

human	MEKCTKSSSTMQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVY	56
chimpanzee	MEKCTKSSPTMQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVY	56
pygmy_chimpanzee	MEKCTKSSPTMQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVY	56
western_lowland_gorilla	-----	MQHPTTENTAKRGQVMPALATTVMVPVY	28
Sumatran_orangutan	----MKSPPTMQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVY	52
northern_white-cheeked_gibbon_a	MEKCTKSPPTMQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVY	56
northern_white-cheeked_gibbon_b	-----		0
sooty_mangabey	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPLN	56
green_monkey	MEKCTKSPPTLQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
crab-eating_macaque	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
rhesus_monkey	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
pig-tailed_macaque	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
drill	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
olive_baboon	MEKCTKSPPTLQVEPS----	FLQGENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
Colobus_angolensis_palliatus	MEKCTKSPPTLQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPVN	56
golden_snub-nosed_monkey	MEKCTKSPPTLQVEPS----	FLQAEENLILRPQMHPHTTENTAKRGQVMPALATTVMVPLN	56
Mas_night_monkey	-----		0
common_marmoset	-----		0
Bolivian_squirrel_monkey	-----		0
Philippine_tarsier	MDKTESPPTLQVESSDS--AVTNAENPILQSQMHPHIRENSALRGQVMPALAI	IPVMPVPF	59
gray_mouse_lemur	MEKYMESPPTLQAEPS----	FPQAEENLTLQPQMHPHTKENSALDKQGMALATPAMTVPVC	56
Coquerels_sifaka	MEKYTESPPTLQVEPS----	FPQAEENLTLQPQMHPHTNDNPAALRGQVMPALATPVMVPVN	56
small-eared_galago	MEKYTESPPTLQVEPS----	FPQAEENLTLRPQVQVHSTKESPALRGQVMPALATPGINVPC	56
Damara_mole-rat	-----		0
naked_mole-rat	-----		0
domestic_guinea_pig	-----		0
long-tailed_chinchilla	-----		0
degu	-----		0
lesser_Egyptian_jerboa	MEKCTESPPTVQVEGS----	FLGGDNLTLQPQMQLTKDNTALRRQGMVPLNTPMMPVSY	56
Ords_kangaroo_rat	MEKCAESPPTLQVEPS----	FPWGDNVMMQRHMQLHSEDNPTLKSQVMPVPTTAVTSTPY	56
prairie_vole	MEKCTESPPTLKAETS----	LLKGDNLIVPSQIEHPTDDNPTLREQVVPVFNIPVMSVPY	56
Chinese_hamster	MEKCTKSPPTLKPETS----	FLRGDSLILQPQMHPHTDDNPTLRQVVPVPLNTPVMSIPY	56
golden_hamster	MEKCTESPPTLKVETS----	FSRGDNLVLPQMHPHTDDNPTLRQVVPVPLNTPMMSTPY	56
prairie_deer_mouse	MEKCTESPPTLKAGPS----	FLRRDNLILQPQMHPHTDDNPTLRQVVPVPLNTPVMSLPY	56
house_mouse	MEKCTESLPLNNAETS----	FLRGGNLIQPQVQVHPTDDKPPITGQVVPALNTPVMSGPY	56
Norway_rat	MEKCTESPPNNAETS----	FLRGGNLIQPQVQVHPTDDKPPITGQVVPALNTPVMSGPY	56
Upper_Galilee_mountains_blind_mole_rat	-----	MIVSQMQHLTDDNPAALRNHVPVSNTPVMSVSY	34
thirteen-lined_ground_squirrel	MEKCTESPPTLQVEPS----	FLQGENLILQPQMHLTEENPALRGQVMPALATPVMVPVN	56
rabbit	MEECTESSSTLQVEPS----	FPQAEENLNLQSQMHLAKENLALRGQVMPALATPAMTVPVC	56
American_pika	MDKYTESPPTLQVEPS----	FLQGENLNQPPQIQCLTKENLDFGDQVMPALATPVMVPVN	56
Chinese_tree_shrew	MEKCTKSPSTLQGESS----	FLQAEENLILQPQMHPHLSKENPTLKGQITPALATSVMSIPC	56
