

Supporting Information 2

An Immunoinformatics Approach to Design a Potent Multi-Epitope Vaccine Against Asia-1 Genotype of Crimean-Congo Haemorrhagic Fever Virus Using the Structural Glycoproteins as a Target

Syed Zawar Shah^{1†}, Basit Jabbar¹, Muhammad Usman Mirza², Muhammad Waqas^{3,4†}, Shahkaar Aziz⁵, Sobia Ahsan Halim⁴, Amjad Ali^{3*}, Shazia Rafique¹, Muhammad Idrees¹, Asaad Khalid^{6,7}, Ashraf N. Abdalla⁸, Ajmal Khan^{4*}, and Ahmed Al-Harrasi^{4*}

1. Centre of Excellence in Molecular Biology, University of the Punjab, 53700, Punjab, Pakistan.
 2. Department of Chemistry and Biochemistry, University of Windsor, ON, Canada.
 3. Department of Biotechnology and Genetic Engineering, Hazara University Mansehra 21120, Mansehra, Pakistan.
 4. Natural and Medical Sciences Research Center, University of Nizwa, Birkat-ul-Mouz 616, Nizwa, Oman
 5. Institute of Biotechnology and Genetic Engineering, the University of Agriculture Peshawar, Pakistan.
 6. Substance Abuse and Toxicology Research Center, Jazan University, P.O. Box: 114, Jazan 45142, Saudi Arabia.
 7. Medicinal and Aromatic Plants and Traditional Medicine Research Institute, National Center for Research, P. O. Box 2404, Khartoum, Sudan
 8. Department of Pharmacology and Toxicology, College of Pharmacy, Umm Al-Qura University, Makkah 21955, Saudi Arabia.
- †These authors have contributed equally to this work.

* Correspondence: amjad.camb@pu.edu.pk (A.A.); ajmalkhan@unizwa.edu.om (A.K); aharrasi@unizwa.edu.om (A.A-H)

A. Multiple Sequence Alignment of Congo virus Asia-1 genotype genomes retrieved from NCBI with accession numbers AAM48107, AAK52742, BAB84572, AIE16134, ABB30033, AIE16135, ABB30035, ABB30032, AIE16129, AIE1612B8, AIE16130, AIE16131, AIE16133, AIE16132, AAW84284, AAK52743, ABB30029, BA84577, AF338470 and BAB84578

AAM48107.1	MSFNIMYTLI	LCAVLCQLW	SSEGLHGLSN	ETQHGNASTI	KAFESVQGLG	LPVSTAPPTI	SDPPSITSAA	SVSGPEGSGB	TNTSPSVTTQ
BAB84577.1	MSFSVMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
BAB84578.1	MSFSVMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
AAK18286.1	MSFSVMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
AAK52743.1	MSFSVMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SEPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
AAW84284.1	MSFSIMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
ABB30029.1	MSFSIMYTP	LCAVLCQLW	SLESHGLSN	KTQHSNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SVSGSEGSGB	TNTSPSVTTQ
AIE16128.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPPTTPTA	SASGPEGSGB	TSTSPSVTTQ
AIE16130.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16129.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16131.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16133.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16132.1	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
ABB30032.1	MPVNTMHTLL	VYAVFCQLW	SPGGTNGLSN	ETQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
ABB30033.1	MTVNTVCTPI	VYAVFCQLW	NLGGTLVPTN	RTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16134.1	MTVNTVCTPI	VYAVFCQLW	NLGGTLVPTN	RTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
ABB30035.1	MPVNTMHTLL	VYAVFCQLW	SPGGTNGLSN	ETQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AIE16135.1	MPVNTMHTLL	VYAVFCQLW	SPGGTNGLSN	ETQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AAK52742.1	MPANIMYTLI	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
BAB84572.1	MPANIMYTLI	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
Consensus	MPFNIMYTP	LCAVLCQLW	SLEGLYGLSN	KTQHNNTSTT	KAFESVQELG	LPVSTVSTIT	SDPPSITSAA	SASGPEGSGB	TSTSPSVTTQ
AAM48107.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
BAB84577.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
BAB84578.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AAK18286.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AAK52743.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AAW84284.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
ABB30029.1	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16128.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16130.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16129.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16131.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16133.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16132.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
ABB30032.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
ABB30033.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16134.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
ABB30035.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AIE16135.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AAK52742.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
BAB84572.1	GTPPETTPE	PHTTTIDDKS	STAIADISTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
Consensus	GTLPEITTE	PLTTTDTGAS	STVYVDVSTQ	TVKDTPTSTT	HTSLPSTPSA	PTTPQGTHHT	ARGLLSVTST	KPEEASTQAN	PKKISMETNS
AAM48107.1	PGPATSETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
BAB84577.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
BAB84578.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AAK18286.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AAK52743.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AAW84284.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
ABB30029.1	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16128.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16130.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16129.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16131.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16133.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16132.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
ABB30032.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
ABB30033.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16134.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
ABB30035.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AIE16135.1	PQPTIRETSP	PPPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
AAK52742.1	PRPAISRKPT	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
BAB84572.1	PRPAISRKPT	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK
Consensus	PRPAISETPS	PSPTTQAPTE	NNNPNTSRQP	TPPTQPATPS	PVTPSP--AL	LASSQGDSTT	AVQDVHPSPT	NRSKRNLME	ITLTLSQGLK

