

Additional file 2. Amino acid alignment of the 53 mammalian AMBN used in our evolutionary analysis.

The sequences were aligned against the human sequence and are ordered following mammalian relationships [117]. Our alignment led to 500 positions, including gaps. For convenience of presentation our alignment does not include the duplicated exons 9c, 9d and 9e (+9c; +9c-9e) that were found in three species only. The specific length of each AMBN in indicated in brackets at the end of the sequence. The signal peptide (underlined) can start at the methionine located either in the region encoded by exon 1 or exon 2 (M, squarred). For a better understanding of SP evolution, the sequences in which the first methionine is lacking are highlighted on grey background. **The 15 alternatively spliced residues encoded by the 5' end of exon 6 in rodents, human and pig are indicated in bold.** Exon limits are indicated by vertical lines; (:): residue identical to human AMBN residue; (-): indel; (?): unknown amino acid; *: stop codon.

	ex 1	exon 2	1	exon 3	exon 4	exon 5	exon 6	122
Human	<u>M</u> SASK	IPLFKM	KDLILILCLLEMSFAV	FFPQSGT	PGMASLSLE	TMRQLGSLQRLNTLSQ	YSRYG-FGKSFNSLWMHGLLPPHSSLPWMRPREHETQQ	YEYSLPVHPPPLPSQ
Chimpanzee	.....	.....	.....	.....	.....	.....	.....	.....
Gorilla	.....	.....	.....	.....	.....	.....	.....	.....
Orangutan	.....	.....	.....	.....	.....	.....	.....	.....
Gibbon	.....	.....	.....	..R.....	.....G.....	.....L.....	.....	.....
Baboon	.....	.....	.....	..T.....	.....G.....	..F.....P.....	.....	.....
Macaque	.....	.....	.....	..T.....	.....G.....	..F.....L.....P.....	.....	.....
Squirrel monkey	..P.....	.....G..K.....	.....	L.....	.....G.....	..F.....F.....	.....	.....
Marmoset	.....	.....	.....	L.....	.....G.....	..F.....F.....	.....	.....
Aye-aye	.....	.....V.....	.....	V..K..I.....	.....T..G..A.....	F..F.....ND.....F.....	.....	.....
Bushbaby	<u>TA</u> ... <u>S</u> ...	G.L.T.WF.HV.A	.....	V.....V.....	.....G.....	..F.....LQ...QP.....	.....	.....
Mouse lemur	..E.....	.....F.H.V.....	.....	V.....I.....	.....G.....	F..F.....N...Q...F.....	.....	.....
Tarsier	.....	.....D.G.....	.....	V...P.....	.....G.....	..F.....F.....	.....A.....L	.....
Tree shrew	.....C.....	.....C.....	.....	M...P.....	.....G.....	.....Q.....F.....	.....	.....
Kangaroo rat	.....	.....F...K.....	.....	A...P..QGMAP.....	.....G..A.....	..F.....AL...L...PA.F...G.....	.....	??????????
Rat	.....	.....G.L.F.S.VK..L.....	.....	A...P..AQGMAP.....	.....G..A.....	..L...AL...L...N.F..IG.....	.....	.....
Mouse	.....	.....G...F.S.VK..L.....	.....	A...P..AQGMAP.....	.....G..A.....	..L...AL...L...N.F..IG.....	.....	.....
Chinese hamster	.....	.....G...F.S..K..L.....	.....	A...P..AQGMAP.....	.....G..A.....	..L...AL.T.L...N.F..I.....	.....	.....
Jerboa	..P.A.....	.....G.V.F...K.....	.....	A...P..AQGMAP.....	.....G..A.....	..L...A.T.LQ...P.F..I.T.....	.....	.....
Naked mole rat	..P.....	.....L...K.T.....	.....	A...P..A-NMAP.....	.....G..A.....	..L...L...LQ...P.F..L.....	.....	..V.....
Chinchilla	..P.....	.....M.L.S..K.....	.....	A...P..A-NMAP.....	.....G..A.....	..L...L...LQ...P.F..L.....	.....	..V.....
Degu	..P.....	.....M.L.F..K.....	.....	A...P..A-NMAP.....	.....G..A.....	..F...L...LQ...P.F..L.....	.....	..V.....
Guinea pig	..P.....	.....M.F.S..K.I.....	.....	A...P..A-NMAP.....	.....G..A.....	..F...L...LQ...P.F..L.....	.....	..V.....
Squirrel	.....	SF.....	.....	M...P..A-GMAP.....	.....G..A.....	F..F...L...LQ...L.T.....	.....	.....
Rabbit	.....	.....L...T.....	.....	A...P.....	.....G..A.....	..K...L...LQ...P.F.....	.....	.....
Pika	..E.....	.....G..L...GT.....	.....	A...P.....	.....G..A.....	L.KF.Q...L...L...P.F...Q.....	.....	..E.L.....
Cow	..P.L.....	.....M...K..S.....	.....	A...P..I.....	.....G..L.....	..F...N...F.....	.....	.....