Sunda_flying_lemur	MERCOTESPPTLQVEPS----	FIQEKLILQPQMHLTKKEPALRGQVMPASGTPVIVPVC	56
dog	MEKYTESPSTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
domestic_ferret	MEKYTESPPTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
Pacific_walrus	MEKYTDSPTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
Weddell_seal	MEKYTDSPTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
giant_panda	MEKYTGSPTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
polar_bear	MEKYTRSSPTLQVEHS----	SLQVENLILPPQIQHLTEENLDRGQVMPALATPVMVPVN	56
domestic_cat	MEKYTETPSTLQVEHS----	SLQVEENLFLQPQIQHLTEENLDRGQVMPALATPVMVPVN	56
Amur_tiger	MEKYTETPSTLQVEHS----	SLQVEENLFLQPQIQHLTEENLDRGQVMPALATPVMVPVN	56
Balaenoptera_acutorostrata_scammoni	-----		0
killer_whale	-----		0
bottlenosed_dolphin	-----		0
Yangtze_River_dolphin	-----		0
sperm_whale	-----		0
chiru	-----		0
Bison_bison_bison	-----		0
cattle	-----		0
wild_yak	-----		0
water_buffalo	-----		0
goat	-----		0
sheep	-----		0
mouflon	-----		0
pig	MENYIDSPPTLQVEHS----	SLQAEENLILQPQMHPHTTEENPALRGQVMSALTPMMPVPC	56
Bactrian_camel	MENYTESPPTLQVEHS----	SLWAENLNPQPHMWHLTEKNPALRDQLMPALATPVMVPVN	56
Arabian_camel	MENYTESPPTLQVEHS----	SLWAENLNPQPHMWHLTEKNPALRDQLMPALATPVMVPVN	56
Wild_Bactrian_camel	MENYTESPPTLQVEHS----	SLWAENLNPQPHMWHLTEKNPALRDQLMPALATPVMVPVN	56
alpaca	MENYTESPPTLQVEHS----	SLWAENLNPQPHMWHLTEKNPALRDQLMPALATPVMVPVN	56
black_flying_fox	MEKYTESPPTMQVEHS----	FFQVENPILPQVQHLTEENLDRGQVMSALATPMMPIFC	56
large_flying_fox	MEKYTESPPTMQVEHS----	FFQVENPILPQVQHLTEENLDRGQVMSALATPMMPIFC	56
big_brown_bat	MEKHTESSPRLQVEHS----	SLWVENLILQPQVQHLTEENTLDRQVMPALATPMMPLLC	56
little_brown_bat	MEKHTESSPRLQVEHS----	SLWVENLILQPQVQHLTEENTLDRQVMPALATPMMPLLC	56
Brandts_bat	MEKHTESSPRLQVEHS----	SLWVENLILQPQVQHLTEENTLDRQVMPALATPMMPLLC	56
Myotis_davidii	MEKHTESSPTSQVEHS----	SLWAENLILQPQVQHLTEENTLDRQVMPALATPMMPLLY	56
European_shrew	MEKCTQSPPIKVEHL----	SLQAEENMILESQWDHPTKENPDLRSQAISAVDITEMSSED	56
star-nosed_mole	MEKHPESSPALQVEQP----	SLQAEENRILPQVQVHLTEENLDRGQVMPALATPVMVPVN	56
horse	MEKYTESPPALQVEHA----	SLQAEENLILRPQMQLYTEENPAMRGQVMSALATPMMPIFC	56
Przewalskis_horse	MEKYTESPPALQVEHA----	SLQAEENLILRPQMQLYTEENPAMRGQVMSALATPMMPIFC	56
southern_white_rhinoceros	MEKYTESPSTLQVEHS----	SLWAENLILPQVQVHLTEENLDRGQVMPALATPMMPIFC	56
Cape_golden_mole	MEKLTDSPPILKIEHP----	SLWADNLIQVQVQHLTEENTLDRGQVMPALATPMMPIFC	56
Cape_elephant_shrew	MEKTRSSPALQGGESDSGANLWAENMILGPPMQPLTEGNTLDRGQVMSALATPMMPIFC		60
African_savanna_elephant	MENFTESPSTLQVEHS----	SLWADNLIQVQVQVHLTEENTLDRGQVMPALATPMMPIFC	56
Florida_manatee	MEKFTESPPTLQVEHS----	SLWADNLIQVQVQVHLTEENTLDRGQVMPALATPMMPIFC	56
small_Madagascar_hedgehog	MEKLTDSPPPTLQVEHS----	SLLTENQIPESQGGTLEENTLDRGQVMPALATPMMPIFC	56
Orycteropus_afer_afer	MEKHTDSPTLQVEPS----	SLWAENLILPQVQVHLTEENTLDRGQVMPALATPMMPIFC	56

Fig. S1