	280		300		320		340		360
AAM48107.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARAGSPVTEP	FKSYFARGLL
BAB84577.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGK	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
BAB84578.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGK	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
AAK18286.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGK	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
AAK52743.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGK	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
AAW84284.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
ABB30029.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LYCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTGP	ARTGSPVTEP	FKSYFAKGFLL
AIIE16128.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARVESPTVEP	FKSYFAKGFLL
AIIE16130.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARVESPTVEP	FKSYFAKGFLL
AIIE16129.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARVESPTVEP	FKSYFAKGFLL
AIIE16131.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARVESPTVEP	FKSYFAKGFLL
AIIE16133.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARVESPTVEP	FKSYFAKGFLL
AIIE16132.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTPSPTKP	AHVESPTVEP	FKSYFAKGFLL
ABB30032.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSSTES	ASVGLPTVEP	FKSYFAKGFLL
ABB30033.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	VPSTLSSTEP	THTGSPVTEP	FKSYFAKGFLL
AIIE16134.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	VPSTLSSTEP	THTGSPVTEP	FKSYFAKGFLL
ABB30035.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	VPSTLSSTEP	THTRPPTVEP	FKSYFAKGFLL
AIIE16135.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	VPSTLSSTEP	THTRPPTVEP	FKSYFAKGFLL
AAK52742.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	TPSTPGSTEP	THAEAPTVEP	FKSYFAKGFLL
BAB84572.1	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GYFNEVLOFK	TPSTPGSTEP	THAEAPTVEP	FKSYFAKGFLL
Consensus	KYYGKILKLL	DLTLEEDTEG	LLEWCKRNIG	LTCDDNFFQK	RIEEFFLTGE	GHFNEVLOFK	TPSTLSPTTEP	ARTGSPVTEP	FKSYFAKGFLL

