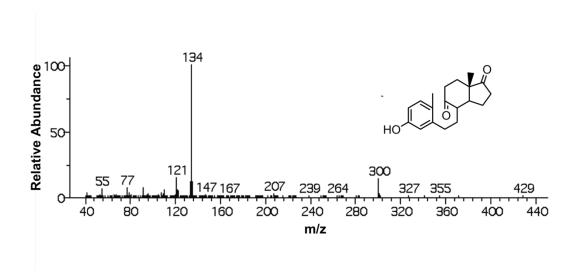


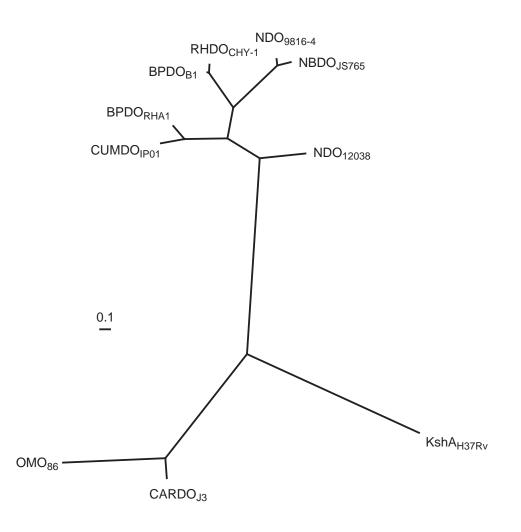
Supplemental Figure 1. Spectra of reduced and oxidized KshA and KshB. UV-vis spectra of KshA (A) and KshB (B) in reduced and oxidized forms are shown as heavy and light lines, respectively. All spectra were recorded in 0.1M potassium phosphate, pH 7.0. Reduced spectra were collected anaerobically. Oxidized KshA and reduced KshB were prepared by adding an excess of potassium ferricyanide or NADH respectively before buffer exchange by gel filtration chromatography.



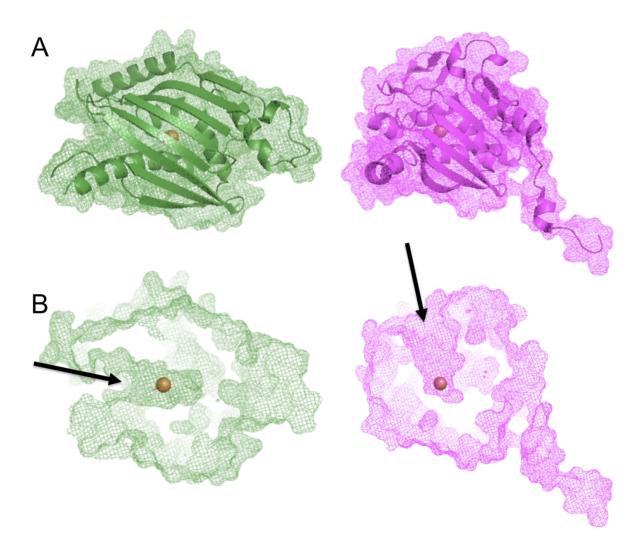
Supplemental Figure 2. Fragmentation pattern of KshA-catalyzed transformation of ADD. GC-MS  $R_t = 15.32$  min; EI-MS (70 eV, EI); m/z: 300 ([M<sup>+</sup>], 15%), 134 (100%), 121 (15%), 77 (8%), 55 (6%). This retention time and fragmentation pattern correspond to those of authentic 3-hydroxy-9,10-seconandrost-1,3,5(10)-triene-9,17-dione (HSA).

		20		40 I		60 I		80 I	
			– I L V – S E S – G						
			– N L V – S E A – G						
			-TLV-DTV-N						
RHDO-CHY-1		-MSGDT	-TLV-DTV-N AELV-DER-T	ASQSRQVFWD	RDVYDLEIER		HKSLLPKPGD	FITTYMAEDK	62
			KALV-DEE-K						
			QKGLHDVNSD						
			KGWA						
OMO-86	ISDARANN	AKTQ	SQYQ	P Y	KDAAW-	GF-INHWYPA	LFTHELEEDQ	VQGIQICGVP	52
KshA-H37Rv		MSTD	T S G V G	VREI	DAGALPT	RYAR – GWHCL	GVAKDYLEGK	PHGVEAFGTK	49
		100		120		140		160	
NDO-98164	VIVSRONDGS		RGKTLVSVEA		S Y HGWG F G S N	-GELOSVPFE	KDLYGESL	NKKCLGLKEV	138
	VIVSRQNDGS					-GELQSVPFE			
BPDO-B1	VILSHQSDGT	FRAFINSCSH	RGNQICHADS	-GNAK-AFVC	NY HGWVF GQD	-GSLVDVPLE	SRCYHNSL	DKQKLAAKSV	132
	I I L S HQ S DG T					- G S L V D V P L E			
	VMVVRQKNGE			-GNAK-SFTC		- GNLVSVPFE			
	VIVVRQKDRS			-GNAK-SFTC		-GNLVNVPYE			
	FIVCRDEGGE LLVNRID-GK					-GSLVGVPAG DGVLCDILTN			
						TGKLVTIVAN			
			MGGDLS-EGT						
		180		200	_	220		240	
NDO 08164						M		VCBBCKVVIK	102
NDO-98164	PRIESENC						KHS-G-GLEL	VCPPCKVVVK	192
RPDO-R1	- RVETYKG	FIFGCHD	PEAP-SLEDY	LGEFRYYLDT		i-w	EGAGG-GMEL		186
RHDO-CHY-1	- RVETYKG	FIFGCHD	QEAP - PLMDY AEAP - PLIDY PEAP - SLEDY PEAP - SLEDY	LGEFRFYLDT		I-W	EGGGA-GLEL	LGPPMKSLLH	191
REDO-KHAT	- KVEIYKG	LIFANWD	ADAP-DLDIY	LGEAKFYMDH		M-L	DRI-EAGIEA	IPGIQKWVIP	192
CUMDO-IP01	– R V D T Y K G – –	LIFANWD	TEAP-DLKTY	LSDATPYMDV		– – – – – – – M – L	DRT-EAVTQV	ΙΤGMQKTVΙΡ	195
NDO-12038	PNLASYKG	LIFGSLD	PHAD-SLEDY	LGDLKFYLDI		V-L	DRS-DAGLQV	VGAPQRWVID	200
			G-DPPP-L						
			P-DEDVPP-L EGNPPDP-						
K311A-1137 KV		260		280		300		320	100
			_			1		1	
			THASS-LRSG						
			THAAA-LRAG						
			THAAA – L SQ I THAAA – L GQ I						
			SHLSG-ILAG						
	CNWKFAAEQF	CSDMYHAGTM	AHLSG-VLSS	LPPEMDLSQV	KLPSS	G-NOFRAKW-	GGHGTG	WF NDD FA	260
NDO-12038			THR SM-VELG						
			IHKDSILVKD						
			VHKDNTIVHA						
KshA–H37Rv	SNCRDIIDNV								
			1 <u>0</u> F	GL-PT	YF	KNVFEG-	HIASQ	TLHNVGRPDV	214
		340		GL-PI	¥F	KNVFEG- 380	HIASQ	400	214
NDO-98164		340 I GVH	SADLVPELMA	360   FG-GA-KQER	LNK-EIGD-V	RARIYRSHLN	<b>CTVFPNNSML</b>	400 I TC	309
NBDO-JS765		340     GVH GNF	S AD L V P E LMA S ADM I P D LMA	360   FG-GA-KQER FG-AA-KQEK	LNK – EIGD – V LAK – EIGD – V	RAR I YR SHLN RAR I YR SFLN	CTVF PNN SML GTIF PNN SFL	400 I TC TG	309 305
NBDO-JS765 BPDO-B1		340   GVH GNF G-L	S AD L V P E LMA S ADM I P D LMA H I K R – E GWT K	360   FG-GA-KQER FG-AA-KQEK FL-ED-TRGE	L N K – E I G D – V L A K – E I G D – V V R R – K F G P – E	RAR I YR SHLN RAR I YR SHLN RAR I YR SFLN RER LY LGHWN	CTVF PNN SML GT I F PNN SF L C S I F PNC SF L	400 I TC TG YG	309 305 302
NBDO-JS765 BPDO-B1 RHDO-CHY-1		340   GVH GNF G-L A-I	S AD L V P E LMA S ADM I P D LMA H I K R – E GWT K HR K G – D GWN K	360   FG-GA-KQER FG-AA-KQEK FL-ED-TRGE YL-ED-TRGE	LNK – E I GD – V LAK – E I GD – V VRR – K FGP – E VRR – K FGA – D	RAR I YR SHLN RAR I YR SFLN RAR I YR SFLN RER L Y LGHWN RER L Y VGHWN	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL	400 I TG YG YG	309 305 302 303
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1		340 GVH GNF GL A-I	S AD L VP E LMA S ADM I P D LMA H I KR – E GWT K H R KG – D GWN K A I – MG P K V T E	360 FG-GA-KQER FG-AA-KQEK FL-ED-TRGE YL-ED-TRGE YWTQGPAAEK	LNK – E I GD – V LAK – E I GD – V VRR – K FGP – E VRR – K FGA – D ASE – R LGS – T	RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN RER L Y VGHWN E RGQQLMAQH	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL MTIFPTCSFL	400 I TC YG YG PG	309 305 302 303 298
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01		340 I GVH G-L A-I LLL LLQ	S AD L VP E LMA S ADM I P D LMA H I KR – E GWT K H R KG – D GWN K A I – MG P K V T E A I – MG P K V V D	360 FG-GA-KQER FG-AA-KQEK FL-ED-TRGE YUL-ED-TRGE YWTQGPAAEK YWTKGPAAER	LNK – EIGD – V LAK – EIGD – V VRR – KFGP – E VRR – KFGA – D ASE – RLGS – T AKE – RLGK – V	AR I YR SHLN RAR I YR SFLN RAR I YR SFLN RER LY LGHWN RER LY VGHWN ERGQQLMAQH LPADRMVAQH	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL MTIFPTCSFL MTIFPTCSFL	400 I TG YG YG PG PG	309 305 302 303 298 312
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038		340 I 	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVVE	360 FG-GA-KQER FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAER LPENIVEE	LNK - EIGD-V LAK - EIGD-V VRR - KFGP - E VRR - KFGA - D ASE - RLGS - T AKE - RLGK - V LERRLTPEQV	ARR I YRSHLN RAR I YRSFLN RER L YLGHWN RER L YVGHWN E RGQQLMAQH LPADRMVAQH E I FRPTAFIH	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL MTIFPTCSFL GTVFPNLSIG	400 I TC YG YG PG PG PG NFLMGKD-HL	309 305 302 303 298 312 314
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-I2038 CARDO-CA10 OMO-86	PVFEGTIGGE PVLE-NQELG	340 GVH GVH G-L LL LLQ MPL VVREGAYGEK L-KVEGLK-G	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVVD PEFMG	360 F G - GA - KQER F G - AA - KQEK F L - ED - TRGE YWTQCPAAEK YWTKGPAAER L P EN I VEE	L NK – E I G D – V L AK – E I G D – V VRR – K F G P – E VRR – K F G A – D AS E – R L G S – T AK E – R L G K – V L E R R L T P E Q V	RAR I YR SHLN RAR I YR SFLN RAR I YR SFLN RER L Y LGHWN E RGQQLMAQH LPADRMVAQH E I FR PTAF I H I VAND I RHY - RT	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL MTIFPTCSFL MTIFPTCSFL GTVFPNLSIG SIWLPGVLKV SVVLPGVLMV	400 1 TC TG YG PG PG NF LMGKD-HL NP FPN ENWP E	309 305 302 303 298 312 314 277 294