human	SLEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
chimpanzee	SLEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
pygmy_chimpanzee	SLEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
western_lowland_gorilla	SLEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	87
Sumatran_orangutan	SFEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	111
northern_white-cheeked_gibbon_a	SLEHLTQFPHG--DPANCSEFLTQVTTYLTALQISNPANDAQINVFFDYLSQQLESCGNIISG	115
northern_white-cheeked_gibbon_b	-----	0
sooty_mangabey	SLEHLTQFPHG--DPANHSEFLTQVTTYLTALQISNPANAQIKLFFDYLSQQLESCGIIISG	115
green_monkey	SLEHLTQFPHG--DPANRSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
crab-eating_macaque	SLEHLTQFPHG--DPANRSEFLTQVTTYLTSLQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
rhesus_monkey	SLEHLTQFPHG--DPANRSEFLTQVTTYLTSLQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
pig-tailed_macaque	SLEHLTQFPHG--DPANRSEFLTQVTTYLTSLQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
drill	SLEHLTQFPHG--DPANRSEFLTQVTTYLTALQISNPANAQIKLFFDYLSQQLESCGIIISG	115
olive_baboon	SLEHLTQFPHG--DPANRSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
Colobus_angolensis_palliatus	SLEHLTQFPHG--DPASRTEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
golden_snub-nosed_monkey	SLEHLTQFPHG--DPANRSEFLTQVTTYLTALQISNPANDAQIKLFFDYLSQQLESCGIIISG	115
Mas_night_monkey	-----	0
common_marmoset	-----MTTYLTALQISNPANDAQINLFDYLFQKLESCGIIISG	38
Bolivian_squirrel_monkey	-----	0
Philippine_tarsier	SLEHLTHFPHG--DPASLSGFLAQVTTYMTALQISNPEDAHVKLFDDYLSQQLESCGVVSG	118
gray_mouse_lemur	SFEHLTKIHD--DPASLAGFLAQVTTYLTDLQISNPDDARVKLFFDYLSQQLGSCGAIISR	115
Coquerels_sifaka	SLEHLTQIRG--DPDLSGFLAQVTTYLTALQISDPDDAQIKLFFDYLSQQLGSCGAIISG	115
small-eared_galago	SLEHLTQFPHG--DPASLSGFLAQVTTYLTALQISNHSDDAQAKLFFDYLSQQLGSCGVMSG	115
Damara_mole-rat	-----	0
naked_mole-rat	-----	0
domestic_guinea_pig	-----	0
long-tailed_chinchilla	-----METFGIYSE	9
degu	-----MENFGINCE	9
lesser_Egyptian_jerboa	VLEHLRPLHG--DPSLSGFLAQVTTYMTALKISNPADDAQVKHFFEYLSQQMQKHGVISE	115
Ords_kangaroo_rat	SLEHHTFPHS--ESSNLSGFLAQVTTYLSPLKCPNPTEDAEVKHFCDVPIHQVQRCGIIISG	115
prairie_vole	SGNHLTPQFHG--KPTSATGFLAQVTTYLTALKISNPADDAQVKHFFDCLSQMQSCDVVSG	115
Chinese_hamster	SGDNLQFPHG--EPTSVTGFLAQVTTYLTALQISNPADDRVVKHFFDYLSQQVQSCDIIVSE	115
golden_hamster	SSGNLQFPHG--ETTSVTGFLAQVTTYLTALQISNPADDAQVKHFFDYLSQQMQSCDIIVSE	115
prairie_deer_mouse	SGDHLTPQFHD--ESTSVTGFLARVTTYLTALKISNPADDAQVKHFFDYLSQQMQSCDIIVSE	115
house_mouse	SGDHIPQFPHG--NPASVKGFFAQVTTYLRALDISNPADNARVKHFFDYLSQQMQNCVLDISE	115
Norway_rat	SGDHLTPQFPHG--NPASVKGFFAQVTTYLRALDISNPADDAQVKHFFDYLSQQMQNCVLDISE	115
Upper_Galilee_mountains_blind_mole_rat	SLEHLFQVHD--DPTSVSEFRAQVTTYLTSLKISNPADDAQVKHFFEYLSQQMQISDVKITG	93
thirteen-lined_ground_squirrel	SLENLTQFPHG--DPASVSGFLAQVTTYLTAFKIPNSVNGTQNKLVFDYLSQQMESCGVTSG	115
rabbit	SLEHFDQFHD--DPASLSGFLAQVTTYLTALKRNNPTDGDVKLFFDYLSQQMQKSRVYTSG	115
