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NTDB id 600 KW2 RS01765 WP 011675413.1	VV	I	D	S	V	A	A	L	V	P	K	A	E	I	D	G	E	I	G	D	S	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	A	G	H	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	S	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	233			
NTDB id 269 KZH43 RS08665 WP 001085462.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 228 SPD RS09265 WP 001085462.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 194 SPR RS08825 WP 001085462.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 159 SP RS09750 WP 001085462.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 499 SM12261 RS08315 WP 078228268.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 527 SMSK321 RS11065 WP 001085454.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	G	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	232	
NTDB id 408 SMU RS09530 WP 002262392.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	S	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	S	232	
NTDB id 453 Spy49 1753c ACI62003.1	V	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	D	I	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	M	R	K	L	S	A	S	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	S	217	
NTDB id 115 BSU 16940 NP 389576.2	L	V	V	D	S	V	A	A	L	V	P	R	A	E	I	D	G	E	M	G	D	A	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	S	G	T	I	N	K	T	K	T	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	V	T	P	G	G	R	A	L	K	F	Y	S	219	
NTDB id 625 LCA RS02525 WP 011374196.1	V	V	V	D	S	V	A	A	L	T	P	R	A	E	I	D	G	M	G	D	S	L	P	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	A	I	L	S	K	T	G	T	A	A	I	F	I	N	Q	L	R	E	K	V	G	V	M	F	G	N	P	E	T	T	P	G	G	R	A	L	K	F	Y	A	231	
NTDB id 1245 Cj1673c YP 002345041.1	I	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	M	G	D	Q	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	I	V	H	K	M	N	T	V	I	F	I	N	Q	L	R	M	K	I	G	A	M	G	Y	C	T	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	219	
NTDB id 1211 C694 RS00795 WP 000963128.1	V	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	M	G	D	Q	H	V	G	L	Q	A	R	M	S	H	A	L	R	K	I	T	G	V	L	H	K	M	N	T	L	I	F	I	N	Q	L	R	M	K	I	G	M	G	Y	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	221		
NTDB id 1214 NCTC11637 00359 SQJ03206.1	V	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	M	G	D	Q	H	V	G	L	Q	A	R	M	S	H	A	L	R	K	I	T	G	V	L	H	K	M	N	T	L	I	F	I	N	Q	L	R	M	K	I	G	M	G	Y	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	221		
NTDB id 1334 RAOC RS04870 WP 004918236.1	V	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	M	G	D	S	K	M	G	L	H	A	R	L	M	S	Q	A	L	R	K	L	T	S	S	I	S	K	T	K	C	T	V	I	F	I	N	Q	L	R	D	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	227
NTDB id 1389 A4U84 RS07560 WP 021112712.1	I	I	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	M	G	D	S	H	M	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	A	N	I	K	N	T	N	C	L	V	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	N	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	235
NTDB id 1130 NGFG RS03960 WP 003688695.1	V	V	V	D	S	V	A	A	L	V	P	K	A	E	I	D	G	M	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	H	I	K	K	T	N	T	L	V	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	S	219
NTDB id 1124 NGFG RS03960 WP 003688695.1	V	V	V	D	S	V	A	A	L	V	P	K	A	E	I	D	G	M	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	H	I	K	K	T	N	T	L	V	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	S	219
NTDB id 1123 OK783 RS03845 WP 003688695.1	V	V	V	D	S	V	A	A	L	V	P	K	A	E	I	D	G	M	G	D	S	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	H	I	K	K	T	N	T	L	V	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	S	219