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-I2038 CARDO-CA10 OMO-86	PVFEGTIGGE PVLE-NQELG	340 GVH GVH G-L LL LLQ MPL VVREGAYGEK L-KVEGLK-G	S AD L VP E LMA S ADM I P D LMA H I KR – E GWT K H R KG – D GWN K A I – MG P K V T E A I – MG P K V V D	360 F G - GA - KQER F G - AA - KQEK F L - ED - TRGE YWTQCPAAEK YWTKGPAAER L P EN I VEE	L NK – E I G D – V L AK – E I G D – V VRR – K F G P – E VRR – K F G A – D AS E – R L G S – T AK E – R L G K – V L E R R L T P E Q V	RAR I YR SHLN RAR I YR SFLN RAR I YR SFLN RER L Y LGHWN E RGQQLMAQH LPADRMVAQH E I FR PTAF I H I VAND I RHY - RT	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL GAIFPNCSFL MTIFPTCSFL MTIFPTCSFL GTVFPNLSIG SIWLPGVLKV SVVLPGVLMV	400 1 TC TG YG PG PG NF LMGKD-HL NP FPN ENWP E	309 305 302 303 298 312 314 277 294
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-I2038 CARDO-CA10 OMO-86	PVFEGTIGGE PVLE-NQELG	340 GVH GVH G-L LL LLQ MPL VVREGAYGEK L-KVEGLK-G	S AD L V P E LMA S AD M I P D LMA H I K R – GWTK HRKG – DGWNK A I – MG PK V TE A I – MG PK V TE P E FMG	360 F G - GA - KQER F G - AA - KQEK F L - ED - TRGE YWTQCPAAEK YWTKGPAAER L P EN I VEE	L NK - E I GD - V L AK - E I GD - V VRR - KFGP - E VRR - KFGA - D AS E - R LGS - T AK E - R LGK - V LERR LTP EQV 	RAR I YR SHLN RAR I YR SFLN RAR I YR SFLN RER L Y LGHWN E RGQQLMAQH LPADRMVAQH E I FR PTAF I H I VAND I RHY - RT	CTVFPNNSML GTIFPNNSFL GAIFPNCSFL MTIFPTCSFL GTVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN	400 1 TC TG YG PG PG NF LMGKD-HL NP FPN ENWP E	309 305 302 303 298 312 314 277 294
NBDO-JS765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv	PVFEGTIGGE PVLE-NQELG	GVH G-L A-I LLQ LLQ VVREGAYGEK L-KVEGLK-G 	SADLVPELMA SADMIPDLMA HIKR-GUWK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTO PEFMG	360 FG-GA-KQER FG-AA-KQEK FG-AA-KQEK YL-ED-TRGE YWTKGPAAER LPENIVEE DDL 440 1	L NK - E I GD - V L AK - E I GD - V VRR - KFGP - E VRR - KFGA - D AS E - R LGS - T AK E - R LGK - V LERR LTP EQV 	ARR I YR SHLN RAR I YR SHLN RAR I YR SFLN RER L Y UGHWN RER L Y VGHWN E I GRUMAQH E I FR PTAF I H RHY - RT RHY - RT AHLD - SEA	CTVF PNN SML GTIF PNN SFL GAIF PNC SFL MTIF PTC SFL GTVF PNL SIG SIWL PGVLKV SVVL PGVLKV SVYL PGVLMV	400 TC YG YG PG NFLMGKD-HL NPFPN ENWPE ENWPE WLHNR-YGN 480 81	309 305 302 303 298 312 314 277 294 248
NBDO-J5765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv NDO-98164	PVFEGTIGGE PVLE-NQELG	3400 	S AD L V P E LMA S AD M I P D LMA H I K R – GWTK HRKG – DGWNK A I – MG PK V TE A I – MG PK V TE P E FMG	3600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAER LP-ENIVEE 	LNK - EIGD-V LAK - EIGD-V VRR - KFGP-E VRR - KFGA-D ASE - RLGS - T AKE - RLGK - V LERR LTPEQV G TSYGE KRR LADSVQR	3800 RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN RER L Y LGHWN RER L Y UGHWN E RGQLMAQH E I FR PTAF I H I VANDI RHY-RT -AHLD-SEA 460 176 GPAGFWES	CTVFPNNSML GTIFPNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL GTVFPNLSIG GTVFPNLSIG SIVLPGVLKV SVVLPGVLKV SYVEGPSFMIN	400 TC YG YG PG PG ENWPE ENWPE WLHNRYGN 480 QNGKKYQSRD	309 305 302 303 298 312 314 277 294 248 380
NBDO-J5765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv NDO-98164 NBDO-J5765	PVFEGTIGGE PVLE-NQELG SGVFK	33400 GVF GNF GNF LLL LLL VVREGAYGEK L-KVEGLK-G 41 VWNPIDANTT VWNPIDANTT	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE PEFMG PEFMG 	33600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE DDL 410 E-KD-MPEDL E-KD-MPEDL	LNK - E I GD - V LAK - E I GD - V VRR - K FGP - E VRR - K FGA - D AS E - R LGS - T AK E - R LGS - T LER R LTP EQV 	33800 I RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN ER GQQLMAQH L PADRMVAQH E I FR PTAF I H IVANDI RHY - RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL GVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVVLPGVLMV DDNDNMETAS DDNENMETMS	4000 I TC YG YG PG PG NFLMGKD-HL NPFPN ENWPE WLHNR-YGN 4800 1 QNGKKYQSSN	309 305 302 303 298 312 314 277 294 248 380 376
NBDO-J5765 BPDO-B1 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv NDO-98164 NBDO-J5765 BPDO-B1 RHDO-CHY-1	PVFEGTIGGE PVLE-NQELG 	3400 GVF GVF GVF LLL LLL LLU VVREGAYGEK L-KVEGLK-G 422 VWNPIDANTT VWNPIDANTT WWPRGPHEI IWHPRGPHEI	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE EVWTYAIV EVWTYAIV EVWTYAIV EVWTYTIV-	33600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK - E I GD - V LAK - E I GD - V VRR - K FGP - E VRR - K FGA - D AS E - R LGS - T AK E - R LGS - T AK E - R LGS - T G T S YGE KRR LADS VQR K RR VADAVQR K SA I QREAT R	ARR I Y R SHLN RAR I Y R SHLN RAR I Y R SFLN RER L Y LGHWN RER L Y LGHWN E R GQQLMAQH L PADRMVAQH E I FR PTAF I H R HV-RT AHLD - SEA I FG PAG FWES S I GPAG FWES S I GPAG FWES T FG TAG TLES	CTVFPNNSML CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL GIVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNDNMETAS DDNENMETMS DDGENMSSAT	4000 1 TC YG PG PG PFLMGKD-HL NPFPN WLHNRYGN 480 QNGKKYQSSN YINGVITRD	309 305 302 303 298 312 214 277 294 248 380 376 373 374
NBDO-JS765           & PDO-B1           RHDO-CHY-1           & PDDO-RHA1           CMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-JS765           BPDO-81           RHDO-CHY-1           BPDO-81           RDO-98164	PVFEGTIGGE PVFEGTIGGE PVLE-NQELG SGVFK SAAFR TNTFK TNTFK TNTFK	3440 GVH GVF GVF LL LLL MPL VVREGAYGEK L-KVEGLK-G 421 VWNP I DANTT IWHPRGPHE I IWHPRGPNE I IWHPRGPNE I	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTO PEFMG  EVWTYAIV EVWTYAFV EVWTYTIV EVWTYTIV- EVWTYTVV-	3360 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK FL-EN-UVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-T ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KRRVADAVQR KSMIQREAIR KSAIQREAIR	33800 RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L Y	CTVFPNNSML GTIFPNCSFL GAIFPNCSFL MTIFPTCSFL GTVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNENMETAS DDRENMETAS DDGENMSSAT DGGENMSSAT	4000 1 TC YG PG PG PG PFLMGKD-HL NPFPN ENWPE WLHNRYGN 480 QNGKKYQSSN YINRGVITRN YVNRGVITRN QVLRGHKARS	309 305 302 303 298 312 314 277 294 248 380 376 373 374 369