Sheep	..P.L.....	.....V...K..S.....	.....	A...P..I.....	.....G..L.....	..F...N.....	.....	.....
Dolphin	..P.L.....	.....M...K..S.....	.....	V...P.....	.....L.G..M.....	..F...F.....	.....	.....
Pig	..P.L.....	.....MV...K..S.....	.....	A..R.P.....V.....	.....G..M.....	..F...G.M.....FQ.....	.....	.....
Alpaca	..P.L.....	.....M...K..S.....	.....	A...P.....	.....G..L.....	..F...F.....	.....	.....
Horse	..P.L.....	.....V...GS.....	.....	A..R.P..I.....	.....G..M.....	..F..Y...N...P.F.....	.....	.....
Rhinoceros	..P.L.....	.....V...S.....	.....	V...P.....	.....G..M.....	..F...L...F.....	.....	.....
Dog	..L.....	.....V...K..S.....	.....	V...P.....	.....G..M.....	..F...F.....	.....	.....
Panda	..L.....	.....S...G..S.....	.....	V..R.P.....	.....G..M.....	..F...F.....	.....	.....
Ferret	..L.....	.....V...S.....	.....	V...P.....	.....G..M.....	..F...F.....	.....	.....
Cat	..TL.....	.....S...F...S.....	.....	M...P.....	.....G..M.....	..F...F.....	.....	.....
Shrew	..P.LQ.....	.....I...S.....	.....	V..K.A.I.....	.....G..M.....	..KF...LQ...F...K.....	.....	.....
Star-nosed mole	..P.L.....	.....S...M...L.S.....	.....	M...P.....	.....G..M.....	..F...F.....	.....	.....
Hedgehog	HASIE	D.....Y...CS.....	.....	V..K.P.M.....	.....G..M.....	..F...N...NP.F.....	.....	.....
Megabat	GQH*R	SHFI.....Y.....	.....	V.....	.....T.HG..M.....	..KF...S...F.....	.....	.....
Big brown bat	GPE.T	.....N...V...T.S.....	.....	V..R.P.....A.....	.....T..G..M.....	..F...L...Q...F...G.....	.....	.....
Microbat	RP.L.	.....N...V...GT.S.....	.....	V...P.....	.....T..G..M.....	..F...L...F.....	.....	.....
Tenrec	..L.....	????????????????????	.....	M..R.P.....	.....G..I.P.....	..F...F.....	.....	.....
Golden mole	..L.....	.....M...AVG.....	.....	M...P.....	.....G..M.P.....	..F...F.....	.....	.....
Elephant shrew	..L.....	.....P..FM..GV.V.....	.....	V...P.....	.....R..G..I.P.....	F..F...P..L...F..L..D.....	.....	.....
Hyrax	..L.....	?????.....M...GV.C.....	.....	V.....	.....G.....	..F...M...PF.....	.....	.....
Elephant	L..LQ	.....M...R.....	.....	V...P.....	.....G.....	..F...L...V...AF.....	.....	.....
Manatee	..L.....	.....N...S...GV.....	.....	M...P.....	.....G..M.....	..F...M.L...PF.....	.....	.....
Opossum	KPVV.	KS.....L.M...GT...IKQ	.....	VY...AAA---T.LG.....	.....N.NG..L.....	F..F..Y..P.T...F...QQ.....	.....	..A.....
Tasmanian devil	KP.V.	KS.....L.M...GTC...IKQ	.....	V...AAA---T.LG.....	.....N.NG..L.....	F..F...Q.P...F...QQ.....	.....	..A.....
Wallaby	KP.V.	????????????????GT...IKQ	.....	V...AAA---T.LG.....	.....N.NG..L.....	L..L..Y..P.T...V...F..IQQ.....	.....	..A.L.....
Platypus	QV.G.	G.TL..EN.V...S.FGT...I---	.....	V.L.PG.P---.G.....	.....H..N---.L.P.....	F..F...Q...F...NY..LS..DQ.....	.....	..A.....R.....