NTDB id 994146 AAG895 RS02855 WP 345794056.1	V	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	E	M	G	D	Q	L	P	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	A	N	I	K	R	T	N	T	L	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	219
NTDB id 1427 RS RS02760 WP 011000510.1	I	V	I	D	S	V	A	A	L	V	P	K	A	E	I	D	G	E	M	G	D	A	L	P	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	T	I	K	E	T	N	C	L	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	227
NTDB id 1165 A1552VC RS01565 WP 000344154.1	I	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	E	M	G	D	S	H	M	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	N	L	K	Q	S	N	C	M	C	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	N	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	218
NTDB id 1142 GTF74 RS11550 WP 000344154.1	I	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	E	M	G	D	S	H	M	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	N	L	K	Q	S	N	C	M	C	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	N	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	218
NTDB id 1205 PSJM300 05545 AFN77183.1	I	I	V	D	S	V	A	A	L	V	P	K	A	E	I	D	G	E	M	G	D	A	H	V	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	N	I	K	N	A	N	C	L	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	218
NTDB id 1022 ACIAD RS06390 WP 004925639.1	I	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	E	M	G	D	S	H	M	G	L	Q	A	R	M	S	Q	A	L	R	K	L	T	G	N	A	K	R	S	N	C	M	V	I	F	I	N	Q	L	R	M	K	I	G	V	M	F	G	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	218
NTDB id 1074 ABD1 RS10195 WP 000344167.1	I	V	V	D	S	V	A	A	L	T	P	K	A	E	I	D	G	E	M	G	D	S	H	M	G	L	Q	A	R	M	S	Q	A	L	R	K	L</																																										




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NTDB id 600 KW2 RS01765 WP 011675413.1	DEKIGGQA E KAKNYLKEHQDV F DEIDHKVRAAH C LDDSEVAETEETTA.SKTKAKAKKEEKAVETEEIELELED... 387
NTDB id 269 KZH43 RS08665 WP 001085462.1	DEKIGGQ S ENAKKYLA E HP E IFDEIDKQVRSK F CIDGEEVSEQDTENKK.DE...PKKEEA..VNEEVPLDLGDELEI 384
NTDB id 228 SPD RS09265 WP 001085462.1	DEKIGGQ S ENAKKYLA E HP E IFDEIDKQVRSK F CIDGEEVSEQDTENKK.DE...PKKEEA..VNEEVPLDLGDELEI 384
NTDB id 194 SPR RS08825 WP 001085462.1	DEKIGGQ S ENAKKYLA E HP E IFDEIDKQVRSK F CIDGEEVSEQDTENKK.DE...PKKEEA..VNEEVPLDLGDELEI 384
NTDB id 159 SP RS09750 WP 001085462.1	DEKIGGQ S ENAKKYLA E HP E IFDEIDKQVRSK F CIDGEEVSEQDTENKK.DE...PKKEEA..VNEEVPLDLGDELEI 384
NTDB id 499 SM12261 RS08315 WP 078228268.1	DEKIGGQ S ENAKKYLA D N P E I FDEID H Q V R V Q F CIDGEEIAES...KK.DE...AAQVDS..VNEEVTLDLGDELEI 380
NTDB id 527 SMSK321 RS11065 WP 001085454.1	DEKIGGQ S ENAKKYLA D N P E V F A EID H Q V R V Q F CIDGEEAAES...KK.DE...VAQVDS..VNEEVTLDLGDLEI 380
NTDB id 408 SMU RS09530 WP 002262392.1	GEKIGGQ S ENAKK F L A D N P E I F D D ID H K V R V Q Y C L IEDNTEEKQSSKEK.....ETDEK..ADKNLVLELDDTIEL 381
NTDB id 453 Spy49 1753c ACI62003.1	GEKIGGQ S ENAKRYL A D H P Q L F DEID R K V R V K F C L EESEEEESAMAVASE.....E.....TDDLALDLNGIEI 376
NTDB id 115 BSU 16940 NP 389576.2	EER L GGGREN A K Q F L KE N K D I M L M I Q E Q I R E H Y C LDNNGVVQQQAEETQE.EL.EFE.E..... 348
NTDB id 625 LCA RS02525 WP 011374196.1	SERIGGQREN A K N Y L A D H E D V E D V R L K V R A A Y C ISDVPEEDLPTTEDE..QI.NILPDDST....EE..... 355
NTDB id 1313 DR RS12030 WP 010888966.1	DERIGGQ K E K T I A Y I A E R P E M E Q E I R D R V M A A I R A G N A G E A P A L A P A A E A E A 363
NTDB id 1245 Cj1673c YP 002345041.1	DKK L GGGREN S K A F L KE N P E I A D E I T K A I Q N S M C I E G M I..SGSEDEGE... 343
