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NTDB id 625 LCA RS02525 WP 011374196.1	I V E I Y G P E S S G K T T V A L H A V A E V Q K Q G G T A A Y I D A E N A M D P K Y A T A L G V N I D D L L S Q P D T G E Q G L E I A D A L V S S G A V D I	140
NTDB id 346635 EXW29 RS18740 WP 001283854.1	I I E I Y G P E S S G K T T V S L H A I A E V Q R Q G G Q A A F I D A E H A M D P V Y A Q K L G V N I D E L L S Q P D T G E Q G L E I A E A L V R S G A V D I	138
NTDB id 115 BSU 16940 NP 389576.2	I I E V Y G P E S S G K T T V A L H A I A E V Q Q Q G G Q A A F I D A E H A L D P V Y A Q K L G V N I E E L L S Q P D T G E Q A L E I A E A L V R S G A V D I	138
NTDB id 600 KW2 RS01765 WP 011675413.1	I V E I Y G P E S S G K T T V A L H A V A A V Q K E G G I A A F I D A E N A L D P E Y A K A L G V N I D E L L S Q P D Y G E Q G L Q I A E K L I T S G A V D L	154
NTDB id 269 KZH43 RS08665 WP 001085462.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 228 SPD RS09265 WP 001085462.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 194 SPR RS08825 WP 001085462.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 159 SP RS09750 WP 001085462.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 499 SM12261 RS08315 WP 078228268.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 527 SMSK321 RS11065 WP 001085454.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 453 Spy49 1753c ACI62003.1	I I E I Y G P E S S G K T T V A L H A V A Q A Q K E G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L A Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 408 SMU RS09530 WP 002262392.1	I V E I Y G P E S S G K T T V A L H A V A Q A Q K D G G I A A F I D A E H A L D P A Y A A A L G V N I D E L L S Q P D S G E Q G L E I A G K L I D S G A V D L	153
NTDB id 1313 DR RS12030 WP 010888966.1	I T E I Y G P E S G K T T L A L A I V A Q A Q K A G G T C A F I D A E H A L D P V Y A R A L G V N T D E L L V S Q P D N G E Q A L E I M E L L V R S G A I D V	152
NTDB id 1245 Cj1673c YP 002345041.1	I I E I Y G P E S S G K T T L T L H I I A E C Q K A G G V C A F I D A E H A L D V K Y A K N L G V N T D D L Y V S Q P D F G E Q A L E I V E T I A R S G A V D L	139
NTDB id 1211 C694 RS00795 WP 000963128.1	I I E I Y G P E S S G K T T L S L H I I A E C Q K N G G V C A F I D A E H A L D V H Y A K R L G V D T E N L L V S Q P D T G E Q A L E I L E T I T R S G G I D L	141
NTDB id 1214 NCTC11637 00359 SQJ03206.1	I I E I Y G P E S S G K T T L S L H I I A E C Q K N G G V C A F I D A E H A L D V H Y A K R L G V D T E N L L V S Q P D T G E Q A L E I L E T I T R S G G I D L	141
NTDB id 1334 RAOC RS04870 WP 004918236.1	I V E I Y G P E S S G K T T L T L H A I A E A Q K V G G T A A F I D A E H A F D M H Y A E K L G I N L E E L I V S Q P D N G E Q A L E I A D S L I T R S G G V D I	148
