

1

Bordetella_pertussis_Tohama_I	.	.	.	.	.	.
Aeromonas_veronii	.	.	.	.	.	.
Bordetella_pertussis_Mn_resister	.	.	MHASRASHVG SIGYSARLA VSIML	I T	.	.
Bordetella_bronchiseptica	.	.	.	.	MFI	I T
Escherichia_coli	.	.	.	.	MF	I T
Clostridium_perfringens	.	.	.	.	MY	.
Methanocaldococcus_jannaschii	.	.	.	.	MII	L
Chlamydomonas_reinhardtii	.	MSAQRKNAISVVKADARSRL	E AIDENDEQAYDEA	IL	GAA	NGVEGNGFARQSAG
Dictyostelium_discoideum	.	.	.	.	MTPV	I T
Saccharomyces_cerevisiae	.	.	MRIHFFAFLI ILSLVCGD	WQADVGKLV	RKWN	NQRTIDGNDIEKC
Caenorhabditis_elegans	.	.	MASLESSRLSSQSL	LLINIFIFI	LHFA	SQNPPPSGSIQTLNSFAG
Arabidopsis_thaliana	.	.	MFDWSSSTD	FKPNCNEWEYYP	FAYRHD	MPY
Drosophila_melanogaster	.	.	MRTDVFLQRRKRDVL	S LII	IA	LLL
Danio_rerio	.	.	MRTDVFLQRRKRDVL	S LII	IA	LLL
Xenopus_laevis	.	.	MEKGSAVALNVGR	RRPF GKKRLP	CRA PLGS	FALE LIVCGTVY
Gallus_gallus	.	.	V	LGFCAILFF	V	WCMSL LSRRGQESSIAD
Mus_musculus	.	.	.	.	MLPQQVGF	VCAVLAL
Homo_sapiens	.	.	.	.	CCASGLF	SLGHKTAS

10

Bordetella_pertussis_Tohama_I	.	.	.	.	.	.
Aeromonas_veronii	.	.	.	.	.	.
Bordetella_pertussis_Mn_resister	.	.	.	.	.	.
Bordetella_bronchiseptica	.	.	.	.	.	.
Escherichia_coli	.	.	.	.	QT	I TFFF
Clostridium_perfringens	.	.	.	.	MYI	FLI
Methanocaldococcus_jannaschii	.	.	.	.	GV	GYFL
Chlamydomonas_reinhardtii	.	RTTSGRNSITGDRTLSRG	SILSVA	KFWFV	RDY	MALKE
Dictyostelium_discoideum	.	.	.	.	V	FSSY
Saccharomyces_cerevisiae	.	AGA	.	.	I	KASP
Caenorhabditis_elegans	.	PDDGEQCTIQAGWNST	QVCEYVKC	NDDNCEGGGYV	W	TGV
Arabidopsis_thaliana	.	GDSDSCGGLASLDDHRS	KCSYIRS	QSKCGPQYIDYL	I	ITG
Drosophila_melanogaster	.	F	TDARNTLPA	IFEPNL	IT	G
Danio_rerio	.	RVRDL	ENASECVQ	QPSSEFPE	G	F
Xenopus_laevis	.	RIRRDI	NETL	CIASPSSEF	T	EQERKQGG
Gallus_gallus	.	TRVPSETWRN	RILMALANG	THEGKNCTEP	I	HFPE
Mus_musculus	.	RKVL	DTWRN	TAHEFPTD	L	LF
Homo_sapiens	.	RKLMAPVN	GQTAKNCTDP	AIHEFPTD	L	LG

