEYAAL	222

At-rbohE	-----	EDGKITREEIKELLMLSASANKLAKLKEQAEYASL	319
At-rbohH	-----	GDGKLTREEVKEVIVLSASANRLGNLKKNAAYASL	246
At-rbohJ	-----	GDGKLTREEVKEVIVLSASANRLVNLKKNAAASYASL	256
Dd-NoxC	YLNSKVGSEEQKITSVFKLYDIYDKGFI	SRDDLKEVLNRYRTKQGLKFQDFTMESLIDH	513
mouse-Duox1	-----	GNGLISKDEFIRMLRSFIEISNNCLSKAQLAEVVES	902
mouse-Duox2	-----	GNGFLSKDEFFTMRSFIEISNNCLSKAQLAEVVES	906
rat-Duox1	-----	GNGLISKDEFIRMLRSFIEISNNCLSKDQLAEVVES	898
dog-Duox1	-----	GNGLISKDEFIRMLRSFIEISNNCLSKAQLTEVVES	902
human-Duox1	-----	GNGLISKDEFIRMLRSFIEISNNCLSKAQLAEVVES	902
dog-Duox2	-----	ANGFLSKDEFFTMRSFIEISNNCLSKAQLTEVVES	665
human-Duox2	-----	ENGFLSKDEFFTMRSFIEISNNCLSKAQLAEVVES	906
rat-Duox2	-----	GNGFLSKDEFFTMRSFIEISNNCLSKDQLAEVVES	906
chicken-Duox	-----	ENGFLSKEEFLRMLRYFSSAQQTFSQRLQLQVSAQA	874
frog-Duox1	-----	GNGILPKEEFSRMLRSFRNVS-SFLSNEKTENVIES	868
frog-Duox2	-----	GNGFLSKDEFFTMLKSFIEISNNCLSKDQTEQVIEI	899
tetraodon-Duox	-----	-----RSFLEISNCTLSKAQAEDGIRA	923
fugu-Duox	-----	GTGSLSKGEF-----	852
zebrafish-Duox	-----	GDGFLSKEEFTSLLRSFIDIS-GALSQSQADDGIAA	875
medaka-Duox	-----	GNGYLSKEEFARMLRSFIEISNGALSKTQAEDGIIKA	906
Ci-Duox-B	-----	HSGEINREEGRNMIKSFLEMAGANLGPDEVSAAVST	883
Ci-Duox-A	-----	KSGELSKKEFKVMLKSMMDMVNASVDSEQVEELVNT	859
Ci-Duox-C	-----	KSGGLSKDEFFTMLKSMEMVNSSADVNDISVVD	796
Ci-Duox-D	-----	QNGSLTKQFKEMCMCTADTYQSTVDQNVLENVLSK	812
Sp-Duox	-----	RSGHLSREEFRQMLKSMEMVSASVETDLDKLIHD	1026
fruit fly-Duox	-----	RNGVIDKGELSEMMRSLVEIARTTSLGDDQVTELD	880
mosquito-Duox	-----	RNGVIDKGELSEMMRSLVEIARTTSLTDEQVNELID	881
honeybee-Duox	-----	CNGVIDKEELSEMLRSLVEIARTTSLSDDHVTELD	885
Celeg-Duox2	-----	GKNKVLRKDLAELVKSLNQTAGVHITESVQLRLFND	912
Celeg-Duox1	-----	GKNKVLRKDLAELVKSLNQTAGVHITESVQLRLFNE	904

-----EF-IV-----

X Y Z -Y-X -Z

human-Nox5alpha	LFESADADGNG	AITFEELRDELQRFPGVMENLTI	-----	178
dog-Nox5	LFESADKDCNG	AITFDELRLDELQRFPGVMENLTI	-----	203
cow-Nox5	LFESADKDCSG	TITFEELRDELQRFPGVLENLTI	-----	206