	exon 6	exon 7	exon 8	exon 9a	exon 9b	245
Human	PSLKPQQPGLKPFLOSAAATT-NQATALKEALQPPHILGH-LPLQEGEL-PLV---QQQVAPSDKPPK-PE	LPGVDFADPQGPS	LPGMDFPDPQGPS	LPGLDFADPQGST	-----	
Chimpanzee	.....Q-----	.....	.....	.....	-----
Gorilla	.....Q-----	..L..H..ST	.....	.....	-----
Orangutan	.....Q-----L---	.....	..L..A...ST	.....	-----
Gibbon	.....L...A...Q-----	.....	..R.....	.....P..P..	-----	
Baboon	.....A...A-DE..Q.....Q-L-----	..A.V....P	..R..A....	.....P...PS	LPRMDFADPQGPS	+9c
Macaque	.....A...A-DE..Q...R...Q-L-----	..A.V....P	..R.....	..RM..P...PS	LPGLDFPDPQGPS	+9c
Squirrel monkey	.....G.A...Q-----Q-L-----PI--E---	..I.....	..R..A...D..	I.....PS	-----	
Marmoset	.....M.....G.A...S.Q...EQ-----PI--E---	..I.....EQ-----	..R..A....	..R.....PS	-----	
Aye-aye	..Q..A...PPNG..A-V..Q.GRP...R.EQ...K..P..AI--E---	..VM..P....	.....	.....	-----
Bushbaby	..A.Q...A...PT..A-V.G..Q.GRP...V...Q-----A---E...EE.L---	..IM...G....	.....	.....	-----
Mouse lemur	..Q..A...PT..NA-I..EQ.GGP..A...Q-----AI---PA-----	..AM...H....	.....	.....	-----
Tarsier	..NQ...V..ALH.PT...A-L...EQQGEA...L..Q-----V..AIKQI-----L---	..VM...R...	.....	.....	-----
Tree shrew	..Q.....PT..A-I...Q.GG...R.EE...KQA...-AL---A-----	..RLE..V.P..T	.....	.....	-----
Kangaroo rat	..P.H...M...PT.S.A-F...VQ.GGPH..M.P.Q...KD..M..A---E...T-S-	M.LM...GQEL.T	.....	.....	-----
Rat	..Q.H...PT..G-V.V.PQ.PGPH..M.P.Q...IAPD---EP...EN..T---	V.IM...F.T	.....	.....	-----
Mouse	..Q.H...PT..G-V.V.PQ.PGP...M.P.Q...IAPD---EP...EN..T---	V.IM...F.T	.....	.....	-----
Chinese hamster	..Q.H...PTD..G-V.V.PQ.PGP...M.P.Q...TAADE---P..L..EN..T---	..V.LM...F.	.....	.....	-----
Jerboa	.....H.....PT..A..D..Q.GGP...M.P.Q...TADQ...E...E...T---	M.IM...F.S	.....	.....	-----
Naked mole rat	..QQ.P...Q.PT.TPA-V.D.PP.GGP...M.PRO...KD...EA---H...TEMALN---	..VL...I..	.....	.....	-----
Chinchilla	..PQQ.P...Q.PT.TPA-V.DAPP.GGP...M.PRO...KD...EA---T.M.LN---	..VL...I.S	.....	.....	-----
Degu	..QQ.P...Q.PT.TPA-G.D.PP.GGP...M.PRO...KD...EA---T.F.LN---	..VL...I..	.....	.....	-----
Guinea pig	..QQ.P...M.H.Q.PT.TPA-I.D.PQ.AGP...M.PRO...KDA...-EA---HE...TEM.LN---	..VL...I..	.....	.....	-----
Squirrel	..Q..S...PT..A-I...Q.GGP...M.PRO...D..P..AT---E...TE...T-SK	..LVM...G.V..	.....	.....	-----
Rabbit	..Q.....PT..PA-I.G..Q.GGP.LR..PAQ...KD..M..EI---E...TE---	..AM...G.V.T	.....	.....	-----
Pika	..P.P.T.M.S...PTV.PA-I.G.PR...GP.H.M.P.Q...KD..V..EI---E...E..N---	..AM...G.V.T	.....	.....	-----
Cow	..Q..Q...Q...PTVV.S-M.NAVQ.GVP...YQ..-P..QA.G-M---E...E...T-T-	.....M...L.D.P	.....	.....	-----
Sheep	..Q.....Q...PTVV.S-M.NAVQ.GVP...YQ..-P..QA.G-M---E...E...T-T-	.....M...L.D.P	.....	.....	-----
Dolphin	..Q.P...Q...PTVV.S-V.N.VQ.GIP...YP..-P..QS.G-MI---E...E..S.-T-	.....MN...D..	.....	.....	-----
Pig	..Q..Q...Q...PTVV.S-I.NPVQ.GVP...YQ..-P..QV.G-M---E...E..E-A-	..L...D..D-	.....	.....	-----
Alpaca	..Q.....Q...PTVV.A-I.NSVQ.GLP...VYQ..-P..QV.G-M---E...E...T-A-	..M...DLP	.....	.....	-----
Horse	..Q.....Q.A...PTIV.SGI.D.IQ.GGH...VYQRO-P...QS.G-M---E...E...-A-	..TEM...PG...Q	..TE...G...Q	..TEM...PG...PQ	LTEMDFPDPQGPS	+9c-9e