	380										400										420										440																																																											
AAM48107.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	A	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
BAB84577.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
BAB84578.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AAK18286.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AAK52743.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AAW84284.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
ABB30029.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	T	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AIIE16128.1	L	M	D	S	G	Y	F	S	A	K	C	Y	P	K	S	S	N	S	G	L	Q	L	N	I	T	Q	H	L	I	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AIIE16130.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	K	S	S	N	S	G	L	Q	L	N	I	T	Q	H	L	I	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AIIE16131.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	K	S	S	N	S	G	L	Q	L	N	I	T	Q	H	L	I	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AIIE16133.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	K	S	S	N	S	G	L	Q	L	N	I	T	Q	H	S	I	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
AIIE16132.1	S	M	D	S	G	Y	F	S	A	K	C	Y	P	K	S	S	N	S	G	L	Q	L	N	I	T	Q	H	S	I	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
ABB30032.1	S	I	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	A	R	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	L	V	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
ABB30033.1	S	M	N	S	G	Y	F	S	A	K	C	Y	P	R	T	S	N	S	G	L	Q	L	N	I	T	V	T	K	H	S	A	K	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S
AIIE16134.1	S	M	N	S	G	Y	F	S	A	K	C	Y	P	R	T	S	N	S	G	L	Q	L	N	I	T	V	T	K	H	S	A	K	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S
ABB30035.1	S	M	N	S	G	Y	F	S	A	K	C	Y	P	R	T	S	N	S	G	L	Q	L	N	I	T	V	T	K	H	S	A	K	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S
AIIE16135.1	S	M	N	S	G	Y	F	S	A	K	C	Y	P	R	T	S	N	S	G	L	Q	L	N	I	T	V	T	K	H	S	A	K	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S
AAK52742.1	T	I	N	S	G	Y	F	S	A	K	C	Y	S	W	T	S	N	S	G	L	Q	L	N	I	T	Q	H	P	A	R	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
BAB84572.1	T	I	D	S	G	Y	F	S	A	K	C	Y	S	R	T	S	N	S	G	L	Q	L	N	I	T	Q	H	P	A	R	I	A	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	N	C	H	V	L	I	K	S	H	V	C	D	Y	S		
Consensus	S	M	D	S	G	Y	F	S	A	K	C	Y	P	R	A	S	N	S	G	L	Q	L	N	I	T	Q	H	S	A	R	I	T	D	T	P	G	P	K	I	T	N	L	K	T	I	N	C	I	N	L	K	A	S	T	F	K	E	H	R	E	I	E	I	N	V	L	L	P	Q	V	A	N	L	S	S	C	H	V	L	I	K	S	H	V	C	D	Y	S		

	460		480		500		520		540																																																																																		
AAM48107.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
BAB84577.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
BAB84578.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
AAK18286.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
AAK52743.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
AAW84284.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
ABB30029.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	I	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q
AEI61628.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	
AEI6130.1	L	D	I	D	G	P	V	R	L	P	S	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	P	N	Y	D	C	I	S	R	T	Q	
AEI61629.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	
AEI61631.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	T	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	
AEI61633.1	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	
AEI61632.1	L	D	I	D	G	P	V	R	L	P	H	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	D	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	S	D	D	C	I	S	R	T	Q	
ABB30032.1	L	D	I	D	G	T	I	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	N	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	E	C	I	S	R	T	Q	
ABB30033.1	L	A	T	D	G	M	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	D	G	D	C	I	S	R	T	Q	
AEI61634.1	L	A	T	D	G	M	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	D	G	D	C	I	S	R	T	Q	
ABB30035.1	L	A	T	D	G	M	V	R	L	P	H	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	D	G	D	C	I	S	R	T	Q	
AEI61635.1	L	A	T	D	G	M	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	D	G	D	C	I	S	R	T	Q	
AAK52742.1	L	D	I	D	G	T	I	R	L	P	R	I	Y	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	D	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
BAB84572.1	L	D	I	D	G	T	I	R	L	P	R	I	Y	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	A	L	R	Q	Y	R	T	E	I	R	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	
Consensus	L	D	I	D	G	P	V	R	L	P	R	I	H	H	E	G	T	F	I	P	G	T	Y	K	I	V	I	D	K	K	N	K	Q	N	D	R	C	T	L	V	T	N	C	V	I	K	G	R	E	I	R	K	G	Q	S	V	L	R	Q	Y	R	T	E	I	K	I	G	K	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	