American_pika	LLEHFAQFHG--DPDLSRFLAQITTYLNLKKNPADDQVKLIFDYISQQIENCRVTSG	115
Chinese_tree_shrew	SLEHLTQFHD--DPARSELLAQMTTYLTDLQIPNPTDNGQVKHFFDYLSQEMENCGVIVSG	115
Sunda_flying_lemur	SLEHFTQFHG--DPASFSEFLAQVTTYLTALQITNPENDVQVKLFFDYLSQQMESYGVIVSG	115
dog	LLEHFAQFHG--DPDLSRFLAQITTYLNLKKNPADDQVKLIFDYISQQIENCRVTSG	111
domestic_ferret	SLEHLSQFHH--DPANLSIFLAQL----TTLKFPSPADDIQVKFFDYLSQQMESCGVIFG	111
Pacific_walrus	SLEHLSQFHH--DPANLSRFLAQQL----ATLKFPPNPDDVQVKFFDYLSQQMESCGIISG	111
Weddell_seal	SLEHLSQFHH--DPANLSRFLAQQL----TTLKFPNPADDVQVKFFDYLSQQMESCGIISG	111
giant_panda	SLEHLSQFHR--DPANLSKFLAQQL----TTFKFPNPADDVQVKFFDYLSQQMEICGVVSG	111
polar_bear	SLEHLSQFHH--DPANLSRFLVQL----TTFKFPNPADDVQVKFFDYLSQQMEICGVVSG	111
domestic_cat	SLEHLSQFPHG--DPDNL-----L----TTVKIPNPADDVQVKFFLNLYLAQQMESCGVIVSG	105
Amur_tiger	SLEHLSQFPHG--DPDNL-----L----TTVKIPNPADDVQVKFFLNLYLAQQMESCGVIVSG	105
Balaenoptera_acutorostrata_scammoni	-----	0
killer_whale	-----	0
bottlenosed_dolphin	-----	0
Yangtze_River_dolphin	-----	0
sperm_whale	-----	0
chiru	-----	0
Bison_bison_bison	-----	0
cattle	-----	0
wild_yak	-----	0
water_buffalo	-----	0
goat	-----	0
sheep	-----	0
mouflon	-----	0
pig	SLEHLSQFPHG--DPTNISEFLAQMTTYLTTLKIPNPEDNAHVKFIIDHLSQQMESCGVIVSG	115
Bactrian_camel	SLEHLSQSHD--DPASLSGLLAQVTTSSSTTFKITNPADDAHVKFSFDYLPQQMEVCGVIVSG	115
Arabian_camel	SLEHLSQSHD--DPASLSGLLAQVTTSSSTTFKITNPADDAHVKFSFDYLPQQMEVCGVIVSG	115
Wild_Bactrian_camel	SLEHLSQSHD--DPASLSGLLAQVTTSSSTTFKITNPADDAHVKFSFDYLPQQMEVCGVIVSG	115
alpaca	SLEHLSQSHD--DPASLSGLLAQVTTSSSTTFKITNPADDAHVKFSFDYLPQQMEVCGVIVSG	115
black_flying_fox	SLEHLSQFYD--DTANISGFLAQVTTYLTILKIPNPADDAQVKFFDYLSQQMESCGIIST	115
large_flying_fox	SLEHLSQFYD--DTANVSGFLAQVTTYLTILKIPNPADDAQVKFFDYLSQQMESCGIIST	115
big_brown_bat	SLKNLSQFPHG--DPANISGFLAQVTTYLTTLKNTNPIHDDQVKFFDHLSSQQMESCGMISR	115
little_brown_bat	SLKNLSQFPHG--DPANLSGFLAQVTTYLTTLKIPNPADDAQVKLFFDYLSQQMESCGIISR	115
Brandts_bat	SLKNLSQFPHG--DPANLSGFLAQVTTYLTTLKIPNPADDAQVKLFFDYLSQQMESCGIISR	115
Myotis_davidii	SLKNLSQFPD--DPANLSGFLAQVTTYLTTLKIPNPADDAQVKLFFDYLSQQMESCGMISR	115
European_shrew	SFGYPSQVPGDSSANISKFLAQMTTCLSTTKLPKPNDDQAKVCPDHKSQQMESQVIVSG	116
star-nosed_mole	SSEHPSKFHG--VPANLSGFLAEVTTYLTTPMVSNTADDTQVKLFFDYLSQQMEKCGVIVSG	115
horse	SLEHLSQFRD--DPASLSGFLAQVTTYLTALKIPNPADDAQVKFFDYLYQQMKSCGIIISG	115
Przewalskis_horse	SLEHLSQFRD--DPASLSGFLAQVTTYLTALKIPNPADDAQVKFFDYLYQQMKSCGIIISG	115
southern_white_rhinoceros	SPEHLSQFPHG--DPANLARFLAQVTTYLTTLKIPNPADDAQIKFFDYLSQQMESCGIISG	115
Cape_golden_mole	SLEHLNQFHV--DPANLSGFLAQATTYLTLASLN--YPADNAKAKFFIDYILQQVKRSGVLHG	113
Cape_elephant_shrew	SPEHLSKFHV--NPASLSGFLAQATYFTALKNSNTADNAQVMSFLEYISRQMERVGTLPG	119
African_savanna_elephant	SLEHLSQFHV--DPANLSGFLAQVTTYLTTLKIPNPADDAQIKFFDYLSQQMESCGIISG	115
Florida_manatee	SLEHPSQFHV--DPANLSGFLAQATTYLTALKTPNPADDAQVKFFDYISQQVERCRILPG	115