Rhinoceros	..Q.....Q...PTIV.AVM.N.GQ.GGP...VYQ.R-P...QS.G-M---E...E...TE-A-	..EM...PV..D.P	.....	.....	-----
Dog	..Q.....Q...IV.D-I.D..Q.RGT...VYQ.Q-P...QT.G-ML---E...E...-A-	..M...E...	.....	.....	-----
Panda	..Q.....Q...IV.N-I.N..P.GGP...VYQ.Q-P...QK.G-ML---E...E...-A-	..M...E...	.....	.....	-----
Ferret	..PQ...Q...LL.D-G.D.P..GP...AYQ.Q-P...QA.G-ML---E...E...T...-A-	..M...L...	.....	.....	-----
Cat	..Q.....Q...PTIV.A-I.DA.Q.GGPH...VYQ.Q-P...QA.G-ML---E...E...-A-	..M...L...	.....	.....	-----
Shrew	..Q.H...Q...PPT..A-V.NP.Q.GGP...VYHHRQP...QA.G-M---E...I...M..N-E-	G..T...E...G	.....	.....	-----
Star-nosed mole	T..Q...Q...LPTV.A-I.N.VQ.GGP...VYQ..-P...QA.E-MI---E...V...-AK	..E...PEL.A.	.....	.....	-----
Hedgehog	..QSH...Q...HLPTVE.A-I.N.IQ.GGP.L.VYQ..-P...QA.G-MI---E...T...EA-	..RM...D..	..LR...A...D..	..QM...ITS	-----	
Megabat	..Q...T.Q...F.PTVV.A-M...Q.GGP...VYQ.Q-P...QA.G-MI---E...S..-A-	..M...G...S	.....	.....	-----
Big brown bat	..Q.....Q...H.PSVI.A-I.D.VQ.GGP...VYH.Q-P...QA.G-MI---E...E...-TK	Q.M.....	.....	.....	-----
Microbat	..Q.....Q...H.PSVI.A-I.D.VQ.GGP...VYH.Q-P...QA.G-MI---E...E...-A-	..M...G...S	.....	.....	-----
Tenrec	Q..Q...S.P...PVPTD..A-I.DP.Q.AGP...F-P...QA.S-AI---L...E...-E...	..F...G...S	.....	.....	-----
Golden mole	Q..Q...Q...PTP..A-I.G.IQNGGP...Q.Q-P...QS.G-V---E...EM...-E-	..M...G...	.....	.....	-----
Elephant shrew	Q..Q...Q...S-PT...V-L.G..P.IGP...Q.L-P...QSDL-M---E...L..-A-	..EMN.GG...I	..EIN.AG..D.T	..EI...D...P	LPEINFADPQVPT	
Hyrax	Q..Q...Q...F..L.T.P.A-MHDK.Q.TL...AL.Q.P-P...QKDS-MI---E...E...-E-	..EMN...HS.P	.....	.....	-----
Elephant	Q..Q...Q...L.P.P.TVP.A-I.N.Q.SL...AF.Q.Q-Q...QN.S-MI---E...E...-E-	..RM...G...S.P	.....	.....	-----
Manatee	Q..Q...RQ.L.PHPT.P.A-I.G..Q.SL...A.YQ..-P...QN.S-MI---L...E...-E-	..M...G...P	.....	.....	-----
Opossum	QT.Q...KS.Q.S...-SPA-P-DA.QHGVL..LNQEO-SHM-QP.DKGAG...PGL.LGNAGR...	..EM...GQL.Q	.....	.....	-----
Tasmanian devil	Q---.K.Q...-SPP-P-D.QHG.H..L.Q.Q-IHMH-P.DRAMG...P.G.LGRAGR...	..ERN...GHL.H	.....	.....	-----
Wallaby	Q---.K.VQ.T...P-SPA-P-DATQHG.P...PNQ.QNPG..-P.DR.VG...P.G.LGRAGR...	..EL...RQI.H	.....	.....	-----
Platypus	RT.Q...KQNA..PPTV.PSAQGGP.QNGDP...LHLQ-P...QE.-K.S---E...PKR...-E-	..AL...TVQLRQ	.....	.....	-----

	exon 10	exon 11	exon 12	exon 13	373
Human	IF-QIA-RLISHGPM--PQNKQ--SP	LYPGMLYVPPGANQL	NAP-ARLGIMSSEEVA	GGREDPMAYGAMFPGFGGMRPGFEGMPH--NPAMGGDFTLEFDSPVAA-TKG---PENEEGG-----AQG	
Chimpanzee	.....	.....	.....	.....	.....
Gorilla	.....	.....	.....	.....	.....
Orangutan	.....	.....	.....	.....G.....E.....K.....	.....
Gibbon	.....R.....	.....	.....N.....	.....G.....EV.....S.....K.....	.....
Baboon	.....R.V.....	.....F.M.....	.....M.....	.....G.....I.....SSLG.....K.....	.....KG.....
Macaque	.....R.....	.....F.M.....	.....M.....	.....G.....E.....I.....SSLG.....K.....	.....KG.....
Squirrel monkey	.....R.....	.....S.F.....	.....M.....	.....GG.G.....G.....S.G.....L.....S.....	.....KV.....
Marmoset	.....R.....L	.....F.....	.....M.....	.....GG.G.....L.S.....S.G.....	.....KG.....