chicken-Nox5	LLEAADQDGNG	SITFQELQQLEAVPGLMESLTI	-----	169
frog-Nox5	LFESADKDHSNG	SITFQELKEELERFPEVMENLTI	-----	194
opossum-Nox5	LFESADKDHSNG	SITFEELQEELDKFPEVMENLTI	-----	185
fugu-Nox5	LFESADKDKSG	AITFEELKAELESFPEVMENLTI	-----	119
medaka-Nox5	LFESADTDNSG	SITFEELKEELENFPEVMENLTI	-----	188
Sp-Nox5A	LFEAADTDGSG	AISFEELKEELENPDMENLTI	-----	129
Sp-Nox5B	LFDDADVVDGNG	EVSFEELSEQLQRYPGITSNLTI	-----	112
fruit fly-Nox5	MFEDADPHNSG	EITYEALKNQLHKHGLENLSI	-----	227
mosquito-Nox5	MFEDADKYNRG	AITYEALKNQLEKHGLENLSI	-----	226
honeybee-Nox5	LFDDADQSNRG	AITFEALKQLEKHEGLENLSI	-----	225
Mg-NoxC	KQDRERHVFLR	SVIG-SDQDRIPRADFARVVKSWR	-----	187
Fg-NoxC	DDRTRHAFRLR	RMMGDSGVDQIPRDEFAMVKEWK	-----	112
At-rbohF	IMEELDPERLG	YIELWQLETLLQKDTYLNYSQAL	-----	350
At-rbohI	IMEELAPDGLYSQ	YIELKDLLEILLKEDISHSYSLPF	-----	343
At-rbohC	IMEELDPDNIG	YIMLESLETLLQAATQSVITSTG	-----	312
At-rbohG	IMEELDPDHMG	YIMMESLKKLLQAETKSVSTDINSE	-----	264
At-rbohA	IMEELDPYHYG	YIMIENLEILLQAPMQDVRDGE	-----	307
At-rbohD	IMEELDPDNAG	FIMIENLEMLLQAPNQSVRMGDS	-----	339
At-rbohB	IMEELDRDNLG	YIELHNLETLLQVPSQSNNSPSS-A	-----	259

At-rbohE	IMEELDPENFG--YIELWQLETLLLRDAYMN-----	349
At-rbohH	IMEELDPDHKG--YIEMWQLEILLTGMVTNADTEKMK-----	281
At-rbohJ	IMEELDPNEQG--YIEMWQLEVLLTGIVSNADSHKVVR-----	292
Dd-NoxC	IFQQFDKNMDG--YIDFEEFKSELTINNENKVKEKEE-----	548
mouse-Duox1	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKGVEVPEVIKNLCRRASYISQE</u>	960
mouse-Duox1	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKG</u> -----	944
rat-Duox1	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKGVEVPEVIKNLCRRASYISQE</u>	956
dog-Duox1	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKGVEVPEVIKDLRASYISQE</u>	960
human-Duox1	<u>MFRESGF-QDKEELTWEDFHFML-RDHNSLRFTQLCVKGVEVPEVIKDLRASYISQD</u>	960
dog-Duox2	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVRGVG</u> -----DIFKPN	711
human-Duox2	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKGGGGGGNGI</u> ----RDIFKQN	959