	560										580										600										620																																																											
AAM48107.1	L	L	R	T	E	T	A	E	I	H	S	D	S	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
BAB84577.1	L	L	R	T	E	T	A	E	I	H	N	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
BAB84578.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AAK18286.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AAK52743.1	L	L	R	T	E	T	A	E	I	H	N	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	N	S	F	N	L	C	E	N	A	T	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R
AAW84284.1	L	S	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
ABB30029.1	L	S	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16128.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16130.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16129.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16131.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16133.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16132.1	L	L	R	T	E	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R		
ABB30032.1	L	L	R	T	E	T	A	E	I	H	G	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	N	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
ABB30033.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
AIE16134.1	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
ABB30035.1	L	L	R	T	E	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R		
AIE16135.1	L	L	R	T	E	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R		
AAK52742.1	L	L	R	T	E	T	A	E	I	H	G	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	N	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
BAB84572.1	L	L	R	T	E	T	A	E	I	H	G	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	G	T	G	K	S	C	E	I	D	N	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	
Consensus	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	V	D	Q	R	L	G	S	E	L	G	C	Y	T	I	N	R	Y	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	K	C	R	Q	G	F	C	L	K	I	T	Q	E	G	R	G	H	V	K	L	S	R	

	740										760										780										800																																																									
AAM48107.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
BAB84577.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
BAB84578.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AAK18286.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AAK52743.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	P	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AAW82484.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
ABB30029.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16128.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16130.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16129.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16131.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16133.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16132.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
ABB30032.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	N	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
ABB30033.1	Y	L	L	I	V	A	G	T	V	K	F	K	Q	Y	R	E	L	R	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16134.1	Y	L	L	I	V	A	G	T	V	K	F	K	Q	Y	R	E	L	R	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
ABB30035.1	Y	L	L	I	V	A	G	T	V	K	F	K	Q	Y	R	E	L	R	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AIE16135.1	Y	L	L	I	V	A	G	T	V	K	F	K	Q	Y	R	E	L	R	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
AAK52742.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	T	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
BAB84572.1	Y	L	L	I	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	T	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W	
Consensus	Y	L	L	I	V	V	G	T	L	G	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	I	C	E	T	T	P	N	A	I	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C	P	K	R	K	E	K	I	E	E	T	E	L	Y	N	L	N	L	E	R	I	P	W

B. GP1 protein sequence alignment between the Congo virus Asia-1 genotype retrieved from NCBI with accession numbers AAM48107, AAK52742, BAB84572, AIE16134, ABB30033, AIE16135, ABB30035, ABB30032, AIE16129, AIE1612B8, AIE16130, AIE16131, AIE16133, AIE16132, AAW84284, AAK52743, ABB30029, BA84577, AF338470 and BAB84578

and BAB84578										20	40	60	80																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
AAM48107.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
BAB84577.1	P	T	G	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	K	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
BAB84578.1	P	T	G	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	K	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AAK18286.1	P	T	G	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	K	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AAK52743.1	P	T	G	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	K	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AAW84284.1	P	T	S	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	A	D	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
ABB30029.1	P	T	S	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	V	C	D	D	D	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16128.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	V	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16130.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	V	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16129.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	V	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16131.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	V	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16133.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	V	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16132.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	M	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	P	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
ABB30032.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	R	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
ABB30033.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	L	K	F	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	V	P	S	T	L	S	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
AIE16134.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	L	K	F	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	V	P	S	T	L	S	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
ABB30035.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	V	P	S	T	L	S	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AIE16135.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	V	P	S	T	L	S	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AAK52742.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	Q	K	L	T	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	T	P	S	T	P	G	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
BAB84572.1	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	R	K	Y	Y	G	K	I	Q	K	L	T	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	Y	F	N	E	V	L	Q	F	K	T	P	S	T	P	G	S	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Consensus	P	T	N	R	S	K	R	N	L	E	M	E	I	L	T	L	S	Q	G	L	K	K	Y	Y	G	K	I	L	K	L	D	L	T	L	E	E	D	T	E	G	L	E	W	C	K	R	N	L	G	L	T	C	D	D	N	F	F	Q	K	R	I	E	E	F	F	L	T	G	E	G	H	F	N	E	V	L	Q	F	K	T	P	S	T	L	S	P	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	100	120	140	160	180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