20

Bordetella_pertussis_Tohama_I	AA	I	YY	F	.	.
Aeromonas_veronii	A	CE	F	.	.	.
Bordetella_pertussis_Mn_resister	AV	T	YY	L	.	.
Bordetella_bronchiseptica	AA	I	YY	F	.	.
Escherichia_coli	AA	I	YY	F	.	.
Clostridium_perfringens	AA	I	YY	F	.	.
Methanocaldococcus_jannaschii	IGFL	L	L	I	KGADL	.
Chlamydomonas_reinhardtii	L	LL	LY	Y	GSDW	.
Dictyostelium_discoideum	L	LL	LCAPL	GWA	SAYFKWGA	VATFSLNFLA
Saccharomyces_cerevisiae	LM	LL	LCAPL	GWA	SAYFKWGA	VATFSLNFLA
Caenorhabditis_elegans	F	A	FLCF	.ASWC	VGE	.
Arabidopsis_thaliana	F	A	FLCF	.ASWC	VGE	.
Drosophila_melanogaster	F	I	LLVF	V	PIGLI	WGHFQLSHTLTF
Danio_rerio	F	I	LLVF	V	PIGLI	WGHFQLSHTLTF
Xenopus_laevis	I	Y	ML	LV	IMVSSA	ADD
Gallus_gallus	I	Y	ML	LV	IMVSSA	ADD
Mus_musculus	A	Y	ML	LV	IMVSSA	ADD
Homo_sapiens	A	Y	ML	LV	IMVSSA	ADD

30

Bordetella_pertussis_Tohama_I	F	V	N	.	.	.
Aeromonas_veronii	F	V	N	.	.	.
Bordetella_pertussis_Mn_resister	F	V	N	.	.	.
Bordetella_bronchiseptica	F	V	N	.	.	.
Escherichia_coli	F	V	N	.	.	.
Clostridium_perfringens	F	V	N	.	.	.
Methanocaldococcus_jannaschii	F	V	D	.	.	.
Chlamydomonas_reinhardtii	F	V	L	.	.	.
Dictyostelium_discoideum	F	V	L	.	.	.
Saccharomyces_cerevisiae	F	V	L	.	.	.
Caenorhabditis_elegans	F	V	L	.	.	.
Arabidopsis_thaliana	F	V	L	.	.	.
Drosophila_melanogaster	F	V	L	.	.	.
Danio_rerio	F	V	L	.	.	.
Xenopus_laevis	F	V	L	.	.	.
Gallus_gallus	F	V	L	.	.	.
Mus_musculus	F	V	L	.	.	.
Homo_sapiens	F	V	L	.	.	.

40

Bordetella_pertussis_Tohama_I	G	VE	W	G	H	R
Aeromonas_veronii	G	VE	W	G	H	R
Bordetella_pertussis_Mn_resister	G	VE	W	G	H	R
Bordetella_bronchiseptica	G	VE	W	G	H	R
Escherichia_coli	G	VE	W	G	H	R
Clostridium_perfringens	G	VE	W	G	H	R
Methanocaldococcus_jannaschii	G	ASG	I	AK	KL	GPA
Chlamydomonas_reinhardtii	G	ASG	I	AK	KL	GPA
Dictyostelium_discoideum	G	ASG	I	AK	KL	GPA
Saccharomyces_cerevisiae	G	ASG	I	AK	KL	GPA
Caenorhabditis_elegans	G	ASG	I	AK	KL	GPA
Arabidopsis_thaliana	G	ASG	I	AK	KL	GPA
Drosophila_melanogaster	G	ASG	I	AK	KL	GPA
Danio_rerio	G	ASG	I	AK	KL	GPA
Xenopus_laevis	G	ASG	I	AK	KL	GPA
Gallus_gallus	G	ASG	I	AK	KL	GPA
Mus_musculus	G	ASG	I	AK	KL	GPA
Homo_sapiens	G	ASG	I	AK	KL	GPA