Aye-aye	.....AR.....	.....F.LSY.....	.....G.....M.....	.....E.GG.T.....I.SSLGEL.....K.....LGT.....	.....KG.....TKD
Bushbaby	.....AR.....	.....F.SY.....	.....G.....M.....	.....GG.G.E.V.....L.SLG.L.....L.....	.....KG.....PD
Mouse lemur	.....AR.....T	.....F.MSY.....	.....G.....M.....	.....GG.....A.....S.G.L.....G.....L.A.....	.....KG.....D
Tarsier	V.....Q.V.....P	.....F.F.MSY.....	.....M.....	.....GG.L.....R.LG.....	.....RG.....D
Tree shrew	.....R.....	.....I.F.MSY.....	.....M.....	.....GG.....S.LG.....	.....KG.....V
Kangaroo rat	V.-HL.....RA.I--.D.P--.T	.....F.F.MSY.T.....	.....T.....F.....MP	.....A.G.....E.L.HTLR.LGP--.T.K.....SV.....TKG.KG.EE-----P..	
Rat	V.....HSL.R.....AH.V--PT	.....F.F.MSY.....	.....I.F.....MP	.....E.GS.....TL.....Y.F.QTLR.LNQ--.SPK.....V.V.....SV.....	.....KG.P-----E.
Mouse	V.....S.R.....AH.A--A	.....F.F.MSY.....	.....I.F.....MP	.....E.GS.....TL.R.....F.QTLRRLNQ--.SPK.....V.V.....SV.....	.....KG.P-----E.
Chinese hamster	V.....HSV.R.....AH.A--PS	.....F.F.MSY.....	.....V.F.....MP	.....GN.....TL.....F.QTLR.LNP--.SPK.....V.V.....SV.....	.....KG.P-----E.
Jerboa	V.....HV.R.....A.....PA	.....F.F.MSY.....	.....F.....MP	.....E.GG.G.S.....YE.L.HTLR.LRP--.T.K.....S.....	.....KG.....EK.
Naked mole rat	V.....F.RV.V.....P--T	.....F.MSY.T.....	S.A.....F.....MP	.....GG.T.....LL.T.....HTIRR.Q--D.T.A.....	.....KG.A-----
Chinchilla	V.....FVPRVLV.....P--PT	.....F.MSY.T.....	S.A.....F.....MP	.....AS.VT.....LL.A.V.HSVRR.Q--D.T.A.....	.....KG.A-----T..
Degu	V.....FM.RV.V.....P--PT	.....F.MSY.T.....	A.....F.....MP	.....GS.VT.....LL.A.V.HSVRR.Q--D.T.A.....	.....KG.....
Guinea pig	V.....FV.RV.V.....P--AM	.....V.MSY.T.....	S.A.....F.....MP	.....VA.VT.....GLL.LT.V.HSVRR.Q--D.T.A.....	.....KG.....
Squirrel	L.-H.....V.R.L--.P--.A	.....F.TSY.....D	.....T.....M.....	.....GG.G.....I.....HSLR.SP--.D.....G.....	.....KG.E-----A
Rabbit	V.....PR.L--.RH--AA	.....F.TSY.G.....	.....L.....MP	.....E.GG.....R.....I.HSLG.....	.....KG.A-----ED
Pika	V.....PR.L--.RH--TA	.....F.MSY.M.....	.....V.....MP	.....EGGG.....I.R.....IKHSLGE.R--L.WV.ILP.....T.G.--I.....	.....KG.....TPD
Cow	M.-P.-H.....R.....P--	.....I.F.TY.....	.....M.G.....	.....G.L.....I.....R.LG.....D.....	.....KG.....D
Sheep	M.-P.-H.....R.....P--	.....I.F.TY.....	.....M.G.....	.....GG.V.....I.....S.LG.....Q--D.A.....	.....KG.....D
Dolphin	M.-P.-L.V.....P--P	.....I.F.MSY.....	.....M.....	.....GGG.....L.....G.....P.....A.G.....	.....KG.....D
Pig	M.-P.-Q.V--.D.P--	.....F.MSY.....	S.....L.....M.....	.....GG.L.....I.....NLG.P--S.K.....A.G.....	.....KG.....E.
Alpaca	MLVP.S.....L.R.....P--	.....F.LSY.....	S.....L.....M.....	.....GG.....S.NLG.....T.....G.....	.....KG.....
Horse	M.-P.-AR.....P--A	.....L.F.LTY.....	T.-G.....M.....	.....GG.....S.SSLR.....P.....	.....KG.....P..
Rhinoceros	M.-P.-MTQ.....S	.....L.F.MSY.....	-G.....M.....	.....GG.....S.SLG.....P--G.....T.....	.....KG.....P..
Dog	V.....R.....P--	.....I.F.MSY.....	-G.....M.....	.....GS.....I.....NLG.....G.....	.....KG.....
Panda	V.....Q.....P--	.....I.F.MSY.....	DT.-G.....M.....	.....GG.....I.....KLG.....G.....	.....KG.....
Ferret	V.....R.....P--S	.....I.F.MSY.....	M.....	.....GS.....I.....HLG.....G.....	.....KG.....
Cat	V.....R.....P--	.....I.F.MSY.....	M.....	.....GG.....I.....NLG.I.....T.....G.....	.....KG.....T..