	280		300		320		340		360																																																																																
AAM48107.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	S	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
BAB84577.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	N	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
BAB84578.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AAK18286.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AAK52743.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	N	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	N	L	C	E	N	T	A	T	G	K	S	C	E	I	D	S	T	P	V
AAW84284.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	S	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
ABB30029.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	S	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16128.1	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	L	L	R	T	E	N	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16130.1	A	S	S	G	S	R	R	L	L	S	E	E	P	N	Y	D	C	I	S	R	T	Q	L	L	R	T	E	N	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16129.1	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	L	L	R	T	E	N	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16131.1	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	L	L	R	T	E	N	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16133.1	A	S	S	G	S	R	R	L	L	S	E	E	S	N	D	D	C	I	S	R	T	Q	L	L	R	T	E	N	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16132.1	A	S	S	G	S	R	R	L	L	S	E	E	S	D	D	C	I	S	R	T	Q	L	L	R	T	E	N	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	
ABB30032.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	G	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	
ABB30033.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
AIE16134.1	A	S	S	G	S	R	R	L	L	S	E	E	S	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	
ABB30035.1	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V	
AIE16135.1	A	S	S	G	S	R	R	L	L	S	E	E	S	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V		
AAK52742.1	A	S	A	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	V	H	G	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	G	T	G	K	S	C	E	I	D	K	H	P	V
BAB84572.1	A	S	A	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	V	H	G	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V
Consensus	A	S	S	G	S	R	R	L	L	S	E	E	S	G	D	D	C	I	S	R	T	Q	L	L	R	T	E	T	A	E	I	H	S	D	N	Y	G	G	P	G	D	K	I	T	I	C	N	G	S	T	I	V	D	R	L	G	S	E	L	G	C	Y	T	I	N	R	V	K	S	F	K	L	C	E	N	S	A	T	G	K	S	C	E	I	D	S	T	P	V

	380	400	420	440					
AAM48107.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
BAB84577.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
BAB84578.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AAK18286.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AAK52743.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CESSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AAW84284.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
ABB30029.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16128.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16130.1	RCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16129.1	RCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16131.1	RCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16133.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16132.1	RCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
ABB30032.1	KCKQGFCLKI	TQEGRGHVKL	SRDSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
ABB30033.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEIYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16134.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEIYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
ABB30035.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEIYLDA	CDSNCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AIE16135.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEIYLDA	CDSNCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
AAK52742.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
BAB84572.1	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT
Consensus	KCRQGFCLKI	TQEGRGHVKL	SRGSEVYLDA	CDSSCEIMIP	KGTGDIIVLDC	SGGQQHFLDK	NLIDLGCNPI	PLLGKMAIYI	CRMSNHPKTT

	460										480										500										520										540																																													
	I										I										I										I										I																																													
AAM48107.1	M	V	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
BAB84577.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
BAB84578.1	M	G	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AAK18286.1	M	G	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	G	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AAK52743.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AAW84284.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
ABB30029.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16128.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	A	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16130.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16129.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16131.1	M	V	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16133.1	M	G	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16132.1	M	G	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
ABB30032.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
ABB30033.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16134.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
ABB30035.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AIE16135.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
AAK52742.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
BAB84572.1	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	I	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C
Consensus	M	A	F	L	W	F	S	F	G	Y	V	T	C	L	C	K	V	I	F	Y	L	L	I	V	G	T	L	G	K	K	F	K	Q	Y	R	E	L	K	P	Q	T	C	T	C	I	C	E	T	T	P	N	N	A	D	A	E	M	H	D	L	N	C	S	Y	N	I	C	P	Y	C	A	S	R	L	T	S	D	G	L	A	R	H	V	M	Q	C