50

Bordetella_pertussis_Tohama_I	T	A	L	P	E	S
Aeromonas_veronii	T	A	L	P	E	S
Bordetella_pertussis_Mn_resister	T	A	L	P	E	S
Bordetella_bronchiseptica	T	A	L	P	E	S
Escherichia_coli	T	A	L	P	E	S
Clostridium_perfringens	T	A	L	P	E	S
Methanocaldococcus_jannaschii	T	A	L	P	E	S
Chlamydomonas_reinhardtii	T	A	L	P	E	S
Dictyostelium_discoideum	T	A	L	P	E	S
Saccharomyces_cerevisiae	T	A	L	P	E	S
Caenorhabditis_elegans	T	A	L	P	E	S
Arabidopsis_thaliana	T	A	L	P	E	S
Drosophila_melanogaster	T	A	L	P	E	S
Danio_rerio	T	A	L	P	E	S
Xenopus_laevis	T	A	L	P	E	S
Gallus_gallus	T	A	L	P	E	S
Mus_musculus	T	A	L	P	E	S
Homo_sapiens	T	A	L	P	E	S

60

Bordetella_pertussis_Tohama_I	S	A	V	F	M	A
Aeromonas_veronii	S	A	V	F	M	A
Bordetella_pertussis_Mn_resister	S	A	V	F	M	A
Bordetella_bronchiseptica	S	A	V	F	M	A
Escherichia_coli	S	A	V	F	M	A
Clostridium_perfringens	S	A	V	F	M	A
Methanocaldococcus_jannaschii	S	A	V	F	M	A
Chlamydomonas_reinhardtii	S	A	V	F	M	A
Dictyostelium_discoideum	S	A	V	F	M	A
Saccharomyces_cerevisiae	S	A	V	F	M	A
Caenorhabditis_elegans	S	A	V	F	M	A
Arabidopsis_thaliana	S	A	V	F	M	A
Drosophila_melanogaster	S	A	V	F	M	A
Danio_rerio	S	A	V	F	M	A
Xenopus_laevis	S	A	V	F	M	A
Gallus_gallus	S	A	V	F	M	A
Mus_musculus	S	A	V	F	M	A
Homo_sapiens	S	A	V	F	M	A

70

Bordetella_pertussis_Tohama_I	V	G	G	A	M	G
Aeromonas_veronii	V	G	G	A	M	G
Bordetella_pertussis_Mn_resister	V	G	G	A	M	G
Bordetella_bronchiseptica	V	G	G	A	M	G
Escherichia_coli	V	G	G	A	M	G
Clostridium_perfringens	V	G	G	A	M	G
Methanocaldococcus_jannaschii	V	G	G	A	M	G
Chlamydomonas_reinhardtii	V	G	G	A	M	G
Dictyostelium_discoideum	V	G	G	A	M	G
Saccharomyces_cerevisiae	V	G	G	A	M	G
Caenorhabditis_elegans	V	G	G	A	M	G
Arabidopsis_thaliana	V	G	G	A	M	G
Drosophila_melanogaster	V	G	G	A	M	G
Danio_rerio	V	G	G	A	M	G
Xenopus_laevis	V	G	G	A	M	G
Gallus_gallus	V	G	G	A	M	G
Mus_musculus	V	G	G	A	M	G
Homo_sapiens	V	G	G	A	M	G

80

Bordetella_pertussis_Tohama_I	G	V	G	G	A	M
Aeromonas_veronii	G	V	G	G	A	M
Bordetella_pertussis_Mn_resister	G	V	G	G	A	M
Bordetella_bronchiseptica	G	V	G	G	A	M
Escherichia_coli	G	V	G	G	A	M
Clostridium_perfringens	G	V	G	G	A	M
Methanocaldococcus_jannaschii	G	V	G	G	A	M
Chlamydomonas_reinhardtii	G	V	G	G	A	M
Dictyostelium_discoideum	G	V	G	G	A	M
Saccharomyces_cerevisiae	G	V	G	G	A	M
Caenorhabditis_elegans	G	V	G	G	A	M
Arabidopsis_thaliana	G	V	G	G	A	M
Drosophila_melanogaster	G	V	G	G	A	M
Danio_rerio	G	V	G	G	A	M
Xenopus_laevis	G	V	G	G	A	M
Gallus_gallus	G	V	G	G	A	M
Mus_musculus	G	V	G	G	A	M
Homo_sapiens	G	V	G	G	A	M