NBDO-JS765           8PDO-81           RHDO-CHY-1           BPDO-RHA1           CUMDO-IPO1           NDO-12038           CARDO-CA10           OMO-86           Ksha-H37Rv           NDO-98164           NBDO-S865           8PDO-81           RHDO-CHY-1           BPDO-814           CUMDO-HPO1		3440 GVF GVF GVF LLQ MPL VVREGAYGEK L	SADLVPELMA SADNIPDLMA HIKR-EGWTK AI-MGPKVTE AI-MGPKVTE AI-MGPKVTE EVWTYAIV- EVWTYAIV- EVWTYAIV- EVWTYTIV- EVWTYTWV- EVWAFTVV- EVWSFIVV-	33600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK ILPENIVEE 	LNK - E I GD - V LAK - E I GD - V VRR - K FGP - E VRR - K FGA - D ASE - R LGS - T AKE - R LGS - T G TSYGE KRR LADSVQR KRR VADAVQR KSM I QREA I R KSA I QREA T K SA I QREA T K E E Y R QUT LR	33800 I RARIYRSHLN RARIYRSFLN RERLYLGHWN RERLYLGHWN RERLYLGHWN RERQQLMAQH LPADRMVAQH LPADRMVAQH LPADRMVAQH FIFRPTAFIH RHY-RT 	CTVFPNNSML GTIFPNNSFL GSIFPNNSFL GAIFPNCSFL MTIFPTCSFL GIVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNDNMETAS DDNENMETMS DDGENMSSAT DDGENWSEVQ DGGENWVEVQ	4000 1 TC YG PG PG PG WLHNRYGN QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QVLRGHKARS RGLRGYKARS	309 305 302 303 298 312 214 277 294 248 380 376 373 374 369 383
NBDO-J5765           BPDO-81           RH00-CHY-1           BPDO-RHA1           CUMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37RV           NDO-98164           NBDO-S1565           BPDO-81           RHOO-CHY-1           BPO-781           RHOO-CHY-1           BPO-781           NDO-12038	PVFEGTIGGE PVLE-NQELG SGVFK SAAFR TNTFK TNTFK INTIR INTVR SAPTAFLTLR	3400 GVH GNF GL LLL MPL VVREGAYGEK L-KVEGLK-G MPL VWNPIDANTT WWNPGPHEI AWHPRGPHEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVT AI-MGPKVVT PEFMG PEFMG  EWTYAIV EWTYTIV EWTYTIV- EWWTYTIV- EWWTYTIV- EWWTYTVV- EWWSFIVV- EWMSFIVV- EWMSFIVV-	3360 FG-GA-KQEK FC-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CTSYGE KRRLADSVQR KSMIQREAIR KSAIQREATR KEEYRQQTLR KEEYRRKNIF	33800 IRARIYRSHLN RARIYRSFLN RERLYLGHWN RERLYLGHWN RERLYUGHWN ERGQQLMAQH LPADRMVAQH EIFRPTAFIH IVANDI EIFRPTAFIH RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLKV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDNEMETAS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDAENWRSIT	4000 1 TC YG PG PG ENWPE ENWPE QNGKKYQSRD QNGKKYQSSN YINRGVITRD QVLRGHKARS RGLRGYKARS	309 305 302 298 312 314 277 294 248 380 376 373 374 369 383 390
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CUMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-SK65           BPDO-81           RHDO-CHY-1           BPDO-81           CUMDO-WORD           RHDO-CHY-1           BPDO-81           CUMDO-IP01           NDO-12038           CARDO-CA10	PVFEGTIGGE PVLE-NQELG 	3440 GVH GVE GVE LL LLL MPL VVREGAYGEK L-KVEGLK-G 420 VWNPIDANTT WNPPIDANTT WNPPIDANTT WNPPIDANTT WNPPGPHEI IWHPRGPHEI IWHPRGPNEI TWHPRGPNEI TWHPRGPNEI WHPLGPDKM VVPIDENT	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE EVWTYAIV- EVWTYAIV- EVWTYAFV- EVWTYTV- EVWTYTV- EVWTYTV- EVWSFIVV- EVWSFIVV- HYYFQTLGKP	3600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK P-ENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGK-V LERRLTPEQV 	3800 RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN RER L Y LGHWN RER L Y UGHWN E FRGQQLMAQH LPADRMVAQH E I FR PTAF I H RHY-RT AHLD-SEA 460 TFGFAGFWES SIGPAGFWES TFGTAGTLES TFGTAGTLES TFSAGGVFEQ TFNQGGTYEQ TFNQGGTYEQ TFGI SGGFEQ MAL EGFNN	CTVFPNNSML GTIFPNCSFL GAIFPNCSFL MTIFPTCSFL GTVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNDMETAS DDRENMETAS DGENMSSAT DGENMSSAT DGENWSEIQ DGENWEIQ DDAENWRSIT DDIWAREAMV	4000 1 TC YG PG PG PFPN ENWPE WLHNRYGN 480 QNGKKYQSRN YINRGVITRN YVNRGVITRN YVNRGVITRN ZVLRGHKARS RQLRGYKARS RVMGQGFAKT DFYADDKGWV	309 305 302 298 312 314 277 294 248 380 376 373 374 369 383 390 351
NBDO-JS765           BPDO-81           RHDO-CHY-1           BPDO-RHA1           CMRDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-JS765           BPDO-RHA1           RHDO-CHY-1           BPDO-RHA1           CMDO-J2038           CARDO-CHY-1           NDO-12038           CARDO-CHY-1           NDO-12038           CARDO-CHY-1		3440 GVF GNF GNF LLL MPL VVREGAYGEK L-KVEGLK-G 420 VWNPIDENTT IWHPRGPHEI AWHPRGPHEI AWHPRGPNEI LWHPLGPDKM YVPIDENT VVPID-DT	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVTE AI-MGPKVVT EVWTYAIV EWTYAIV EWTYAIV EWTYTYIV EWTYTWV EWTYTWV EWTYTWV EWSFLV EWSFLV HYYFQTLGKP	33600 FG-GA-KQEK FC-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK - EIGD - V LAK - EIGD - V VRR - KFGP - E VR - KFGA - D ASE - RLGS - T AKE - RLGS - T AKE - RLGS - T G TSYGE KRRLADSVQR KSNIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQUTLR KEESYKSYLR EQEFESKWKP	33800 IRARIYRSHLN RARIYRSFLN RERLYLGHWN RERLYLGHWN ERGQQLMAQH LPADRMVAQH EIFRPTAFIH IVANDI EIFRPTAFIH RHV-RT AHLD-SEA 460 TFGPAGFWES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGISGGFEQ MALEGFND	CTVFPNNSML CSIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL TIFPTCSFL SIWLPGVLKV SVVLPGVLKV SVVEPGVLKV SVFGPSFMIN DDNENMETAS DDRENMETMS DDGENWSSAT DDGENWSAL DDGENWSID DAENWRSIT DDIAENWRSIT DDIAENWRSIT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE QNGKKYQSBN QNGKKYQSSN YINRGVITRD QVLRGHKARS RGLRGYKARS RVMGGQFAKT DFYADDKGWD	309 305 302 298 312 314 294 294 294 294 380 376 373 374 369 383 390 351 368