NTDB id 1211 C694 RS00795 WP 000963128.1	DKK L GGGREN A K A L L K E D K A L A D E I T L K I K E S I C S N E E I ..MPLPDEPLEE..ME..... 347
NTDB id 1214 NCTC11637 00359 SQJ03206.1	DKK L GGGREN A K A L L K E D K A L A D E I T L K I K E S I C S N E E I ..MPLPDEPLEE..ME..... 347
NTDB id 1334 RAOC RS04870 WP 004918236.1	DTK L GGGRD T V K E L I K D N P E I A E E L A K I R E K L Q A K..... 343
NTDB id 1389 A4U84 RS07560 WP 021112712.1	G T KIGGQ K N N A V K V LKE N P E I A D K L E Q E I R N T L A SNPNS..VLKATASDSNDESDVEEF.....SEEL..... 372
NTDB id 1130 NGFG RS03960 WP 003688695.1	GAKIGGQ K D N V R V L KE N P E I S D E I D A K I R A L N C V E M H I..TEGTQD.....ETDGER.....PEE..... 348
NTDB id 1124 NGFG RS03960 WP 003688695.1	GAKIGGQ K D N V R V L KE N P E I S D E I D A K I R A L N C V E M H I..TEGTQD.....ETDGER.....PEE..... 348
NTDB id 1123 OK783 RS03845 WP 003688695.1	GAKIGGQ K D N V R V L KE N P E I S D E I D A K I R A L N C V E M H I..TEGTQD.....ETDGER.....PEE..... 348
NTDB id 994146 AAG895 RS02855 WP 345794056.1	GDKIGGQ K D N S R E F L R N P A L A R E I E N K V R V A V C L P E M P ..P.ATPAAPAPAEA..... 345
NTDB id 1427 RS RS02760 WP 011000510.1	GE R IGGQ R D N C R E F L R E N A E L A R E I E N K V R E H L C V T P M G..A.VTLAEVEED..... 352
NTDB id 1165 A1552VC RS01565 WP 000344154.1	GDKIGGQ K A N A C K Y LKE N P E I A K T L D K K L R E M L L N P E N M..QLIAETSSAADDVEFGAV.....PEEF..... 354
NTDB id 1142 GTF74 RS11550 WP 000344154.1	GDKIGGQ K A N A C K Y LKE N P E I A K T L D K K L R E M L L N P E N M..QLIAETSSAADDVEFGAV.....PEEF..... 354
NTDB id 1205 PSJM300 05545 AFN77183.1	GSKIGGQ K A N A A K Y L E E N P E I G G E I E Q Q I R A K L L V T S A N..TKATPVAEDLADADI..... 347
NTDB id 1022 ACIAD RS06390 WP 004925639.1	GNKIGGQ K N N V I R Y L E E N P Q I S T E I E A V I R E Q L L T K A S D..QTAA.HDETEEEPDLL.....ES..... 349
NTDB id 1074 ABD1 RS10195 WP 000344167.1	GNKIGGQ K N N V I R Y F E E N N Q I A E I E R N I R E Q L L T T G T N ..GAVQ.I.EDEEPPDLL.....LES..... 349
consensus	***!!!***** ** ***** ***** ** **

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	E	L	E	E	
NTDB id 600 KW2 RS01765 WP 011675413.1	387
NTDB id 269 KZH43 RS08665 WP 001085462.1	E	I	E	E	388
NTDB id 228 SPD RS09265 WP 001085462.1	E	I	E	E	388
NTDB id 194 SPR RS08825 WP 001085462.1	E	I	E	E	388
NTDB id 159 SP RS09750 WP 001085462.1	E	I	E	E	388
NTDB id 499 SM12261 RS08315 WP 078228268.1	E	I	E	E	384
NTDB id 527 SMSK321 RS11065 WP 001085454.1	E	I	E	E	384
NTDB id 408 SMU RS09530 WP 002262392.1	E	D	.	.	383
NTDB id 453 Spy49 1753c ACI62003.1	E	D	.	.	378
NTDB id 115 BSU 16940 NP 389576.2	.	.	.	.	348
NTDB id 625 LCA RS02525 WP 011374196.1	.	.	.	.	355
NTDB id 1313 DR RS12030 WP 010888966.1	.	.	.	.	363
NTDB id 1245 Cj1673c YP 002345041.1	.	.	.	.	343
NTDB id 1211 C694 RS00795 WP 000963128.1	.	.	.	.	347
NTDB id 1214 NCTC11637 00359 SQJ03206.1	.	.	.	.	347
NTDB id 1334 RAOC RS04870 WP 004918236.1	.	.	.	.	343
NTDB id 1389 A4U84 RS07560 WP 021112712.1	.	.	.	.	372
NTDB id 1130 NGFG RS03960 WP 003688695.1	.	.	.	.	348
NTDB id 1124 NGFG RS03960 WP 003688695.1	.	.	.	.	348
NTDB id 1123 OK783 RS03845 WP 003688695.1	.	.	.	.	348
NTDB id 994146 AAG895 RS02855 WP 345794056.1	.	.	.	.	345
NTDB id 1427 RS RS02760 WP 011000510.1	.	.	.	.	352
NTDB id 1165 A1552VC RS01565 WP 000344154.1	.	.	.	.	354
NTDB id 1142 GTF74 RS11550 WP 000344154.1	.	.	.	.	354
NTDB id 1205 PSJM300 05545 AFN77183.1	.	.	.	.	347
NTDB id 1022 ACIAD RS06390 WP 004925639.1	.	.	.	.	349
NTDB id 1074 ABD1 RS10195 WP 000344167.1	.	.	.	.	349
consensus					

 non conserved
 similar
 ≥ 50% conserved