90

Bordetella_pertussis_Tohama_I	A	T	G	T	V	L
Aeromonas_veronii	A	T	G	T	V	L
Bordetella_pertussis_Mn_resister	A	T	G	T	V	L
Bordetella_bronchiseptica	A	T	G	T	V	L
Escherichia_coli	A	T	G	T	V	L
Clostridium_perfringens	A	T	G	T	V	L
Methanocaldococcus_jannaschii	A	T	G	T	V	L
Chlamydomonas_reinhardtii	A	T	G	T	V	L
Dictyostelium_discoideum	A	T	G	T	V	L
Saccharomyces_cerevisiae	A	T	G	T	V	L
Caenorhabditis_elegans	A	T	G	T	V	L
Arabidopsis_thaliana	A	T	G	T	V	L
Drosophila_melanogaster	A	T	G	T	V	L
Danio_rerio	A	T	G	T	V	L
Xenopus_laevis	A	T	G	T	V	L
Gallus_gallus	A	T	G	T	V	L
Mus_musculus	A	T	G	T	V	L
Homo_sapiens	A	T	G	T	V	L

100

Bordetella_pertussis_Tohama_I	T	A	L	P	E	S
Aeromonas_veronii	T	A	L	P	E	S
Bordetella_pertussis_Mn_resister	T	A	L	P	E	S
Bordetella_bronchiseptica	T	A	L	P	E	S
Escherichia_coli	T	A	L	P	E	S
Clostridium_perfringens	T	A	L	P	E	S
Methanocaldococcus_jannaschii	T	A	L	P	E	S
Chlamydomonas_reinhardtii	T	A	L	P	E	S
Dictyostelium_discoideum	T	A	L	P	E	S
Saccharomyces_cerevisiae	T	A	L	P	E	S
Caenorhabditis_elegans	T	A	L	P	E	S
Arabidopsis_thaliana	T	A	L	P	E	S
Drosophila_melanogaster	T	A	L	P	E	S
Danio_rerio	T	A	L	P	E	S
Xenopus_laevis	T	A	L	P	E	S
Gallus_gallus	T	A	L	P	E	S
Mus_musculus	T	A	L	P	E	S
Homo_sapiens	T	A	L	P	E	S

★

	110	120	130	140	150
Bordetella_pertussis_Tohama_I	AAINA[DQR	LARDQ[AWE	MGV[FVKV[AIG	I]AFAWKP	.WLGLI[LFLAVY
Aeromonas_veronii	RAIDGEVORE	.IGRDQ[RWF	MGIE[LVATA	I[GIV[AGT	GIV[YLVYV.
Bordetella_pertussis_Mn_resister	AAINA[DQR	LARDQ[AWE	MGV[FVKV[AIG	I]AFAWKP	.WLGLI[LFLAVY
Bordetella_bronchiseptica	AAINA[DQR	LARDQ[AWE	MGV[FVKV[AIG	I]AFAWKP	.WLGLI[LFLAVY
Escherichia_coli	AKIR[VDYAR	.MSHDQAAF	LAV[FVKV[AIG	I]IVFTLKP	.WLGV[LFLVAY
Clostridium_perfringens	LV1KKHIIKND	EIVNIIATF	IILYVFT	.FTG	I]GSKNSLSRIDGG
Methanocaldococcus_jannaschii	MYHS[VOTFN	.AMSNRACSS	IILMIA	.CIGIS.	IPS
Chlamydomonas_reinhardtii	RNRKGGSFQ	.LOPPVKKOCL	IILLL	.ISLIL.	IP.
Dictyostelium_discoideum	YNRVRQQTFN	.QTAAQTMSS	LLAIA	.CASIL	.IPAA.
Saccharomyces_cerevisiae	RPFKAEVFS	.SIRDIAF	YLVAAF	.LAFCFV	.YYDHVEI
Caenorhabditis_elegans	RDVSIDRNS	.FIRD	VVFELLV	.WMPITF	LGVY
Arabidopsis_thaliana	QPTKLDWNP	.VTRD	TAWYLLIAIA	.LTYV	LIYV
Drosophila_melanogaster	AVGRILSCWP	.LF	RDCVAYSISVA	.VIAII	SDNRVWY
Danio_rerio	SISRLTCWP	.LF	RDCVAYAJSVA	.VIAII	WYDGA
Xenopus_laevius	QVVCUTOWA	.VF	RDSVYYT	.LIVP	LLVY
Gallus_gallus	MVSTLSCWP	.LF	RDCAVYAVSVGA	.VFGII	WESL
Mus_musculus	QVVRUTWWA	.VCRD	DSVYYTISVI	.LIVEI	YEGAGL
Homo_sapiens					.YDEQIVWW