rat-Duox2	<u>MFRESGF-QDKEELTWEDFHFML-RDHSDLRFTQLCVKGGAGGTG</u> -----DIFKQS	956
chicken-Duox	AHCFSSS-VPK-EATWPKMGSTL-TTR-----	898
frog-Duox1	<u>MFNEAGI-SNKELAWEDFYGLF-KDHKNILNQTNYFDGIHVIN</u> -----QSY	914
frog-Duox1	<u>MFRDSGF-QNKEELTLEDFHYLL-RDHDKELRFSQICIAGMDAPEVFNQMCRRVSFVDTT</u>	957
tetraodon-Duox	<u>MMQATGF-DRKEKITWKDFHFLL-QDHEKELQFAQLNVKGMKRGQRRLSRDQVRSFICP</u>	981
fugu-Duox	-----ARMLRFDPHFLFIL-APVPI TRPILPFCRSFIEISN-----CTLS	891
zebrafish-Duox	<u>MLQTAGL-YNKDRFSWEDFHFLL-RDHSAQLNIKGMVVLGK</u> -----KCLG	918
medaka-Duox	<u>MMQAAGF-NNKEQISWEDFHFLL-ADHDKELQFAKLVKGGQTCIVKEVPLWMEKEGRKR</u>	964
Ci-Duox-B	<u>IFKEAGIGENKDSLTLEDFTYVLLKDHREAFESSELSMPGRSNLYKDQGESEQNKMSDQ</u>	943
Ci-Duox-A	<u>MLATHGY-EHKESLTLEDFQTVM-QKYSTELSDASLTVPAVKSFYFCLRYFFIYFCTNE</u>	917
Ci-Duox-C	<u>MMRANGF-SSKDSLDFLMLL-GQYS-DISNQQSTSNHGK</u> -----TYQAKRQ	842
Ci-Duox-D	<u>VVPLKND-EEIQYLKFDFFKML-DLPEMDEAMLNLTAPVIG</u> -----KNKKS	857
Sp-Duox	<u>MFQNAAGL-GDKEALSDDFIAVM-AEHKDELNNAKLDIAGNIPQIAGQKDGPPGGAAT</u>	1084
fruit fly-Duox	<u>GMFQDVGLEHKNHLYQDFKLM-KEYKGDVFAIGLDCKGA</u> -----	920
mosquito-Duox	<u>GMFQDVGLEHKNHLYEDFKLM-KEYKGDVFAIGLDCKGA</u> -----	921
honeybee-Duox	<u>GMFQDAGLERKDYLTYNDFKLM-KEYKGDVFAIGLDCKGA</u> -----	925
Celeg-Duox2	<u>VLHKSQVSDDAEYLTCNFDALF-SEISDVQPIGLPFN</u> -----	949
Celeg-Duox1	<u>VLHYAGVSNDAKYLYDDFNALF-SDIPDKQPVGLPFN</u> -----	941

human-Nox5alpha	-----	SAHWLTAPAPR	190
dog-Nox5	-----	CGSASRVGTARVQV	217
cow-Nox5	-----	SAHWLTPAPQ	218
chicken-Nox5	-----	SAASWLKPPAPT	181
frog-Nox5	-----	SAANWLKPPAVQ	206
opossum-Nox5	-----	SAANWLKPPSSK	197
fugu-Nox5	-----	SAANWLKPPDLE	131
medaka-Nox5	-----	SAANWLKPPDLD	201
Sp-Nox5A	-----	SAASWLKPPSLK	141
Sp-Nox5B	-----	-----	112
fruit fly-Nox5	-----	TIDRWLVPIAED	239
mosquito-Nox5	-----	SIDRWLVPLPQE	238
honeybee-Nox5	-----	SIDRWLVPPKPE	237
Mg-NoxC	-----	VPSMKQEGDKDDQ	201
Fg-NoxC	-----	IPSLKQAKKEEED	126
At-rbohF	-----	SYTSQALSQNLQG	363
At-rbohI	-----	SQTSRALSQNLK-	355