Shrew	L.-H.....RE.L--S...P--S	.....I.Y.MSY.....	-G.I.F.....MP	.....AS.T.S.YSRL.L.NLA..QNQ..K.....T.G.....	.....KG.....P.R
Star-nosed mole	L.-P.-AQ.V--.P--S	.....F.FMSY.....	-V.....M.....	.....GG.....S.....S.LG.....T.....	.....KG.....
Hedgehog	L.-P.-AR.IAV...P--S	.....F.F.MSY.....	-G.....MP	.....G.T.....R.....N.GR.HQ--.SPK.....V.....T.AV--.Q.KG...KEGEGDPHH	
Megabat	..-P.-AQ.T--.P--Q	.....F.MSY.....	T.-.....M.....	.....GG.....E.....S.SLG.....H.G.....T.....G.....	.....KG.....D
Big brown bat	..-S.-Q.L--A..P--S	.....F.F.MSY.....	-TT.....M.....	.....GG.....I.....F.SLG.....P--L.GK.....	.....KG.P-----V..
Microbat	..-S.-Q.L--A..P--S	.....F.F.MSY.....	-T.....M.....	.....GG.....I.....S.....SLG.....P--L.GK.....	.....KG.V-----V..
Tenrec	..-Q.V--.P..SQ..	.....F.F.MSY.....	-G.....M.....	.....GG.....E.....I.....G.QP--.Q.GK.....T.F.....	.....KG.....H.
Golden mole	..-Q.V--.P..SQ..	.....F.F.M.Y.....	-G.....M.....	.....GG.F.S.....E.....G.P--.Q.GK.....	.....KG.....
Elephant shrew	ML.....Q.V--T.T.....	.....F.M.Y.....	-G.....MV	.....GG.....I.....R.L.....G.AP--.Q.GK.....T.G.....	.....KG.....T.E
Hyrax	..-Q.L--.E--	.....F.F.MSY.T.....	M.....	.....GG.L.....I.....S.S.G.RP--.HG.....N.A.....	.....KG.....VH.
Elephant	M.....Q.SV--	.....F.F.MSY.....	M.....	.....GG.....V.....L.SS.GR.T--Q.....I.....PG.....	.....KGG.....HS
Manatee	..-R.V--	.....E.F.MSY.....	F.....M.....	.....G.T.....V.....S.....G.....Q.....L.....	.....KG.....
Opossum	M.-PMG-...Q.E--.AEKA.	.....D.....F.M.Y.....R.	.....F.LL.....MM	.....GT.....G.....KS.G.P--.H.Q.TGG-N.S--.GVA.....	.....D
Tasmanian devil	M.-PMG-...AE.T--.TEKA.	.....R.V.M.Y.....	-G.F.ML.....MM	.....GS.G.....--KS.GE.TP--.T.....H.L.TGN-N.T--.GAA.....	
Wallaby	M.-PMG-...AEA.T--.TEKA.	.....R.F.....E.E.	???????????????	.....GG.G.S.....E--KS.L.IAP--.T.....R.L.KG.-R.S--.GPA.D-----D.T	
Platypus	..-P..QK...Q.R--.AEQ..	.....ELV.....Q	..-AP...KV...MP	.....GGE.L.....SI.....S.....GA.QI--.L.K.....D...TW.-G.P--.GOGGEV-----LGS	

Human	SPMPEANPDNLENPAFLTELE-PAP--HAGLLALPKDDIPGLPRSPSGMKMGLPS-VTPAAADPLMTPELADVRYTYDADMTTSDVDFQEEATMDTTMAPNSLQTSM-PGNKAQEPPEMMDAWHFQEP*	(447)
Chimpanzee	.....	(447)
Gorilla	.....P.....	(421)
Orangutan	.....P.....H.....G.....	(434)
Gibbon	..VL.....P.....A.....V.S.....F.-I.....NI.....D.....	(447)
Baboon	.....DP.....A.....VA.....V.S.....G.....D.V.....R.....Y.....	(473)
Macaque	.....DP.....VA.....V.S.....G.....D.V.....I.....R.....Y.....	(473)
Squirrel monkey	.....P.....VFPD.....A.....VSS.....R.AL.-I.....G.G.....M.....T.....	(446)
Marmoset	.....P.....GVFPD.....A.....VSS.....R.ALG-F.....M.....G.G.....T.....S.....	(446)
Aye-aye	..V.DD.A.P.....R.....L-AGA--RT..TF.E.D.S.A.G.A.QR.RP.....I.E.G.....PLEATMDT.....DPQEI.....L.....QSQIV.....K.....	(417)