	160	170
Bordetella_pertussis_Tohama_I	KREI[TREEE	.CLDCE
Aeromonas_veronii	.RREI[KQSDS	.HEVELP
Bordetella_pertussis_Mn_resister	KREI[TREEE	.CLDCE
Bordetella_bronchiseptica	KREI[TREEE	.CLDCE
Escherichia_coli	.WREI[RNSDT	.APEEEMI
Clostridium_perfringens	.YL	.KEDEV
Methanocaldococcus_jannaschii	.YL	.VALTAEIE
Chlamydomonas_reinhardtii	RWTVKNGSA	.EIE
Dictyostelium_discoideum	.DW	.VIMLIC
Saccharomyces_cerevisiae	.ILDVSRGTA	.YACYLTF
Caenorhabditis_elegans	.IFG	.IIYLYFIGYSLFHKL
Arabidopsis_thaliana	SQILHNRHKD	.IVILIVYVLF
Drosophila_melanogaster	EEKVDEVKTV	.LYFQ
Danio_rerio	TDTSLEDDDD	.RMSDQILRS
Xenopus_laevius	IVYSHGHVHL	.REDLA
Gallus_gallus	HAHEVMKMEAE	.VMQRFSPCC
Mus_musculus	IEAV	.WCLKPRDRD
Homo_sapiens	.FLSVSHFD	.RHEHAES
	DRKK.	.SELLDEDPM
	.QL	.RHEA
	.SFDRRIQNLV	.VQNL
	.VL	.CFDIKISEY
	.CFDIKISEY	.VVRFFSPCC
	.IM	.ACCAEAAMVE
	.CFDIKISKY	.VMKTCSPCC
	.IM	.CLARAME
	.KYNVRMQNF	.TVKQKSIANGNPVNSEL
	FTLKSKNVGN	.EAVKE
	GDTVDNEMEDGN	
	KCYDSSCDPSI	
	PLLW	
	KVKG	
	.LL	
	.CFDTTISRH	
	.IM	
	.KYNV	
	KMQAFF	

	180	190
Bordetella_pertussis_Tohama_I	.PLK.	.
Aeromonas_veronii	.PLKL.	.
Bordetella_pertussis_Mn_resister	.PLK.	.
Bordetella_bronchiseptica	.PLK.	.
Escherichia_coli	.PLK.	.
Clostridium_perfringens	.	FE
Methanocaldococcus_jannaschii	.	.
Chlamydomonas_reinhardtii	QLK	.THSELFK
Dictyostelium_discoideum	DEKKEDRD	.IEMGERKNGANEQTTAST
Saccharomyces_cerevisiae	.	.TASSTES
Caenorhabditis_elegans	.	.SHHALFE
Arabidopsis_thaliana	.	.PLKTWSFRGVVHDFKEHLKPW
Drosophila_melanogaster	.	.PSMDEWD
Danio_rerio	TREEE.	.MGVSLLGYIAEKLALPEKTT
Xenopus_laevius	.	.QEKFIVF
Gallus_gallus	.PLKGFDRDVCAKPK.	.TEYNFYQ
Mus_musculus	.	.SGEQQ.
Homo_sapiens	.NTEHA.	.PLVGWSDSSLRVQRRSR
	VQQYGNNSVVMDEII	.NDSGIFQ
	CSSPPKYRFP	.PLLGWKEESLPVIRRHSR
	EQRIMI	.SDSGIFQ
	TNKFGFRT	.VQQLKQKSIANGNPVNSEL
	TRMRMASRII	.INERQRLIQ
	INERQRLIN	.TVKQKSIANGNPVNSEL
	EQRIMI	.TDSGIFQ
	TLLGWEDESQLFIRROSR.	.TDSGIFQ
	RIEQQ	.RQYQGKNPVMVDEIMSSPKFT
	TLLGWEDESQLFIRROSR.	.PEAGLRIIMITNKFGFRT
	EQRIMI	.LRLMASRII
	TDKQKSIANGNPVNSEL	.INERQRLIN