At-rbohC	-----	ERKNLSHMMSQRLKP	327
At-rbohG	-----	ERKELSDMLTESLKP	279
At-rbohA	-----	KKLSKMLSQNLMV	320
At-rbohD	-----	RILSQMLSQKLRP	352

At-rbohB	-----NKRALNKMLSQKLIP	273
At-rbohE	-----YSRPLSTTSGG	360
At-rbohH	-----KSQTLTRAMIP	292
At-rbohJ	-----KSQQLTRAMIP	303
Dd-NoxC	-----NTNYNFKEENIG	560
mouse-Duox1	KICPSPRMSAHCARNN---MKTASSPQRLQCPMDTDPPEIIRRRFGKKVTSFQPL--LF	1014
mouse-Duox2	-----GAGGTKDIFK--FKQSSACR-----VSFINRTPGNRMGSPR--LY	980
rat-Duox1	KICPSPRMSAHCARNN---TKTASSPQRLQCPVDTDPPEIIRRRFGKKVTSFQPL--LF	1010
dog-Duox1	KICPSPRVSARCPHSN---TEVEWTPQRLQCPVDTDPPEIIRRRFGKKVTSFQPL--LF	1014
human-Duox1	MICPSPRVSARCSRS---IETELTPQRLQCPMDTDPPEIIRRRFGKKVTSFQPL--LF	1014
dog-Duox2	ISCRVSFITRTPGKRS---CSQDLEFSASEAPELGGP--GLKKRFGKKVVGTPR--LY	763
human-Duox2	ISCRVSFITRTPGERS---HPQGLGPPAPEAPELGGP--GLKKRFGKKAAPTTPR--LY	1011
rat-Duox2	NACRVSFLTRTPGNR-----VMAPSPR--LY	980
chicken-Duox	----SPFLLAN-----QYQLH--LY	912
frog-Duox1	VLCIICSDSNINYNI---SSALCFILFICFIALLLIKHLCHPNRNTSQIQLPN--IY	968
frog-Duox2	NMCQSPNPSSLTGRIRKKVRNTTFLMHINFFRTNPHLFDLEKQTRKLIKPKTSS--EA	1015
tetraodon-Duox	ASRWGHWFSI-----IFNCNDHFNTSCSMAASARRKYTRFADRKSQFLPN--VF	1029
fugu-Duox	KKQAEDAIG-----AMMTAAGFDHKEKITWEDFHLLRDHEKELHVRPN--VY	938
zebrafish-Duox	RQHKVSFIRK-----NSSSSVEELTHTPEEEHGQELRQRQTKKAGQSQAQ--LY	966
medaka-Duox	LSQCQRVSFICPKKSVICFWLCLTVCSNKD-----KAEGLELRRRKNKTSIKTPN--VY	1015
Ci-Duox-B	RRVDKPYI IKDNNQ-----LLSTYSTYNLSDDVICIPNNNIRQNI TVQNFFFRSNGKVF	997
Ci-Duox-A	SFLHVRLLRITQNFL-----VFIKLSLLIKNYEPKIYRKNPEKKNRTPETS-RIQ	967
Ci-Duox-C	SKYHRYSKRKFEK-----YVRLHCIKSMFTKLYITHRPQTPQRRLTR---K	885
Ci-Duox-D	LAKSSKNERPNRGNFI-----QTAEGQGIVRNNHPQIIAPPCEKSPNVST--VEN	906
Sp-Duox	VIRRGNLNSRARQTII-----RAYKDRDQASTKANGAAKAGGSGGGVVRKRAQSKSVR	1137
fruit fly-Duox	-----KQNFLDTSTNVARMTSFN	938
mosquito-Duox	-----KQNFLDTSTNVARMTSFH	939
honeybee-Duox	-----KQNFLDTSTNVARMTSFH	943
Celeg-Duox2	-----RKNYNSHIKEPSCHTSFP	967
Celeg-Duox1	-----RKNYQPSIGETSSLNSFA	959