Bushbaby	T.G.....S.AHP.Q.LPP.A.GA--P...F.D.ED.S.A.G.A.QRL.P.G.....I.G.A.V.PL----T...G.DL.E.SA...R.QAQAAREV.RY....	(418)
Mouse lemur	..IL.....A.P.....L.P.A.DA--T...F.E.ID.S.A.G.A.QLM.P.....E.G.....PL----VT...T.DP.E.V..D..Q.QIV.....	(418)
Tarsier	..L.....AHP.Q.LIP.G-G--G...FS.NV.S.A.G.A.QR.P.R.....T.....FG.G.....PLS.....TI...ST..DTQ..T-E..V.QS.N.....	(423)
Tree shrew	..L.....A.P.....EL.P.VV-GA--...S.TKGST.QRM.PSG.....D.G.GV.V.PMGL.....T.D.Q.....I.....QV.....	(421)
Kangaroo rat	..LH.G.--G.R.SHIA-SGA--...GF.D.N.S.A.G.A.QRP.S.G.....NT.....SE.DV.GS.V.PLGE-G.....S.DTQ..LI...MHH.Q.V...R.....	(424)
Rat	..LQ.S.KG...L.SQMA-GA--...F.N.H.NMA.G.A.QR--L.G.....I.....E.E.G.V.PLGD-G...I.S.DTQ.PP...VHQ.Q-V.N.R.....	(422)
Mouse	..LQ.....GKR...L.SQMA-GA--...F.N.H.SMA.G.A.QR--L.G.....I.....E.E.G.V.PLGD-G...I.S.DTQ.PLL...VHQ.Q-V.N.R.....	(422)
Chinese hamster	..LQ.....A.R...L.SQMA-GA--...F.N.H.S.A.G.A.QKQ.LG.....E.G.A.PLGD-G...V.I.S.DTQ.PLV...VHQSQ-V.N.R.....	(425)
Jerboa	..LE.TQE.P.Q.L.SHIA-GA--...GF.N.N.S.A.G.A.QR...G.....E.D.G.E...PLSD-G...TE.AS.DTQ..W...VHQ.QLV.K.....	(426)
Naked mole rat	..LQ.....P.A.L.SQIA-GA--E...GF.N.NV.SMA.G.A.QR.RPLG--TT...I...EA.D.G.V.PL--G...E...T.DTP.SL...HH.QII.N.RY....	(421)
Chinchilla	..LH.TKAEDA.A.L.SQIA-GA--RT...GF.N.NV.SMA.G.A.QR.RPLE--VT...EI.E.G.V.PL--G...E...T.DTP.LV...RH.Q...P.R.....	(422)
Degu	..LH.TKAEDN.KAGL.SQIA-GA--R...GF.N.NV.SMA.G.A.QR.RPLG--T...EI.E.G.V.PL--G...E...T.DTP.LA...RQAQ...P.R.....	(422)
Guinea pig	..LH.TKGEDP.A.L.SQIA-GA--T.FGF.N.NV.SMA.G...HRNRPLE--VT...I...EI.E.GG.V.PL--G...E...T.DTP.P...VRQ.Q.V.EP....	(422)
Squirrel	..Q.....A.PK...L.SQIA-GA--...F.N.N.N.A.G.A.RQK.PLG--S.....E.E.GD.V.PL-T.G.....T.DTQ...VHQ.Q.V...R.H....	(423)
Rabbit	A.....S.P...L.Q.VA-HGA--...F.N.N.MA.G.A.KM.V.R...SD...A...E.DI.GP.V.PLGT...T.T...T.DTQE.I...D.HSQ...N.R.....	(421)
Pika	.....T.S.PA...GL.Q.IA-HGA--...F.HV.S.AMG.A.QRM.P.R...SP.G.AN.V.E.DM.GP...PLG...S.T.P.T...TQEIP.-L...D.Q.QI.R.V.R.P....	(422)
Cow	..V...HLADP.S.L.S.A-GA--LE...N.EGN.N.A.G.A.RSR.FLRG.....G.E.E.G.E.TLGL...T.V.S.AT.DTQH.L.-R...Q.QIK.....	(422)
Sheep	..V...HLADP.S.L.S.A-GA--LG...N.EGN.N.A.G.A.RSR.FLRG.....G.E.E.G.E.TLGL...T.V.S.AT.DTQHPL.-R...Q.QIK.....	(422)
Dolphin	P.V...AD...L.S.A-GA--LG...N.GN.N.A.G.A.QSR.PLR.....G...E.S.E.TLGL...T.V.S.VT.D.QH...Q.QIK.....	(420)
Pig	..VA...TADP.S.LFS.VA-SGV--LG...N.GK.N.A.G.A.RSR.P.G...D.....G.A.E.TLGL...M.S.AT.Y.EH...Q.QIKR...R.....	(421)
Alpaca	..V.T...DP...L.S.VA-GA--LG...SA.NV.N.A.----IR.PFR.....G...E.GV.E.TMGL...T.V.S.AT.D...S...Q.QNKY.....	(417)
Horse	..AK...DEA.P...Q.L.S.IA-SG--LG...GSV.N.A.G.A.QSR.P.R...G.EA.E.G.V.PL.E.T.T...VT.E.P...E.EQ.Q.V...R.....	(499)