NTDB id 1389 A4U84 RS07560 WP 021112712.1	I V E I Y G P E S S G K T T L T L S L I A Q A Q K G N K T C A F I D A E H A L D P V Y A R N L G V N T D E L L S Q P D N G E Q A L E I C D A L V R S G A V D V	156
NTDB id 1130 NGFG RS03960 WP 003688695.1	I V E I F G P E S S G K T T L C L E A V A Q C Q K N G G V C A F V D A E H A F D P V Y A R K L G V K V E E L Y L S Q P D T G E Q A L E I C D T L V R S G G I D M	140
NTDB id 1124 NGFG RS03960 WP 003688695.1	I V E I F G P E S S G K T T L C L E A V A Q C Q K N G G V C A F V D A E H A F D P V Y A R K L G V K V E E L Y L S Q P D T G E Q A L E I C D T L V R S G G I D M	140
NTDB id 1123 OK783 RS03845 WP 003688695.1	I V E I F G P E S S G K T T L C L E A V A Q C Q K N G G V C A F V D A E H A F D P V Y A R K L G V K V E E L Y L S Q P D T G E Q A L E I C D T L V R S G G I D M	140
NTDB id 1427 RS RS02760 WP 011000510.1	V V E I Y G P E S S G K T T L T L Q V V A E M Q K L G G T C A F I D A E H A L D V T Y A D K L G V K V P D L I S Q P D T G E Q A L E I A D A L V R S G S V D L	148
NTDB id 1165 A1552VC RS01565 WP 000344154.1	I V E I F G P E S S G K T T L T L E L I A A A Q R E G K T C A F I D A E H A L D P V Y A K K L G V N I D E L L V S Q P D T G E Q A L E I C D A L A R S G A V D V	139
NTDB id 1142 GTF74 RS11550 WP 000344154.1	I V E I F G P E S S G K T T L T L E L I A A A Q R E G K T C A F I D A E H A L D P V Y A K K L G V N I D E L L V S Q P D T G E Q A L E I C D A L A R S G A V D V	139
NTDB id 1074 ABD1 RS10195 WP 000344167.1	I I E I Y G P E S S G K T T M T L Q A I A Q C Q K S G G T C A F I D A E H A L D P Q Y A R K L G V D I D N L L V S Q P D N G E Q A L E I A D M L V R S G A I D L	139
NTDB id 1022 ACIAD RS06390 WP 004925639.1	I V E I Y G P E S S G K T T M T L Q A I A Q C Q K A G G T C A F I D A E H A L D P Q Y A R K L G V D I D N L L V S Q P D H G E Q A L E I A D M L V R S G A I D L	139
NTDB id 1205 PSJM300 05545 AFN77183.1	I V E I Y G P E S S G K T T L T L S V I A A A Q R M G S T C A F V D A E H A L D P D Y A G K L G V N V D D L L V S Q P D T G E Q A L E I T D M L V R S N A V D V	139
consensus	* * ! * * ! ! ! * ! ! ! ! * ! * * ! * * * ! * * ! ! * ! * * ! ! ! * * * ! ! * * * ! ! * ! ! ! * ! * ! ! * * * ! * * * ! * * * ! *	



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NTDB id 625 LCA RS02525 WP 011374196.1	TVRLEVRRRAETIKNGT.....DM	IGNRARIKVVKNKVAPPFKVAEVDIMYGGQGISRTGELVDMAVEKDII	INKSGSWYSYG	294
NTDB id 346635 EXW29 RS18740 WP 001283854.1	TVRLEVRRRAEQLKQGN.....DI	VGNKTKVKKVKNKVAPPFRVAEVDIMYGGEGISREGEILDMASELDIV	QKSGAWYSYN	292
NTDB id 115 BSU 16940 NP 389576.2	SVRLEVRRAEQLKQGN.....DM	MGNKTKIKVVKNKVAPPFRVAEVDIMYGGEGISKEGEIIDLGTELD	IVQKSGSWYSYE	292
NTDB id 600 KW2 RS01765 WP 011675413.1	SVRLDVRGSTKIEEGS.GDNKTQ	IGKITKIKVVKNKVAPPFKVALVDIMFGEGISSTGELLNIAVEEGI	IKKSGAWFAYN	312