				560					580					600					620	
AAM48107.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
BAB84577.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
BAB84578.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AAK18286.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AAK52743.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AAW84284.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
ABB30029.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AIE16128.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
AIE16130.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
AIE16129.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
AIE16131.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
AIE16133.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
AIE16132.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PISHGETVEV	YQIREGYTSN	CLFVLGSILF											
ABB30032.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
ABB30033.1	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
ABB30035.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AIE16135.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
AAK52742.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIEA	YQIREGYTSN	CLFVLGSILF											
BAB84572.1	PKRKEKVEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIEA	YQIREGYTSN	CLFVLGSILF											
Consensus	PKRKEKIEET	ELYLNLERIP	WVVRKLLQVS	ESTGVALKRS	SWLVVLLVLL	TVSLSPVQSA	PIGHGKTIVET	YQIREGYTSN	CLFVLGSILF											
		640																		
AAM48107.1	IYSCLMKGLV	DS	D	G	644															
BAB84577.1	IYSCLMKGLV	DS	V	G	644															
BAB84578.1	IYSCLMKGLV	DS	V	G	644															
AAK18286.1	IYSCLMKGLV	DS	V	G	644															
AAK52743.1	IYSCLMKGLV	DS	V	G	644															
AAW84284.1	IYSCLMKGLV	DS	V	G	644															
ABB30029.1	IYSCLMKGLV	DS	V	G	644															
AIE16128.1	IYSCLMRGLV	DS	V	S	644															
AIE16130.1	IYSCLMKGLV	DS	V	G	644															
AIE16129.1	IYSCLMKGLV	DS	V	G	644															
AIE16131.1	IYSCLMKGLV	DS	V	G	644															
AIE16133.1	IYSCLMKGLV	DS	V	G	644															
AIE16132.1	IYSCLMRGLV	DS	V	G	644															
ABB30032.1	IYSHLMKGLV	DS	V	G	644															
ABB30033.1	IYSCLVKGLI	DS	V	G	644															
AIE16134.1	IYSCLVKGLI	DS	V	G	644															
ABB30035.1	IYSCLVKGLI	DS	V	G	644															
AIE16135.1	IYSCLVKGLI	DS	V	G	644															
AAK52742.1	IYSCLMKGLV	DS	V	S	644															
BAB84572.1	IYSCLMKGLV	DS	V	S	644															
Consensus	IYSCLMKGLV	DS	V	G																

C. GP2 protein of Congo virus Asia-1 genotype multiple sequence alignment among the genomes retrieved from NCBI with accession numbers AAM48107, AAK52742, BAB84572, AIE16134, ABB30033, AIE16135, ABB30035, ABB30032, AIE16129, AIE1612B8, AIE16130, AIE16131, AIE16133, AIE16132, AAW84284, AAK52743, ABB30029, BA84577, AF338470 and BAB84578.

	20				40				60																																																																		
AAM48107.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
BAB84577.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	T	L	I	E	74
BAB84578.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	T	L	I	E	74
AAK18286.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	T	L	I	E	74
AAK52743.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	T	L	I	E	74
AAW84284.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	H	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
ABB30029.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16128.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16130.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16129.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16131.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16133.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16132.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	D	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
ABB30032.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
ABB30033.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16134.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
ABB30035.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AIE16135.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
AAK52742.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
BAB84572.1	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	74
Consensus	S	S	T	C	L	H	K	E	W	P	H	S	R	N	W	R	C	N	P	T	W	C	W	G	V	G	T	G	C	T	C	C	G	L	D	V	K	D	L	F	T	D	Y	M	F	V	K	W	K	V	E	Y	I	K	T	E	A	I	V	C	V	E	L	T	S	Q	E	R	Q	C	S	L	I	E	