---TM1-(TM2 for Duox)--

human-Nox5alpha	PR-----PRRPRQLTRAYWHNHRSLFCLATYAGLHVLLFGLAASAHRDL-----	235
dog-Nox5	PL-----QLRRLALTWAYWHNHRSHLLCLAAAFAGLHLLLFALAASEHRAR-----	262
cow-Nox5	RH-----RRQPRLLTSAYWHNHRSHVLCIAVAVGLHMLLFALAASAYRAF-----	263
chicken-Nox5	RH-----SRRPRCPTSRSWHNHRGQLAFLGGYVSLNLLFTLAALRHFGG-----	226
frog-Nox5	NK-----SHTPRYLTRTYWHNHRSKLLFMCCYWCLNVLLFGLAAVNHASL-----	251
opossum-Nox5	KR-----PQIPRHLTSAYWHNNC183-AVLAVYIGLNILLFTLAALKYQS-----	241
fugu-Nox5	QKKQ-----NHTPRYLTRAYWHNCRKLLFLCMYAFFSLMLFVNAMLQHSYG-----	178
medaka-Nox5	QNKH-----QTPRYLTRAYWQNSRKLFLFGYGVNLLLFVVAAMLRHSDG-----	247
Sp-Nox5A	PSR-----RVLPRYLTRWYVHNRYRILFVVFILINVALFTEAARYAKK-----	237
Sp-Nox5B	-----SYNTRLRNHFSVIFWIVFVMINAGLAAWAGAYEGYQS-----	198
fruit fly-Nox5	RQAGGAAKSGFWNSLPHQFSLAYMKNQVFTYLYFFYITVNLCLFISRAIQYRAS-----	294
mosquito-Nox5	DTKKRKKK---PLPHQLTAPYIKNNYVYLSFLTIVFTLINVGLFVSRAIQYRNS-----	289
honeybee-Nox5	SKRKSRLQLLAS-LRPYQLTKPYMKNYVYIFFISIFILINVSFLVSRLEYRKS-----	291
Mg-NoxC	DKYLR-----DMSTFRVRVAYVAVHGPETIAFLGIVVGLQLGLGIWQCHKYASGEQ--	251
Fg-NoxC	KSYIK-----RLPGWRRIRSYVAVHGPETIVFLGVVISMQLAFGIWQLVKYQTPG--	176
At-rbohF	LRGKSR-----IHRMSSDFVYIMQENWKRIWVLSLWIMIMIGLFLWKFFQYKQKD--	413
At-rbohI	---DR-----RWRMSRNLLYSLQDNWKRIWVLTWVFWIMAWLFMWKCYQYKHKD--	401
At-rbohC	TFNRNP-----LKRWYRGLRFFLLDNWQRCWVIVLWFIVMAILFTYKYIQYRRSP--	377
At-rbohG	TRDPNH-----LRRWYQRLRFFVLDWSQRVWVIALWLTIMAILFAYKYIQYKNRA--	329
At-rbohA	PQSRNL-----GARFCRGMKYFLFDNWKRVVVMALWIGAMAGLFTWKFMEYRKRK--	370



At-rbohD	AKESNP-----LVRWSEKIKYFILDNQRLWIMMLWLGICGGLFTYKFIQYKNKA----	402
At-rbohB	TKDRNP-----VKRFAMNISYFFLENWKRIVVLTWLTWISICITLFTWKFLQYKRKT----	323
At-rbohE	-----VNNWQRSWVLLVWVMLMALFVWKFLEYREKA----	392
At-rbohH	ERYRTP-----MSKYVSVTAELMHENWKKLWVLAALWAIINVYLFMWKYEEFMRNP----	342
At-rbohJ	KRYRTP-----TSKYVVVTAELMYEHWKKIWWVTLWLAVNVVLFMWKYEEFTTSP----	353
Dd-NoxC	IYTEKE-----SFHSLKRYLKIEGSKLFFISLFFIINSLVITSFLNVHANNKR--	1542