NTDB id 269 KZH43 RS08665 WP 001085462.1	SVRLDVRGNTQIKGTG.DQKETN	VGKETKIKVVKNKVAPPFKAEVVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 228 SPD RS09265 WP 001085462.1	SVRLDVRGNTQIKGTG.DQKETN	VGKETKIKVVKNKVAPPFKAEVVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 194 SPR RS08825 WP 001085462.1	SVRLDVRGNTQIKGTG.DQKETN	VGKETKIKVVKNKVAPPFKAEVVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 159 SP RS09750 WP 001085462.1	SVRLDVRGNTQIKGTG.DQKETN	VGKETKIKVVKNKVAPPFKAEVVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 499 SM12261 RS08315 WP 078228268.1	SVRLDVRGSTQIKGTG.DQKDTN	VGKETKIKVVKNKVAPPFKAEAFVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 527 SMSK321 RS11065 WP 001085454.1	SVRLDVRGSTQIKGTG.DQKDTN	VGKETKIKVVKNKVAPPFKAEAFVEIMYGGEGISKTGELLKIASDLDI	IKKAGAWYSYK	311
NTDB id 453 Spy49 1753c ACI62003.1	SVRLDVRGTTQIKGTG.DQKDS	IGKETKIKVVKNKVAPPFKVAEVEIMYGGEGISRTGELVKIASDLDI	IQKAGAWFSYN	311
NTDB id 408 SMU RS09530 WP 002262392.1	SVRLDVRGNTQIKGTG.EQKDSN	IGKETKIKVVKNKVAPPFKAEAFVEIYYGGEGISRTGELVKIASDLGI	IQKAGAWYSYN	311
NTDB id 1313 DR RS12030 WP 010888966.1	SVRLDVRKIGQ....PTKVGND	AVANTVKIKTVKNKVAAPFKVEVELALVYGGKGFQDLSDLVGLAADM	DIKKAGSFSYSG	307
NTDB id 1245 Cj1673c YP 002345041.1	SVRLDVRKIVAT....L.KQNEEP	IGNRVKVVKNKVAPPFRQAEFDMVFGEGLSREGELIDYGVKLDIV	DKSGAWFSYK	294
NTDB id 1211 C694 RS00795 WP 000963128.1	SVRIDIRRIAS....L.KQNEQH	IGNRAKAKVVKNKVAPPFRQAEFDIMFGEGISKEGEIIDYGVKLDIV	DKSGAWLSYQ	296
NTDB id 1214 NCTC11637 00359 SQJ03206.1	SVRIDIRRIAA....L.KQNEQH	IGNRAKAKVVKNKVAPPFRQAEFDIMFGEGISKEGEIIDYGVKLDIV	DKSGAWLSYQ	296
NTDB id 1334 RAOC RS04870 WP 004918236.1	SVRIDIRRLSDTGKIKDKSGEV	IGNRTKVVKNKVAPPFKSAEFDIMYGGEGVSKVGEILDVATDLDI	IQKSGSWFSYQ	307
NTDB id 1389 A4U84 RS07560 WP 021112712.1	SVRLDIRRCGV....V.KDGDEI	IGSETKVVKNKVAPPFRVQFQDIMYGGEGISRMNELLILAEANGFI	IKKSGAWFSYD	310
NTDB id 1130 NGFG RS03960 WP 003688695.1	SVRLDIRRTGS....I.KKGEV	LGNETRVKVIKNKVAPPFRQAEFDILYGGEGISWEGELIDIGVKNDI	INKSGAWYSYN	294
NTDB id 1124 NGFG RS03960 WP 003688695.1	SVRLDIRRTGS....I.KKGEV	LGNETRVKVIKNKVAPPFRQAEFDILYGGEGISWEGELIDIGVKNDI	INKSGAWYSYN	294
NTDB id 1123 OK783 RS03845 WP 003688695.1	SVRLDIRRTGS....I.KKGEV	LGNETRVKVIKNKVAPPFRQAEFDILYGGEGISWEGELIDIGVKNDI	INKSGAWYSYN	294
NTDB id 1427 RS RS02760 WP 011000510.1	SVRLDIRRIGS....I.KKGEV	GNETKVVKNKVAPPFRQAEIFDILYGGAGVSREGEIIDLGVEAKV	VEKSGAWYSYN	302
NTDB id 1165 A1552VC RS01565 WP 000344154.1	SVRLDIRRTGA....I.KEGEEV	VGNETRIKVVKNKIAAPFKAEANTQIMYGGGFNREGELIDLGVKHKM	VEKSGAWYSYN	293
NTDB id 1142 GTF74 RS11550 WP 000344154.1	SVRLDIRRTGA....I.KEGEEV	VGNETRIKVVKNKIAAPFKAEANTQIMYGGGFNREGELIDLGVKHKM	VEKSGAWYSYN	293
NTDB id 1074 ABD1 RS10195 WP 000344167.1	SVRLDIRRIGQ....V.KEGDEI	VGSETKVVKNKMAPPFKEAIFQILYGGKGTNQLGELVDLAVQQN	IVQKAGAWYSYQ	293
NTDB id 1022 ACIAD RS06390 WP 004925639.1	SVRLDIRRIGQ....V.KEGDEI	IGSETKVVKNKMAPPFKEAIFQILYGGKGTNQLGELVDLAVQQN	IVQKAGAWYSYQ	293
NTDB id 1205 PSJM300 05545 AFN77183.1	SVRLDIRRTGA....V.KEGDEV	VGSETRVKVVKNKVAPPFRQAEFQILYGGKIYRNGEIIDLGVQQGL	VEKSGAWAYK	293
consensus	*!!**!*	* ** *****!!*!!*!!*!!* * *****!*!*** **	*** ! !****!	