NBDO-JS765           BPDO-81           RHDO-CHY-1           BPDO-RHA1           CMRDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-JS765           BPDO-RHA1           RHDO-CHY-1           BPDO-RHA1           CMDO-J2038           CARDO-CHY-1           NDO-12038           CARDO-CHY-1           NDO-12038           CARDO-CHY-1		3440 GVF GNF GNF LLL MPL VVREGAYGEK L-KVEGLK-G 420 VWNPIDENTT IWHPRGPHEI AWHPRGPHEI AWHPRGPNEI LWHPLGPDKM YVPIDENT VVPID-DT	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE EVWTYAIV EVWTYAFV EVWTYAFV EVWTYTWV- EVWTYTWV- EVWSFIVV- EVWSFIVV- EVWSFIVV- EVWSFIVV- HYYFQTLGKP HEYWEILVRV	33600 FG-GA-KQEK FC-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-T ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREAT KEEYRQQTLR KEEYRQUTLR KEEYRKNIF EQEFESKWKP QYRYDHMYKP	33800 IRARIYRSHLN RARIYRSFLN RERLYLGHWN RERLYLGHWN ERGQQLMAQH LPADRMVAQH EIFRPTAFIH IVANDI EIFRPTAFIH RHV-RT AHLD-SEA 460 TFGPAGFWES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGISGGFEQ MALEGFND	CTVFPNNSML GTIFPNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLKV SVVLPGVLMV SVFGPSFMIN DDNENTMS DDGENMSSAT DGGENWSEIQ DGAENWEVIQ DGAENWEVIQ DGAENWESIT DDIWAREAMV SDLYAREAMQ QVEIWKHKT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE QNGKKYQSBN QNGKKYQSSN YINRGVITRD QVLRGHKARS RGLRGYKARS RVMGGQFAKT DFYADDKGWD	309 305 302 298 312 314 294 294 294 294 380 376 373 374 369 383 390 351 368
NBDO-JS765 8PDO-81 RHD0-CHY-1 8PDO-RHA1 CUMD0-IP01 ND0-12038 CARD0-CA10 OMO-86 KshA-H37Rv ND0-98164 NB0-JS765 8PDO-81 RHD0-CHY-1 8PDO-RHA1 CUMD0-IP01 ND0-12038 CARD0-CA10 OMO-86 KshA-H37Rv	PVFEGTIGGE PVFEGTIGGE PVLE-NQELG SAAFR TNTFK TNTFK INTIR INTIR SAPTAFLTLR PDMMQFEW 	3400 1 GVH GVF GVE MPL VVREGAYGEK L-KVEGLK-G 421 VWNP I DANTT IWHPRGPHE I WHPRGPHE I WHPRGPHE I TWHPRGPNE I TWHPRGPNE I TWHPRGPNE I TWHPRGPNE I TWHPRGPNE I TWHPRGPNE I TWPIDENT YVP I DNS 5000 1	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTC EVWTYAIV EVWTYAFV EVWTYAFV EVWTYTVV- EVWTYTVV- EVWSFIVV EVWSFIVV EVWSFIVV HYYFQTLGKP HEYWEILVRV FVLQWGVIVE	3600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK FL-EN-MPEDL P-RD-ADPAT P-RD-ADPAT P-RD-ADPAT D-AD-APEDI D-AD-APEDI D-AD-APEDI CANDERKKF KPK-GMSEEM 51 1	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-E ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KEEYRQUTLR KEEYRQUTLR KEESYRQUTLR KEESYRVSYLR EQEFESKWKP QYRYDHMYKP TDKLSRVFTE	33800 RARIYRSHLN RARIYRSFLN RERLYLGHWN RERLYLGHWN RERLYUGHWN ERGQQLMAQH LPADRWVAQH EIFRPTAFIH IVANDI RHY-RT 460 TFGPAGFWES TFGTAGTLES TFGTAG	CTVF PNN SML GTIF PNN SFL CSIF PNC SFL MTIF PTCSFL TTF PTCSFL SIWL PGVLKV SVVE PGVLKV SVVE PGVLKV SVFGPSFMIN DDNENMETMS DD RENMETMS DD GENMSSAT DG GENWVE VQ DG AENWVE VQ DG AENWVE VQ DG AENWR SIT DG IWAR EAMV SD LY AR EAMQ QD VE IWKHKT	4000 1 TC YG PG PG PFLMGKD-HL NPFPN ENWPE ENWPE ENWPE QNGKKYQSRD 480 QNGKKYQSRD YINRGVITRD YVNRGVITRD YVNRGVITRD QVLRGHKARS RGLRGYKARS RGLRGYKARS RGLRGYKARS RGLRGYKARS TO FYADDKGWV NFYDGTGWD -RIDN 560 1	309 305 302 298 312 277 294 248 380 376 373 374 369 383 390 351 368 316
NBDO-JS765           8PDO-81           RHD0-CHY-1           BPDO-RHAI           CUMD0-IP01           NDO-12038           CARD0-CAI           OMO-86           KshA-H37Rv           NDO-98164           NBD0-S1655           BPD0-81           RHD0-CHY-1           BPD0-816           ND0-12038           CARD0-CAI00           OMO-86           KaD0-CAT37           VMO0-12038           CARD0-CA100           OMO-86           KshA-H37Rv           ND0-98164		3400 GVF GVF GVF LLL MPL VVREGAYGEK L-KVEGLK-G 	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVTE AI-MGPKVVT EVWTYAIV EVWTYAIV EVWTYAIV EVWTYTIV EVWTYTIV EVWTYTIV EVWSFFLV HYYFQTLGKP HEYWEILVRV FVLQWGVIVE	33600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK - EIGD - V LAK - EIGD - V VRR - KFGP - E VRR - KFGA - D ASE - RLGS - T AKE - RLGS - T AKE - RLGS - T G TSYGE KRRLADSVQR KSMIQREAIR KSAIQREAIR KEEYRQQTLR KEEYRQUTLR KEEYRQUTLR KEEYRQUTLR KEEYRKNIF KDESYKSYLR QYRYDHMYKP TDKLSRVFTE YQAHVSSSNW	33800 RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L YLGHWN RER L YLGHWN ER GQQLMAQH L PADRMVAQH L PADRMVAQH E I FR PTAF IH IVANDI RHY-RT RHY-RT RHY-RT RHY-RT SI GPAGFWES TFGTAGTLES	CTVFPNNSML CSIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL TIFPTCSFL SIWLPGVLKV SVVLPGVLKV SVVEQVLMV SVFGPSFMIN DDNENMETAS DDRENMETMS DDGENWSSAT DDGENWSAT DDGENWSVQ DDAENWRSIT DDAENWRSIT DDIAENWRSIT DDIAENWRTH DDIWAREAMU QDVEIWKHKT	4000 1 TC YG PG PG PF-LMGKD-HL NP FPN WLHNRYGN 4800 JNGKKYQSSN YINRGVITRD QVLRGHKARS RVMGGQFAKT DFYADDKGWD RIDN 560 	309 305 302 303 298 312 248 380 376 373 374 369 383 374 369 383 374 369 383 374 369 383 374 369 381 447
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CUMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-CHY-1           RHD0-17038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-200-RHA1           CUMDO-IP01-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-JS765	PVFEGTIGGE PVFEGTIGGE PVLE-NQELG SAAFR TNTFK INTIR INTIR INTIR INTVR SAPTAFLTLR 	3400 GVH GVF GVF LL MPL VVREGAYGEK L-KVEGLK-G 421 VWNP IDANTT IWHPRGPNEI IWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPCPNEI TWHPCPNEI NS 500 1 -EDVYGDAVY NS	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE EVWTYAIV EVWTYAFV EVWTYAFV EVWTYTWV EVWTYTWV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV- FVLQWGVIVE PGVVGKSAIG PGVVGKSAIG	3600 FG-GA-KQEK FC-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE DDL 41 E-KD-MPEDL P-SD-ADPAT D-AD-APEDM D-AD-APEM D-AD-APEM D-AD-APEM D-AD-APEM CANDERKKF CANDERKKF ETSYRGFYRA	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-E ASE-RLGS-T AKE-RLGS-T AKE-RLGK-V LERRLTPEQV CTSYGE KRRLADSVQR KSMIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRKNIF QYRYDHMYKP TDKLSRVFTE YQAHVSSSNW	33800 RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L YLGHWN RER L YLGHWN RER L YLGHWN RER L YLGHWN RER L YLGHWN RER L YLGHWN E I FR PTAFIH I VANDI RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL TVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVVLPGVLKV SVFCPSFMIN DDNENMETMS DDCENMSSAT DGENWVEVQ DGENWVEVQ DGENWVEVQ DGENWVEVQ DGAENWESIT DDIWAREAMV SDLYAREAMQ QVEIWKHKT	4000 1 TC YG PG PG ENWPE ENWPE QNGKKYQSRD QNGKKYQSRD YINRGVITRD QVLRGHKARS RGLRGYKARS RGLRGYKARS RVMGQFAKT DFYADDKGWV NFYDGTGWD RIDN 500 1	309 305 302 298 312 277 294 277 294 380 376 373 374 369 383 390 351 368 316 447 437