mouse-Duox1	TEAHREKFQRRRHQTVQQFKRFIENYRRHIGCVAVFYTITGALFLERAYYYAFAAHHSG	1074
mouse-Duox2	TEALQEKKQSGFLAQKFKQYKRFVFNRRHIVCVTIFSAICIGLFADRAYYYGFASPPD	1040
rat-Duox1	TEAHREKFQRRRHQTVQQFKRFIENYRRHIGCVAVFYTITGALFLERAYYYAFAAHHSG	1070
dog-Duox1	TEAQRKFKQRRRHQTVQQFKRFIENYRRHIGCVAVFYAITGGLFLERAYYYAFGAHHMG	1074
human-Duox1	TEAHREKFQRRSCLHQTVQQFKRFIENYRRHIGCVAVFYAIAAGGLFLERAYYYAFAAHHGT	1074
dog-Duox2	TEALKEKMQRGLLAQKLRQYKRFVFNRRHIVCVVFSIAICAGLFAERAYYYAFASPPSG	823
human-Duox2	TEALQEKMQRGFLAQKLRQYKRFVFNRRHIVCVVFSIAICAGLFAERAYYYGFASPPSD	1071
rat-Duox2	TEALQEKMQRGFLAQKLRQYKRFVFNRRHIVCVTIFSAICAGLFAERAYYYGFASPPD	1040
chicken-Duox	TEAQRKKYQNKVKVQKIQEFKRFIENYRRHIVCVVLSAITAGLFLERAYYYAFASPSTG	972
frog-Duox1	TVARREKYETSTFRQKIQQFKRVLVFNRRHIVCLIFVYGISAGLFAERAYYYGFASPSG	1028
frog-Duox2	RLYKKEKYPKGIHQKLEKRFVFNRRHIVCVVIFVYGISVGLFLERAYHYAFESQHRG	1075
tetraodon-Duox	VDPKREYIRSPVIRQKIQQFKRFVFNRRHIVCFIVVYGITAGLCLERCYYYGFQAESTG	1089
fugu-Duox	VDPRRERYIRSPVIRQKIQHFKRFVFNRRHIVCSALVYVYMAAGLCLERCYYYGFQAESTG	998
zebrafish-Duox	VRPQRERFNRNPVQQCVQQFKRFIENYRRHICTVVIYVYISAGLALERICIYYGLQAHSSG	1026
medaka-Duox	VKAKRQEYIRNPVQQKIQQFKRFIENYRRHIVCFIITYSITVGVTLERCYYYGLQAEATG	1075
Ci-Duox-B	SDATVSHEEKTWFARTWKYLRNENYRRHIFCMVIFVYGITIALVVERATFYAFGAEHIG	1057
Ci-Duox-A	IKVYEKVFKPGRLNNWLRAMENYVNHRLQIFWLTLYLLVLAGIFIERAYFYSVEREFAG	1027
Ci-Duox-C	VKTVREDYKTKSYEKFFVALVKLTEHYANHFCLSLYSLITAGVFLN-AFFVVYSKNATG	944
Ci-Duox-D	VMPDVYFQNSSKFRLAYRAIRRLFECYALHIFWTSLYIWIWITIGVFLW-AFSMTIYPSFIF	965
Sp-Duox	VETVQQEEAKTQSSKAYNTVVRFFENNRLQIFVYVLYLLVLAGVFIERAYYSVEREFAG	1168
fruit fly-Duox	IEPMQ-DKPRHWLLAKWDAYITFLEENRQNIYFLFLFYVVTIVLFFVERFIHYSFMAEHTD	997
mosquito-Duox	IEPIS-DSRRHWMQEKWDCYTTFLEENRQNIYFLFLFYVVTIVLFFVERFIHYSFMAEHTD	998
honeybee-Duox	IDQLPPEDSKTWAQKQWDAISTFLEENRQNIYFLFVYVVTIALFFVERFIYYSFMAEHTD	1003
Celeg-Duox2	IVDHST--PAPLSLIQR--ICAFLETYRQHVFIIFCFVAINIVLFFELFWHSRYLNEDRD	1023
Celeg-Duox1	VVDRSINSSAPLTLIHK--VSAFLETYRQHVFIIFCFVAINIVLFFERFWHYRYMAENRD	1017