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NTDB id 625 LCA RS02525 WP 011374196.1  
 NTDB id 346635 EXW29 RS18740 WP 001283854.1  
 NTDB id 115 BSU 16940 NP 389576.2  
 NTDB id 600 KW2 RS01765 WP 011675413.1  
 NTDB id 269 KZH43 RS08665 WP 001085462.1  
 NTDB id 228 SPD RS09265 WP 001085462.1  
 NTDB id 194 SPR RS08825 WP 001085462.1  
 NTDB id 159 SP RS09750 WP 001085462.1  
 NTDB id 499 SM12261 RS08315 WP 078228268.1  
 NTDB id 527 SMSK321 RS11065 WP 001085454.1  
 NTDB id 453 Spy49 1753c ACI62003.1  
 NTDB id 408 SMU RS09530 WP 002262392.1  
 NTDB id 1313 DR RS12030 WP 010888966.1  
 NTDB id 1245 Cj1673c YP 002345041.1  
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 NTDB id 1389 A4U84 RS07560 WP 021112712.1  
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 NTDB id 1142 GTF74 RS11550 WP 000344154.1  
 NTDB id 1074 ABD1 RS10195 WP 000344167.1  
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consensus



SERIGQGRENAKNYLADHEDVEDEVRLKVRRAAYGTSVPEEDLPTTEDEQINILPDDSTEE..... 355  
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 EERLGQGRENAKQFLKENKDIMLMIQEIQIREHYGLDNNGVVQQQA..EETQEELE...FEE..... 348  
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 DEKIGQGS ENAKKYLA EHPEIFDEIDKQVRSKFG LIDGEEVSEQD TENKKDE...PKKEEA..VNEEVPLDLGDELEIE 385  
 DEKIGQGS ENAKKYLA EHPEIFDEIDKQVRSKFG LIDGEEVSEQD TENKKDE...PKKEEA..VNEEVPLDLGDELEIE 385  
 DEKIGQGS ENAKKYLA EHPEIFDEIDKQVRSKFG LIDGEEVSEQD TENKKDE...PKKEEA..VNEEVPLDLGDELEIE 385  
 DEKIGQGS ENAKKYLA EHPEIFDEIDKQVRSKFG LIDGEEVSEQD TENKKDE...PKKEEA..VNEEVPLDLGDELEIE 385  
 DEKIGQGS ENAKKYLA DNPEIFDEIDHQV RVVQFGLIDGEEIAES...KKDE...AAQVDS..VNEEVTLDLGDELEIE 381  
 DEKIGQGS ENAKKYLA DNPEVFAEIDHQV RVVQFGLIDGEEAAES...KKDE...VAQVDS..VNEEVTLDLGDELEIE 381  
 GEKIGQGS ENAKRYLADHPQLFDEIDRKV RVVKFGLLEESEEEESAMAVASE.....E.....TDDLALDLNGIEIE 377  
 GEKIGQGS ENAKKFLADNPEIFDDIDHKV RVVQYGLIEEDNTEEKQSSKEK.....ETDEK..ADKNLVLELDDTIELE 382  
 DERIGQGKEKTIAYIAERPMEQEIRDRVMAAIRAGNAGEAPALAPAPAAPEAAEA..... 363  
 DKKLGQGRENSKAF LKENPEIAD EITKAIQNSMGT EGM I...SGSEDDE..GEE..... 343  
 DKKLGQGRENAKALLKEDKALADEITLTKESIGSNEEI...MPLPDEP..LEEME..... 347  
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 GAKIGQKDNV RVVWLKENPEISDEIDAKIRALNGVEMHI...TEGTQDETD...GER..PEE..... 348  
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 GDKIGQK KANACKY LKENPEIAKTL DKKLREMLLN PENM...QLIAETSSAADDVEFGAV..PEEF..... 354  
 GDKIGQK KANACKY LKENPEIAKTL DKKLREMLLN PENM...QLIAETSSAADDVEFGAV..PEEF..... 354  
 GNKIGQGNNVIRYFEENNQIAEEIERNIREQLLTGTN...GAVQ.I.EDEE EPD..LL..LES..... 349  
 GNKIGQGNNVIRYLEENPQISTEIEAVIREQLLTKASD...QTAA.HDETEE EPD..LL..ES..... 349  
 GSKIGQK KANAACKY LEENPEIGQEIEQQIRAKLLVTSAN...TKATPVAEDLADAD..I..... 347

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NTDB id 600 KW2 RS01765 WP 011675413.1	...	387	
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NTDB id 228 SPD RS09265 WP 001085462.1	IEE	388	
NTDB id 194 SPR RS08825 WP 001085462.1	IEE	388	
NTDB id 159 SP RS09750 WP 001085462.1	IEE	388	
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NTDB id 1022 ACIAD RS06390 WP 004925639.1	...	349	
NTDB id 1205 PSJM300 05545 AFN77183.1	...	347	

consensus

 non conserved  
 similar  
 ≥ 50% conserved