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CUMDO-IPO1           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-S765           BPDO-RHA1           CUMDO-IPO1           NDO-98164           NBDO-CHY-1           BPDO-RHA1           CUMDO-IPO1           NDD-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-JS765           BPDO-81	PVFEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NQELG 		SADLVPELMA SADMIPDLMA HIKR-EGWTK AI-MGPKVVE AI-MGPKVVE AI-MGPKVVE EVWTYAIV EVWTYAIV EVWTYAIV EVWTYTIV EVWTYTWV EWSFFLV EWSFFLV HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGVVGKSAIG PGIVGISFIG	33600 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK I E-KD-MPEDL E-KD-MPEDL E-KD-MPEDL E-KD-APPAT D-AD-APEDI E-KD-APDWT D-AD-APEDI E-KD-APDWT S200 S2	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KRRVADAVQR KRRVADAVQR KRRVADAVQR KSAIQREATR KEEYRRVNIF KDESYKSYLR KEEYRQUTLR KEEYRKNIF KDESYKSYLR QYRYDHMYKP TDKLSRVFTE YQAHVSSSNW YQAHISSSNW	37800 ARAR IYRSHLN RAR IYRSFLN RERLYLGHWN RERLYLGHWN RERLYLGHWN RERLYVGHWN ERGQQLMAQH LPADRMVAQH LPADRMVAQH EIFRPTAFIH RHY-RT RHY-RT 	CTVFPNNSML CSIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL GIVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNDNMETAS DDNENMETMS DDGENMSSAT DDGENMSSAT DDGENWSENQ DDAENWRSIT DDIWAREAMV SDLYAREAMQ QDVEIWKHKT	4400 1 TC YG PG PG WLHNRYGN QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSTRD QVLRGHKARS RVMGCQFAKT PFYADDKGWV NFYYDGTGWD RIDN 560  NEKLNAAE	309 305 302 303 298 312 314 277 2248 380 376 373 374 369 351 368 316 447 437
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CUMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-SF05           BPDO-81           CUMDO-H701           NDO-98164           NDO-98164           NDO-98164           NDO-98164           NDO-98164           NDO-10018           CARDO-CH10           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-15765           BPDO-81           RHDO-CHY-1           RPDO-816           NBO-0-5765           BPDO-8164           NBO-0-5765           BPDO-8164           NBO-20-841	PVFEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NQELG NUTFK 	3400 	SADLVPELMA SADMIPDLMA HIKR-EGWTK AI-MGPKVVTE AI-MGPKVVTE AI-MGPKVVTE CONTENSION EVWTYAIV EVWTYAIV EVWTYAIV EVWTYTIV EVWTYTIV EVWSFFLV EVWSFFLV HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG	3760 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK I E-KD-MPEDL E-KD-MPEDL E-KD-MPEDL CADAEPKKY CPTDEDRKKF KPK-GMSEEM 570 571 572 573 573 573 573 573 573 573 573	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KRRLADSVQR KRRLADSVQR KRRLADSVQR KRRLADSVQR KRRLADSVQR KSMIQREAIR KSMIQREAIR KSAIQREATR KEEYRRVNIF KDESYKSYLR QYRYDHMYKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WKRMIDAPDW	ARR I YR SHLN RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L YLGHWN ERGQQLMAQH LPADRMVAQH LPADRMVAQH EI FR PTAF IH RHY-RT AHLD-SEA TFGPAGFWES SI GPAGFWES SI GPAGFWES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFGTAGTLES TFAGTAGTS AGFEHASSTW AEFEHASSTW ASVKANDDTW ASVKANDDTW AALDA-TR	CTVFPNNSML GTIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL GIVFPNLSIG SIWLPGVLKV SVVLPGVLKV SVFGPSFMIN DDNDNMETAS DDNENMETMS DDGENMSSAT DGGENMSSAT DGGENWSVEVQ DDAENWRSIT DGGENWSVEVQ DDAENWRSIT DIWAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV SDLYAREAMV	4400 1 TC YG PG PG WLHNRYGN WLHNRYGN QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSN YINRGVITRD QVLRGHKARS RVMGQFAKT RCLRGYKARS RVMGGQFAKT DFYADDKGWV NFYDGTGWD -RIDN 560 	309 305 302 303 298 312 248 380 376 373 374 369 351 368 316 447 447 449 448 424
NBDO-J5765           BPDO-81           RH00-CHY-1           BPDO-81           CUMDO-IP01           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-12038           CARDO-CH10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CH10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-3765           BPDO-811           RHDO-CHY-1           BPDO-8161           CHDO-CHY-1           BPDO-RHA1           CUMDO-1901		3400 GVF GVF GVF HL LLL MPL VVRPIDANT VWNPIDANTT WNPPIDANTT WNPROPHEI WHPRGPHEI WHPRGPNEI LWHPLGPDKM YVPIDENT HYPVTQNS 500 -EDVYGDAVY -KDVYGDECY -YEGP-HPVY -YEGP-HPVY -VPNKNNPEF	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVTE AI-MGPKVVT EVWTYAIV EWWTYAIV EWWTYAIV EWWTYTIV EWWTYTIV EWWTYTIV EWWFTVV EWSFIV EWSFFLV HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGTS-YVS	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK - EIGD - V LAK - EIGD - V VRR - KFGP - E VRR - KFGA - D ASE - RLGS - T AKE - RLGS - T AKE - RLGS - T G TSYGE KRRLADSVQR KSNIQREAIR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRQVTR KEEYRQVTR EQFESKWKP TDK LSRVFTE YQAHVSSSNW WCAHIDAPDW WKEMIDAPDW WSRMMSPSW	ARR IYRSHLN RAR IYRSHLN RAR IYRSFLN RERLYLGHWN RERLYLGHWN ERGQQLMAQH LPADRMVAQH EIFRPTAFIH RHQ-RT AHLD-SEA 460 TFGPAGFWES TFGTAGTLES TFG	CTVFPNNSML CTIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL TIFPTCSFL SIWLPGVLKV SVVLPGVLKV SVVCPGVLKV SVFGPSFMIN DDNNMETAS DDRENMETMS DDGENMSSAT DDGENWSSAT DDGENWSSAT DDGENWSIT DDAENWRSIT DDIAENWRSIT DDIAENWRSIT DDIAENWRSIT DDIAENWRSIT DDIAENWRSIT DDIAENWRSIT DDIAENWRSIT DSUFFNRNFW SVFFNRNFW	4400 1 TC YG PG PG ENWPE ENWPE ENWPE WLHNRYGN 4800 1 QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QNGKKYQSRD QVLRGHKARS RGLRGYKARS RGLRGYKARS RVMGGQFAKT DFYADDKGWD RIDN 560  NEKLNAAE NEKLNAA	309 305 302 303 312 314 277 2294 2248 380 376 373 374 369 383 374 369 383 316 344 316 447 4437 4449 444 444 444