	200	210
Bordetella_pertussis_Tohama_I	EQ.	.
Aeromonas_veronii	GDD	.
Bordetella_pertussis_Mn_resister	DDEDTDE	.
Bordetella_bronchiseptica	QFEEFTDEV	.
Escherichia_coli	EMNIFQKV	.AVLN
Clostridium_perfringens	EQ.	.TIPNFLFKLTIPHSE
Methanocaldococcus_jannaschii	GDD	.QPWSKPI
Chlamydomonas_reinhardtii	DDEDTDE	.TLLQCLICPV
Dictyostelium_discoideum	QFEEFTDEV	.FLLFCI
Saccharomyces_cerevisiae	EMNIFQKV	.QVCS
Caenorhabditis_elegans	EQ.	.EDSPKRHRSCFSVL
Arabidopsis_thaliana	EQ.	.VTSITGLPLYI
Drosophila_melanogaster	EQ.	.PRLRTIPVVCEEK
Danio_rerio	DDSGYSHLS	.WSKPCAVVSTA
Xenopus_laevius	EDSDYSQLS	.IAPVLLTE
Gallus_gallus	ISLSGLKEP	.LYCS
Mus_musculus	SANGSSK.P	.
Homo_sapiens	LQNGRHQNIENG	.EQDN
	NIPVVNQEEN	.
	EDSGYS	.EQDPQQNQEQQPPP
	SANGVSSKP	.QPPPQPEPEVADF

	180	190	200
<i>Bordetella_pertussis_Tohama_I</i>	LRPRDPSPSLFWA...CAQT	VLA	LAV
<i>Aeromonas_veronii</i>	APDAVIP...P.VGKV.LLQT	LA	LV
<i>Bordetella_pertussis_Mn_resister</i>	LRPRDPSPSLFWA...CAQT	VLA	VIA
<i>Bordetella_bronchiseptica</i>	LRPRDPSPSLFWA...CTQT	VLA	VIA
<i>Escherichia_coli</i>	IRPSAIEPMGWI...VLQI	VLS	VIAAA
<i>Clostridium_perfringens</i>	..NIKSP...NSTVKRN.IILS	IVGVIGI	ILGG
<i>Methanocaldococcus_jannaschii</i>	NNDKNNP...SVFVSLVLL	IIGL	IGVLVGA
<i>Chlamydomonas_reinhardtii</i>	.DDAVPM...MTVGTS.IGAL	TIVTA	IVAVCS
<i>Dictyostelium_discoidium</i>	EDEHDEP...LYKGVF	LGGI	ICYCF
<i>Saccharomyces_cerevisiae</i>	MSTISRNP...PHSLSVKS	II	ISFC
<i>Caenorhabditis_elegans</i>	ISPFPNSPGLWMYGLILSV	LKEPP	WYLI
<i>Arabidopsis_thaliana</i>	HYSGSQRLNLILYIISGSIG	FYSKSLISYAGF	MSAWI
<i>Drosophila_melanogaster</i>	LIVGILAYLTTEKSHPP	LMSIA	WTYIM
<i>Danio rerio</i>	WTWWAIKYPLML...ACTVP	SARSIF	FLSMISA
<i>Xenopus_laevis</i>	KSVF SMPDHDLKRILWVLSLPV	FWKNFY	MLTFMSA
<i>Gallus_gallus</i>	STLLFVSPVDCRRP...I	TF	WISAF
<i>Mus_musculus</i>	PSVFKMPENDLRII	WKWWF	LTFTVMSA
<i>Homo_sapiens</i>	WVLSPLPIITLFYLTVPDC	PSAVW	ISAVT
	RRK	W	
	LSPFSLPEGKMNKIKWILT	W	IALF
	TWPFLIFVLFCTIPNC	ESWF	SI
	SKP	MFT	HSI
		I	HLISQV
		LISTI	QI
		W	HSI
		TA	HLISQV
		W	AVFS
	LSPF SVPEARGDKVWKWFT	W	
	WP LIFLCLVTIPNC	SKP	
		RWEKFFF	
		MVTF	
		ITAT	
		W	