Rhinoceros	..T.D.A.P...L.S.IA-SG--LG...QGSV.R.A.G.A.HSR.P.R...G...A.E.A...PLGLE.S.T...VTSE.P...EQ.QLVR...R.P....	(422)
Dog	..DV...A.P...L...A-GA--LG...H.ND.S.A.G.A.QSG.P.R...D.....I.E.G.V.PL---TPT...VI.DTQ..L.-E...Q.QI..G.....	(418)
Panda	..T.DGD.A.P...DL.PGVA-GA--LG...H.E.E...A.G.A.QSG.P.R...D.....G...I.E.G.V.PL---TPT...AV.DTQ..L.-ES...Q.QI..V...K.....	(419)
Ferret	..LT.LD.A.P.S.L.P.GA-GA--LG...H.GND.NMA.G.A.QSG.PLR...D.....G...I.EN.G.V.PL---TPT...AS.DTQ..L.-E.N...Q.QV...V.R.....	(418)
Cat	..R.DV...ADP...L.P.VA-GA--LG...H.GND.S.A.G.A.QSG.P.R...E.....G...I.E.G.V.PL---TPT...AI.DTQ...E...Q.QI..V.....	(418)
Shrew	..Q...QRADP.ETETRDF.PEA.LGPLG...S...H.SQA.G.A.QNW.F.A--AD.T.A.N.GI..I.E.G...PPGL.G.S.T...DAKH.PK-A.S...K.QIS...R.P....	(427)
Star-nosed mole	.....V.P...L.S.VA-LGA--LG...S.GSV.S.VKG.A.QSW.T.K...G...A.E.G...PLGL...S.T.A.VS.DTQ..L.-V...QIT.....	(421)
Hedgehog	..RL.R.RLSP...LFQ.AAALEA--LG.F.S...N.S.AMG.A.LIREPSK-I.E...G...E.G...PLNL.G.S.T.S.TTMDIQE..T...EEQ.QV...R.....	(445)
Megabat	F.T...H.A.P...LPP.GV-SA--LR...G.SVS...A.G.A.QRV...K...T...A.EN.G.T.PL--G.T...VT.DTQ...Q...V.....	(405)
Big brown bat	..V...LA.P...L.P.VVM.GA--L.G...N.S.V.G.EEHN...S.R...G...EP.A.T.PL--G.T.L...VT.DTE...V.Q.HI..NG.....	(409)
Microbat	..V...LA.P...L.P.V.M.SA--L.G...GN.S.A.G.A.HS.S.R...G...G.EP.A.T.PL--G.T.L...VT.DTE...V.Q.HI..NG.....	(422)
Tenrec	A.....A.A...L.S.VA-GA--GA...F.GLF.S.A.G.A.QSR.PLR--EV...MV.G...G...PLGL.G.G.T.P.T.DVS...A-Q...EQ.PN.KG.....	(422)
Golden mole	..L.T.LA.P...L.L.VS-GA--G...F.GN.S.A.G.A.QSR.HFG...V.G...A.E.G.V.PLGL.G.T...T.DTQ...Q...Q.QI..N.P.....	(421)
Elephant shrew	PHR.AG.A...TL.T.FA-GG--...P.GN.F.VARK.A.HSW.SLR...--A.G...L.E.GP.A.PPG.D.T.T.S.VT.DTA...V.G.Q.QI..N.....	(457)
Hyrax	.....V.A.P...L...VA-TGA--G...N.LN.AKG.A.QSS.P.R...TTT...V.G.D.A.E.A.L.PLNL.GS.T.I.AT.DTQE...RG.Q.Q.....	(417)
Elephant	..A...T.A.P...L.DVA-TGA--G...F.GN.AS.A.G.A.QSR...K...N...V.G.T.A.G.T...PLGL...T...AT.DTM...Q.QI.....	(411)
Manatee	.....A.P...L.DVA-AGT--G...F.GN.S.A.G.A.QSR.P.R...T...V.G.EI.G.S...PLGL...T...AT.DTQ...Q.QV.....	(421)
Opossum	..G.KG.G...K...P.EI-WA--QG.I.SF..GR.SS.GGG.A.QV.FLR-G.SPTPESGI.GPS.ITE.FGT.I.PLGM.L.GPL.I.E.DTHH.V-Q.E.S.Q.QI.Q.V.....	(408)
Tasmanian devil	..VA...E.D.D.P.DF-WV--QG.I.NF..GRMSK.G.G.A.QI.RPLK-G.PTSE.G.LGT.FTD.FGT.V.PLANL.GPL.V.VE.DTHH.V-Q.TGVRSQI.E.V.....	(405)
Wallaby	..T.DD.E.I...P.EI-WA--QG.I.SF..GS.SN.GGSA.QI.RPLK-G.PTSE.G.LGPS.TTE.FGT.I.PLAMIG.GPL.I.VE.DTHH.V-E.E.HQ.QI.G.V.....	(406)
Platypus	PRDGAIPAGHP...GL.P.RISRLRS-G.A.-TF.S.F.HRGQG.A.QS.LP.G...PP...GPS.PLEFFEG.E.PLGL.R.LL...T.DTQS.Y...E.QMQVTO.Q.Q.....	(411)