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CVMD0-IP01           ND0-12038           CARD0-CA10           OMO-86           KshA-H37Rv           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-98164           ND0-740-12038           CHDO-CHY-1           BPDO-R1           CMD0-98164           ND0-12038           ND0-12038           ND0-98164           ND0-12038           ND0-12038           RHOO-CHY-1           BPDO-R1A1           CUMD0-IP01           ND0-12038		3400 GVH GVF GVF GVF LLL MPL VVREGAYGEK L-KVEGLK-G 421 VWNPIDENTT WHPRGPNEI IWHPRGPNEI IWHPRGPNEI IWHPRGPNEI IWHPRGPNEI IWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI -EDVYGDAVC -EDVYGDAVC -EDVYGDECY -YEGP-HPVY -YEGP-HPVY -YEGPHPVY -YEGPNWTG	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVTE AI-MGPKVTE EVWTYAIV EVWTYAFV EVWTYTFV EVWTYTWV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV EVWSFIVV- BYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGISFISFIG PGTIS-YVYS PGEAYPLDYA	33600 FG-GA-KQEK FC-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE DDL 410 E-KD-MPEDL P-SD-ADPAT D-AD-APEDM D-AD-APEDM D-AD-APEM D-AD-APEM D-AD-APEM S200 ETSYRGFYRA ETSYRGFYRA ETSYRGFYRA ETSYRGFYRA ETSYRGFYRA	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-E VRR-KFGP-E ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T CTSYGE KRRLADSVQR KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAT KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRKNIF QYRYDHMYKP TOKLSRVFTE YQAHVSSSNW WKEMIDAPDW WVRMMTSPDW WNQLMLASP	33800 RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L YLGHWN L PADRWAQH I FR PTAFIH I VANDI RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL TVFPNLSIG SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVFCPSFMIN DDNENMETMS DDGENMSSAT DDGENWEVIQ DDGENWEVIQ DGENWVEVQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DGAENWEVTQ DAAENWENTQ DGAENWEVTQ DAAENWENTQ DGAENWEVTQ DAAENWENTQ DA	4000 1 TC YG PG PG ENWPE ENWPE ENWPE QNGKKYQSRD 410 QNGKKYQSRD YINRGVITRD QVLRGHKARS RGLRGYKARS RGLRGYKARS RGLRGYKARS RGLRGYKARS NFYDGTGWD RIDN 500 1 	309 302 303 312 314 2277 2294 2277 2294 2277 380 376 373 374 369 351 368 316 447 443 448 444 444
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CUMDO-IPO1           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-S16765           BPDO-81           RHO0-CHY-1           BPDO-81           CMBO-CHY-1           BPDO-81           CMDO-2038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-51655           BPDO-81           RHDO-CHY-1           BPDO-81           RHDO-2038           CMDO-98164           NBDO-98164           NDO-98164           NDO-98164           NDO-98164           NDO-90-1038           CMDO-CHY-1           BPDO-RHA1           CUMDO-IPO1           NDO-12038           CARDO-CA10	PVFEGTIGGE           PVFEGTIGGE           PVLE-NQELG	3400 GVF GVF GVF LLL LLL MPL VVREGAYGEK L-KVEGLK-G 	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVTE AI-MGPKVVT EVWTYAIV EVWTYAIV EVWTYAFV EVWTYTIV EVWTYTIV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV FVLQWGVIVE FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVSF-VVYS PCKTS-VVYS	3760 FG-GA-KQEK FG-AA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGP-E ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KEEYRRVIF KDESYKSYLR EQEFESKWKP QYRYDHMYKP TDKLSRVFTE YQAHVSSSNW WQAHISSSNW WKEMIDAPDW WKEMIDAPDW WSRMMSEPSW WMQLMLAESP	33800 RAR I YR SHLN RAR I YR SFLN RER L YLGHWN RER L YLGHWN RER L YLGHWN RER L YLGHWN ER GQQLMAQH L PADRWAQH L PADRWAQH EI FR PTAFIH HVANDI SI GPAGFWES TFGTAGTLES TFGT	CTVFPNNSML CSIFPNNSFL CSIFPNNSFL GAIFPNCSFL MTIFPTCSFL TIFPTCSFL SIWLPGVLKV SVYFGVLKV SVYFGPSFMIN DDNENMETAS DDRENMETMS DDGENWSSAT DDGENWSUQ DDAENWRSIT DDGENWSUQ DDAENWRSIT DDIWAREAMU QDVEIWKHKT HTELTKTT	4400 1 TC YG PG PG PF-LMGKD-HL NP FPN ENWPE WLHNRYGN 480 QNGKKYQSRD QNGKKYQSRD QNGKKYQSN YINRGVITRD QVLRGHKARS RVMGCQFAKT DFYADDKGWV RIDN 5500  NEKLNAAE NEKLNAAE NEKLNAAE	309 305 302 298 312 314 2248 380 376 373 374 369 383 390 351 368 390 351 368 316 447 449 448 444 436
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-RAD           CMBO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-CH71           BPDO-81           RHDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-15765           BPDO-81           RHDO-CHY-1           BPDO-8164           NBDO-15765           BPDO-8164           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1701           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-17010           OMO-86           CARDO-CA10	PVFEGTIGGE PVLEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NTTK 	3400 GVH GVF GVF LL MPL VVREGAYGEK UVRFIDANTT WNPFIDENTT IWHPRGPHEI IWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI  STOO -EDVYGDAV -EDVYGDECY -YEGP-HPVY -YEGP-HPVY -YEGP-HPVY -YEGP-HPVY -YEDPNWTG 	SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EVWTYAIV EWTYAFV EWTYTFV EWTYTVV EWWTYTIV EWWTYTWV EWWFYTVV EWSFIV EWSFIN EWSFIN E	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-JS765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-RAD           CMBO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-CH71           BPDO-81           RHDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-15765           BPDO-81           RHDO-CHY-1           BPDO-8164           NBDO-15765           BPDO-8164           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1701           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-17010           OMO-86           CARDO-CA10	PVFEGTIGGE PVLEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NTTK 	3400 GVH GVF GVF LL MPL VVREGAYGEK UVRFIDANTT WNPFIDENTT IWHPRGPHEI IWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI TWHPRGPNEI  STOO -EDVYGDAV -EDVYGDECY -YEGP-HPVY -YEGP-HPVY -YEGP-HPVY -YEGP-HPVY -YEDPNWTG 	SADLVPELMA SADMIPDLMA HIKR-EGWTK HRKG-DGWNK AI-MGPKVVTE AI-MGPKVVT EVWTYAIV EVWTYAIV EVWTYAFV EVWTYTIV EVWTYTIV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV EVWSFFLV FVLQWGVIVE FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVSF-VVYS PCKTS-VVYS	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765 BPDO-81 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv NDO-98164 NBDO-S765 BPDO-81 RHDO-CHY-1 BPDO-RHA1 CUMDO-IP01 NDO-12038 CARDO-CA10 OMO-86 KshA-H37Rv NDO-98164 NBO-98164 SBPDO-81 RHDO-CHY-1 BPDO-81 RHDO-CHY-1 DO-12038 CARDO-CA10 OMO-86 KshA-H37Rv	PVFEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NTFK 	3400 	SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EVWTYAIV EWTYAFV