	270	280	290	300	310
<i>Bordetella_pertussis_Tohama_I</i>	MMI QAT IPSAM	M I QAT I IPSA L G I F L T P W L L		D A P I . L A A G . . G F T L A A I . . L L	
<i>Aeromonas_veronii</i>	MMI QGT I P K A M	M I QGT I I P K A F C L F L T P W L L		D G T M . M A S S . . L V T L A A V . . G L	
<i>Bordetella_pertussis_Mn_resister</i>	A M M I Q A T I I P S A L G I F L T P W L L		D A P L . L A A G . . G F T L A A I . . L L	
<i>Bordetella_bronchiseptica</i>	A M M I Q A T I I P S A L G I F L T P W L L		D A P L . L A A G . . G F T L A A I . . L L	
<i>Escherichia_coli</i>	A M M I Q A T I I P S A L G L F F T P W L F		D G P L . L V A G . . I V T A L A I . . V Y	
<i>Clostridium_perfringens</i>	S N T F N I L L I . . L G L S . . S V I		..... . . S P I T I A A S L I D L I F L I . I V T L I	
<i>Methanocaldococcus_jannaschii</i>	S N I A D . . I I G G A L A V G . . S L F		..... . . M H I P A B E . . N V Q M A V L . V I	
<i>Chlamydomonas_reinhardtii</i>	S S I Q I A L F A I P F A V V . . W G W A T		..... . . G H D F S . . L D F S . . P F S A M . V L	
<i>Dictyostelium_discoidium</i>	G T I T K T T I L L . . M G I F . . C F F		..... . . G V V K G F E W E . . S P T Y S L C . L I	
<i>Saccharomyces_cerevisiae</i>	S S L Q V A L F V T P F M V L . V G W M I		D V P M T L N F S . . . T F E T A . . T L	
<i>Caenorhabditis_elegans</i>	G Q L F N L L I G . . F G L P . . F T		..... . . P T Y R L L . M L	
<i>Arabidopsis_thaliana</i>	G P L F N T V I G . . L G V P . . L V		..... . . T I A K I Q G K S I M I N . . .	
<i>Drosophila_melanogaster</i>	S N T F D I L V C . . L G L P . . W L K I L I . . Y Q Q K I D I D S T		..... . . N S L L E T L G F L M . . .	
<i>Danio rerio</i> S N V F D M L C . . L G L P . . W F I Q T V F V D G V S P V D / V N S S . . G L V F M S C . T L		..... . . A L T I T T A . M L	
<i>Xenopus_laevis</i> S N V F D M L C . . L G V P . . W F I K T V F V D R S S P V E / V N S S . . G I T Y T I T I . S L			
<i>Gallus_gallus</i> S N V F D I L V G . . L G V P . . W G L Q T M A I D Y G S T / V K I N S K . . G L V Y S V A . L L			
<i>Mus_musculus</i> S N V F D M L C . . L G L P . . W F I K T A F T I N A S V / V K I N S R . . G L T Y T I T I . S L			
<i>Homo_sapiens</i> S N V F D I L V G . . L G V P . . W G L Q T M V V N Y G S T / V K I N S R . . G L V Y S V A . L L			

