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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	C	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	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	219	
NTDB id 625 LCA RS02525 WP 011374196.1	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	219	
NTDB id 1313 DR RS12030 WP 010888966.1	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	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	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	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	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	T	G	I	V	H	K	M	N	T	L	I	F	I	N	Q	L	R	M	K	I	G	A	M	G	Y	C	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	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	T	G	I	V	H	K	M	N	T	L	I	F	I	N	Q	L	R	M	K	I	G	A	M	G	Y	C	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	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	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 1130 NGFG RS03960 WP 003688695.1	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	T	G	H	I	K	K	T	N	L	V	V	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	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	T	G	H	I	K	K	T	N	L	V	V	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	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	T	G	H	I	K	K	T	N	L	V	V	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 74701 NTHI477 RS08465 WP 005654959.1	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	T	G	Q	I	K	N	A	N	C	L	V	V	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	S	220
NTDB id 1389 A4U84 RS07560 WP 021112712.1	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	T	A	N	I	K	N	T	N	C	L	V	V	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 1427 RS RS02760 WP 011000510.1	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	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	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	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	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	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	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	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	S	P	E	T	T	P	G	G	N	A	L	K	F	Y	A	218
NTDB id 1022 ACIAD RS06390 WP 004925639.1	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																																												






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NTDB id 600 KW2 RS01765 WP 011675413.1	DEKIGGQAEKAKNYLKEHQDVFEIDHKVRAAHGILDDSEVAETE.EETASKTKAKAKKEEKAVETEEIELELED...	387
NTDB id 269 KZH43 RS08665 WP 001085462.1	DEKIGGQSENAKKYLAEHPEIFDEIDKQVRSKFCIDGEEVSEQD.TENKKDE....PKKEEA..VNEEVPLDLGDELEI	384
NTDB id 228 SPD RS09265 WP 001085462.1	DEKIGGQSENAKKYLAEHPEIFDEIDKQVRSKFCIDGEEVSEQD.TENKKDE....PKKEEA..VNEEVPLDLGDELEI	384
NTDB id 194 SPR RS08825 WP 001085462.1	DEKIGGQSENAKKYLAEHPEIFDEIDKQVRSKFCIDGEEVSEQD.TENKKDE....PKKEEA..VNEEVPLDLGDELEI	384
NTDB id 159 SP RS09750 WP 001085462.1	DEKIGGQSENAKKYLAEHPEIFDEIDKQVRSKFCIDGEEVSEQD.TENKKDE....PKKEEA..VNEEVPLDLGDELEI	384
NTDB id 499 SM12261 RS08315 WP 078228268.1	DEKIGGQSENAKKYLADNPEIFDEIDHQVRSKFCIDGEEIAES....KKDE....AAQVDS..VNEEVTLDLGDELEI	380
NTDB id 527 SMSK321 RS11065 WP 001085454.1	DEKIGGQSENAKKYLADNPEVFAEIDHQVRSKFCIDGEEAAES....KKDE....VAQVDS..VNEEVTLDLGDLEI	380
NTDB id 408 SMU RS09530 WP 002262392.1	GEKIGGQSENAKKFLADNPEIFDDIDHKVRSKFCILEEDNTEEKQ.SSKEK.....ETDEK..ADKNLVLELDDTIEL	381
NTDB id 453 Spy49 1753c ACI62003.1	GEKIGGQSENAKRYLADHPQLFDEIDRKVRSKFCILEESEESAM.AVASE.....E.....TDDLALDLNGIEI	376
NTDB id 115 BSU 16940 NP 389576.2	EERLGGQRENAKQFLKENKDIIMLMIQEQIREHYCIDNNGVVQQQA.EETQEEL.EFE.E.....	348
NTDB id 625 LCA RS02525 WP 011374196.1	SERIGGQRENAKNYLADHEDVEDEVRLKVRAYGICSDVPEEDLPT.TEDE.QI.NILPDDST....EE.....	355
NTDB id 1313 DR RS12030 WP 010888966.1	DERIGGQCKEKTIAIYIAERPMEQEIRDRVMAAIRAGNAGEAPALAPAPAAPEAAEA.....	363
NTDB id 1245 Cj1673c YP 002345041.1	DKKLGQGRENSKAFLENPEIADEITKATQNSMCIEGMISGS..EDDEGE..E.....	343
NTDB id 1211 C694 RS00795 WP 000963128.1	DKKLGQGRENAKALLKEDKALADEITLTKESIGSNEEIMPL..PDEPLE..EME.....	347
NTDB id 1214 NCTC11637 00359 SQJ03206.1	DKKLGQGRENAKALLKEDKALADEITLTKESIGSNEEIMPL..PDEPLE..EME.....	347
NTDB id 1334 RAOC RS04870 WP 004918236.1	DTKLGQGRDITVKELIKDNPEIAEELAKIREKLQAK.....	343
NTDB id 1130 NGFG RS03960 WP 003688695.1	GAKIGQCKDNVVRVWLENPEISDEIDAKIRALNCEMHITEG..T...QD..ETDGE.RPEE.....	348
NTDB id 1124 NGFG RS03960 WP 003688695.1	GAKIGQCKDNVVRVWLENPEISDEIDAKIRALNCEMHITEG..T...QD..ETDGE.RPEE.....	348
NTDB id 1123 OK783 RS03845 WP 003688695.1	GAKIGQCKDNVVRVWLENPEISDEIDAKIRALNCEMHITEG..T...QD..ETDGE.RPEE.....	348
NTDB id 74701 NTHI477 RS08465 WP 005654959.1	GEKIGQCKANSKMWLNENIEKSDLEARLRAELVANPEQALM..ADIEQSENNTESDFE.....	354
NTDB id 1389 A4U84 RS07560 WP 021112712.1	GTKIGGQKNNVAVKWLKENPEIADKLEQETRNTLASNPNSVLK..ATASDSNDVSDVE.EFSE.....EEL.....	372
NTDB id 1427 RS RS02760 WP 011000510.1	GERIGQCRDNCHEFLRENAEIAREIENKVRHLCTPMGAV..TLAEVEED.....	352
NTDB id 1165 A1552VC RS01565 WP 000344154.1	GDKIGGQKANACKYLLKENPEIAKTLDKKLREMLLNPNMQLI..AETSSAADVEFGAVPE.....EF.....	354
NTDB id 1142 GTF74 RS11550 WP 000344154.1	GDKIGGQKANACKYLLKENPEIAKTLDKKLREMLLNPNMQLI..AETSSAADVEFGAVPE.....EF.....	354
NTDB id 1205 PSJM300 05545 AFN77183.1	GSKIGQCKANAACKYLEENPEIGQEIQQTRAKLVTSANTKA..TPVAEDLADADI.....	347
NTDB id 1022 ACIAD RS06390 WP 004925639.1	GNKIGGQKNNVIRYLEENPEISTEIEAVIREQLLTKASDQTA..A.HDETEEIPDLL..ES.....	349
NTDB id 1074 ABD1 RS10195 WP 000344167.1	GNKIGGQKNNVIRYFENNQIAEIERNIREQLLTTGTNGAV..Q.I.EDEEIPDLL..LE.....S.....	349
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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 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 74701 NTHI477 RS08465 WP 005654959.1	.	.	.	.	354
NTDB id 1389 A4U84 RS07560 WP 021112712.1	.	.	.	.	372
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