EWTYTFV EWTYTVV EWWTYTIV EWWTYTWV EWWFYTVV EWSFIV EWSFIN EWSFIN E	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CMBO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-CHY-1           BPDO-RHA1           CMDO-CHY-1           NDO-98164           NBO-98164           NBO-12038           CARDO-CHY-1           BPDO-RHA1           CUMOD-IPO1           NDO-98164           NBO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-86           KshA-H37Rv           NDO-98164           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1901           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1901           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1901           NDO-12038           CARDO-CHY-1           BPDO-RHA1           CMO-86           KyhA-H37Rv           NDO-98164		3400 1 GVF GNF A-I ML VVREGAYGEK-G 41 VWNPIDENTT WHPRGPHEI AWHPRGPHEI AWHPRGPNEI IWHPRGPNEI IWHPRGPNEI IWHPRGPNEI CHUYGDECY -EDVYGDAVY -EDVYGDAVY -YEGP-HPVY	SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EVWTYAIV EWTYAFV EWTYTFV EWTYTVV EWWTYTIV EWWTYTWV EWWFYTVV EWSFIV EWSFIN EWSFIN E	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-RHA1           CMD0-2038           CARDO-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBD0-S765           BPDO-81           RHD0-CHY-1           BPD0-81           RHD0-S765           BPD0-81           CARD0-CH10           ND0-98164           NBD0-12038           CARD0-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBD0-217038           CARD0-CA10           OMO-86           KshA-H37Rv           ND0-21038           CARD0-CA10           OMO-86           KshA-H37Rv           ND0-2038           CARD0-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBD0-J5765	PVFEGTIGGE PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NQELG PVLE-NQELG NUTTER 		SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EVWTYAIV EWTYAFV EWTYTFV EWTYTVV EWWTYTIV EWWTYTWV EWWFYTVV EWSFIV EWSFIN EWSFIN E	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-RHA1           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-21038           BPDO-81           RHD0-15765           BPDO-81           RHD0-CHY-1           BPDO-8141           CUMDO-1701           ND0-12038           CARDO-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBDO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-1901           ND0-98164           NBD0-15765           BPDO-RHA1           CMD0-17038           CARDO-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBD0-35765           BPDO-RHA1           VMD0-98164           NBD0-35765           BPD0-816           NBD0-35765           BPD0-8164           NBD0-35765           BPD0-8164           NBD0-35765           SPD0-8164           NB0-38164			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV C	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-RHA1           CMBO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-CH12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-CHY-1           BPDO-81           NDO-98164           NBO-212038           CARDO-CHY-1           BPDO-81           RHDO-CHY-1           BPDO-81           NDO-98164           NBO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-95765           BPO-81           NDO-98164           NBO-95765           BPO-81           NDO-98164           NBO-5756           BPO-81           RHOC-CHY-1			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV C	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81           CMBO-CHO-100           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-S765           BPDO-RHA1           CUMO-IP01           NDO-98164           NBDO-S765           BPDO-RHA1           CUMO-P01           NDO-98164           NBDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBD0-JS765           BPDO-R141           NDO-98164           NBD0-S765           BPDO-8161           NDO-98164           NBD0-S167           BPDO-8161           NDO-98164           NBDO-2107-110           NDO-98164           NBDO-2107-110			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRKNIF TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMISSPSW WKEMIDAPDW WSRMISEPSW WMQLMLAESP ASRWNRGIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-RHA1           CUMOO-PO1           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-5765           BPDO-81           CUMDO-101           NDO-98164           NDO-98164           NDO-9806           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-98164           NBO-98164           NBO-98164           NDO-98164           NDO-98164           NDO-2755           BPDO-RH-137kv           NDO-98164           NBO-CHY-1           BPO-RH-137kv           NDO-98164           NDO-2738           RHOO-CHY-1           BPO-RH-12038	PVFEGTIGGE           PVFEGTIGGE           PVLE-NQELG           PVLE-NQELG           PVTETNTFK		SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T AKE-RLGS-T GTSYGE KRRLADSVQR KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRQQTLR KEEYRKNIF TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMISSPSW WKEMIDAPDW WSRMISEPSW WMQLMLAESP ASRWNRGIAK	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81           CARDO-CA10           OMO-86           KshA-H37RV           NDO-98164           NBDO-21238           CARDO-CA10           OMO-86           KshA-H37RV           NDO-98164           NBO-21238           CARDO-CHY-1           BPDO-RHA1           CUMOD-IP01           NDO-98164           NBO-98164           NBO-21238           CARDO-CHY-1           BPDO-RHA1           CUMO-IP01           NDO-98164           NBO-12038           CARDO-CHY-1           BPDO-RHA1           CUMO-IP01           NDO-12038           CARDO-CHY-1           BPDO-RHA1           NDO-98164           NBO-38164           NBO-12038           CARDO-CHY-1           BPDO-RHA1           CMDO-12038           CARDO-CHY-1           NDO-98164           NBO-28164           NDO-12038           CARDO-CHY-1           