		320	330	340
Bordetella_pertussis_Tohama_I	L...WLRFRR[AAM]SVPALS[A]	V[G]	.GLY[ALFA]GY[GWHFYA.	.
Aeromonas_veronii	L...WWGFRKGTMAAAGRLAL	V[G]	.LLY[LGF]CGWLLVS.	.
Bordetella_pertussis_Mn_resister	L...WLRFRR[AAM]SVPALS[A]	V[G]	.GLY[ALFA]GY[LGHFYA.	.
Bordetella_bronchiseptica	L...WLRFRR[AAM]SVPALS[A]	V[G]	.GLY[ALFA]GY[LGHFYA.	.
Escherichia_coli	L...WQVFRRGIAIDGRALII	VS.	.GGY[GLFVLL]IVGYVA.	.
Clostridium_perfringens	IGALIFLNKKKEVKVLTKY.	EG.	VFLLA[LYI]GYTVYIIMRN.	.
Methanocaldococcus_jannaschii	MSLLLYLFAKYS.KIGRWF.	QG.	IILFLA[LYI]IAASLRMG.	.
Chlamydimonas_reinhardtii	AVCVIINHANFVADATSHWL.	LG.	VQLI[ALCY]VIAVAFYR.	.
Dictyostelium_discoidium	LTLI...CAAAASIGIGFYVN	HG.	LMLFIA[IFL]AII[GIIQ]KYNNINIDEGD.	.
Saccharomyces_cerevisiae	FIAVFLSNYLILDGESNWL.	EG.	VMSL[AMY]IILA[MAFFYY].	PDEKTLDSIG.
Caenorhabditis_elegans	FLAIISLIFTI[AMFAQKYFLRR.	IHSYSLVYIYISFFVFIGLSDDLI	VFGVLDLWNR.	.
Arabidopsis_thaliana	VGLLWL...ALVIMPKKMRLDKL.	VG.	GLLLA[AYI]CLFCLSLRLARVFGLVDTDR.	.
Drosophila_melanogaster	VVTAAV..LYLGLLARRFVMGKT.	VG.	YLSI[I]FYALFLIIACTLE.	ILLNKEKMCD.
Danio rerio	LISIIF..LF[LAVHNGWKLDWK.	LG.	LVCLAC[YI]FLATLISLYELGIIGNNPIRSCS.	.
Xenopus_laevis	LFSIMF..IF[VAIHLNGWKLDK.	LG.	VICLFL[MYLV]FTLISLYELGIIGNTPMVLCG.	.
Gallus_gallus	LGGSVALGTGVILLSPREPSVERIK.	SORYKNTLYL	SLPVETLLEE.GIITGDA	TPLHGS.
Mus_musculus	NISIILF..LF[LAVHFNGWKLRK.	LG.	VCLGLATLISLYELGIIGNNPIRSCS.	.
Homo_sapiens	LGGSVAL.TVLGIHLNKWRDLDRK.	LG.	YVYLICCSIMIEFNVEITFVNLPMCR.	.

<i>Bordetella_pertussis_Tohama_I</i>	...
<i>Aeromonas_veronii</i>	...
<i>Bordetella_pertussis_Mn_resister</i>	...
<i>Bordetella_bronchiseptica</i>	...
<i>Escherichia_coli</i>	...
<i>Clostridium_perfringens</i>	...
<i>Methanocaldococcus_jannaschii</i>	...
<i>Chlamydomonas_reinhardtii</i>	...
<i>Dictyostelium_discoideum</i>	P I A
<i>Saccharomyces_cerevisiae</i>	NS L
<i>Caenorhabditis_elegans</i>	...
<i>Arabidopsis_thaliana</i>	...
<i>Drosophila_melanogaster</i>	I Q D
<i>Danio_rerio</i>	D ..
<i>Xenopus_laevis</i>	D ..
<i>Gallus_gallus</i>	...
<i>Mus_musculus</i>	V ..
<i>Homo_sapiens</i>	E D D