NDO-12038           CARDO-CA10 <td></td> <td></td> <td>SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D</td> <td>33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE </td> <td>LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV C</td> <td>33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH  IVANDI  RHY-RT  RHY-RT </td> <td>CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT</td> <td>4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER</td> <td>309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389</td>			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV C	33800 RAR I YR SHLN RAR I YR SFLN RER LY LGHWN RER LY LGHWN RER LY UGHWN RER LY UGHWN ERGQQLMAQH LPADRMVAQH EI FR PTAFIH IVANDI RHY-RT RHY-RT 	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81A           CARDO-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBO-STR           BPDO-81           RHDO-CHY-1           BPDO-81           RHDO-12038           SBPDO-81           RHDO-26765           BPDO-81           RHDO-CHY-1           BPDO-81           CARDO-CA10           OMO-86           KshA-H37Rv           ND0-98164           NBO-21038           CARDO-CHY-1           BPDO-81           RHDO-CHY-1           BPDO-8164           NBO-98164           NBO-12038           CARDO-CHY-1           BPDO-RHA1           UMO-1P01           NDO-12038           CARDO-2			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EWTYAIV EWTYAFV EWTYTFV EWTYTVV- EWWTYTIV EWTYTWV EWSFIVV EWSFIVV EWSFIVV- HYYFQTLGKP HEYWEILVRV FVLQWGVIVE PGVVGKSAIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGIVGISFIG PGTS-YVYS PGEAYPLDYA D	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV C	33800 RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN RER L Y LGHWN RER L Y UGHWN ER GQQLMAQH L PADRMVAQH E I FR PTAF IH I VANDI RHY - RT AHLD - SEA 460 TF GPAGFWES SI GPAGFWES TF GTAGTLES TF GTAGTLES	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389
NBDO-J5765           BPDO-81           RHD0-CHY-1           BPDO-81A           CMBO-200           NDO-12038           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBDO-210388           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-CHY-1           BPDO-81           CARDO-CA10           OMO-86           KshA-H37Rv           NDO-98164           NBO-98164           RHDO-CHY-1           BPDO-RHA1           CUMO-1901           NDO-12038           CARDO-CA10           OMO-86           KShA-137Rv			SADLVPELMA SADNIPDLMA HIKR-EGWTK HRKG-DGWVK AI-MGPKVVT EAI-MGPKVVT EVWTYAIV EWTYAFV EWTYTFV EWTYTVV EWWTYTIV EWWTYTWV EWWFYTVV EWSFIV EWSFIN EWSFIN E	33600 FG-GA-KQEK FL-ED-TRGE YWTQGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK YWTKGPAAEK IPENIVEE 	LNK-EIGD-V LAK-EIGD-V VRR-KFGP-E VRR-KFGA-D ASE-RLGS-T AKE-RLGS-T LERRLTPEQV CHERRLTPEQV CHERRLTPEQV CHERRLTPEQV GTSYGE KRRVADAVQR KSMIQREAIR KSAIQREAIR KSAIQREAIR KSAIQREATR KEEYRQQTLR KEEYRQQTLR KEEYRRKNIF CDESVKSYLR EQEFESKWKP TDKLSRVFTE YQAHVSSSNW WKEMIDAPDW WYRMITSPDW WSRMISEPSW WMQLMLAESP ASRWNRQIAK	33800 RAR I YR SHLN RAR I YR SFLN RER L Y LGHWN RER L Y LGHWN RER L Y UGHWN ER GQQLMAQH L PADRMVAQH E I FR PTAF IH I VANDI RHY - RT AHLD - SEA 460 TF GPAGFWES SI GPAGFWES TF GTAGTLES TF GTAGTLES	CTVFPNNSML GTIFPNNSFL CSIFPNCSFL MTIFPTCSFL MTIFPTCSFL MTIFPTCSFL SIWLPGVLKV SVVLPGVLMV SVVLPGVLMV SVVLPGVLMV SVFGPSFMIN DDRENMETMS DDGENMSSAT DGENWVEIQ DDGENWVEIQ DDGENWVEIQ DGAENWRSIT DDIWAREAMV QDVEIWKHKT HTELTKTT	4000 1 TC YG PG PG ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWPE ENWER	309 302 303 302 312 298 312 277 294 248 380 376 373 374 369 383 390 368 316 447 437 448 448 444 448 444 448 444 389

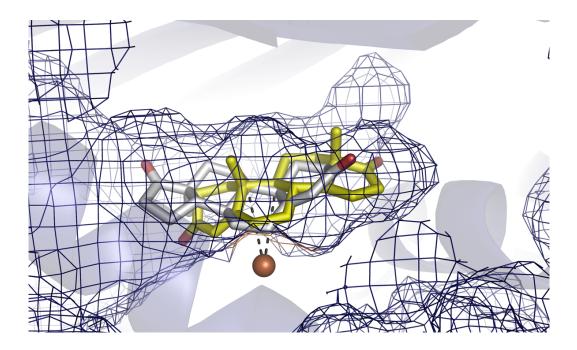
Supplemental Figure 3. Structure-based sequence alignment of ROs of known structure. The ROs are identified in the legend of Supplemental Figure 4. Metal ligands are highlighted in dark grey. Other conserved residues are highlighted in light grey.



Supplemental Figure 4. Radial phylogram of structurally characterized ROs. The  $\alpha_3$  and  $\alpha_3\beta_3$  enzymes are clustered at the bottom and top of the tree, respectively. Structure-based sequence alignments were performed using: KshA<sub>H37Rv</sub> from *M. tuberculosis* H37Rv (PDB accession code 2ZYL); OMO<sub>86</sub>, 2-oxoquinoline 8-monooxygenase from *P. putida* 86 (1Z02), CARDO<sub>J3</sub>, carbazole 1,9 $\alpha$ -dioxygenase from *Janthinobacerium* sp. strain J3 (1WW9); BPDO<sub>B1</sub>, biphenyl dioxygenase from *S. yanoikuyae* B1 (2GBW); BPDO<sub>RHA1</sub> from *R. jostii* RHA1 (1ULI); NDO<sub>9816-4</sub>, naphthalene dioxygenase from *Pseudomonas* sp. strain NCIB 9816-4 (1O7W); NDO<sub>12038</sub> from *Rhodococcus* sp. strain NCIMB 12038 (2B1X); CUMDO<sub>IP01</sub>, cumene dioxygenase from *P. fluorescens* IP01 (1WQL); NBDO<sub>JS765</sub> from *Comamonas* sp. strain JS765 (2BMO); and RHDO<sub>CHY-1</sub>, ring-hydroxylating dioxygenase from *Sphingomonas* sp. strain CHY-1 (2CKF).



Supplemental Figure 5. Orientation of the active site channel. The catalytic domains of KshA (green) and CARDO<sub>J3</sub> (magenta) are shown in the same orientation as A) ribbon diagrams with the Connolly surface displayed as mesh, and B) cross sections of the Connolly surface. The orientation of the active site channel is indicated with a black arrow. Figures were prepared using PYMOL.



Supplemental Figure 6. Additional solution of ADD docking simulation, from the same top rmsd cluster. Two conformations of ADD docked in the active site of KshA are shown as stick representations. Carbon atoms of the two conformations are shown in magenta and grey, oxygen atoms are shown in red. The distance between the mononuclear iron and the C9 atom is 3.8 Å and 3.7 Å for the two solutions. The mononuclear iron is represented as an orange sphere. Docking simulations were performed using AutoDock. The Connolly surface of the substrate-binding pocket is represented by blue mesh. Figure generated using PYMOL.