small_Madagascar_hedgehog	LFEHLNQFHV--DPDNPSELLAQVTTYLTALKPSNPAENTQIKCFIDYISQQAKKCGVILPG	115
Orycteropus_afer_afer	SPEHLGQFDA--DPASISGFLAQATDDLTLKTLNPNVNAQVKFFDYISQQVERCGVLG	115

Fig. S1 (continued)

human	PKDSTLLKQYENLILEFQQSFGKPTKQEIINPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
chimpanzee	PKDSTLLKQYENLILEFQQSFGKPTKQEIINPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
pygmy_chimpanzee	PKDSTLLKQYENLILEFQQSFGKPTKQEIINPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
western_lowland_gorilla	PKDSTLLKQYENLILEFQQSFGKPTKQEIINPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	147
Sumatran_orangutan	PKDSTLLKQYENLILEFQQSFGKPTKQEMNPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	171
northern_white-cheeked_gibbon_a	PKDSTLLKQYENLILEFQQSFGKPTKQEMNPLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
northern_white-cheeked_gibbon_b	-----	0
sooty_mangabey	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
green_monkey	SDKSTLLKQYENCILEFQQSFGKPTKQEMNPLMNAKFEKGDNSSQDPTTFQLLAQNLIC	175
crab-eating_macaque	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
rhesus_monkey	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
pig-tailed_macaque	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
drill	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
olive_baboon	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
Colobus_angolensis_palliatus	PKDSTLLKQYENCILEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
golden_snub-nosed_monkey	PKDSTLLKQYENCIVLEFQQSFGKPTKQEMNLLMNAKFDKGDNSSQQDPATFHLLAQNLIC	175
Mas_night_monkey	-----MNPLMNAKVDKGDNSSQQDPATFQLFAQNLIC	32
common_marmoset	PKDSTLLKQYENFVLEFQQLLGEPTKQEMNPLMNAKVDKGDNSSQQDPATFQLLAQNLMIC	98
Bolivian_squirrel_monkey	-----MNPLMNDKVDKGDNSSQQDPATFQLLAQNLIC	32
Philippine_tarsier	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	177
gray_mouse_lemur	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Coquerels_sifaka	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
small-eared_galago	PDQSTLLKQYENFVLEFQRFSGDSTKQEMNPLMNTKVDKGDNS--QDASTFKLFAQNLS	175
Damara_mole-rat	-----MNHLMDAKVDRGDSTSDQDVTTFQFFSQNLSS	32
naked_mole-rat	-----MNPLMNDKVDKGDNTSQDVTTFQFFSQNLSS	32
domestic_guinea_pig	-----MNPLMNSKVEKGDNTSQDVTTFQFFSQNLSS	32
long-tailed_chinchilla	YNQ-----QNENCVLDFQSSGEPKQEMNPLMNPVKVDKGDNS--QDASTFKLFAQNLS	64
degu	YDQCAPLKENENFALDFQSSSRDP IEQEMNLLMNAKVDKVDSDGTFSSQNLSS	69
lesser_Egyptian_jerboa	SNQNILLEQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Ords_kangaroo_rat	SDHSAVLQQYENFVLEFQKSFDEPMQKQEMNPLIFADADKENS--QDASTFKLFAQNLS	175
prairie_vole	SNQSNLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
Chinese_hamster	SNQSHLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
golden_hamster	SNQSHLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
prairie_deer_mouse	SNQSNLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
house_mouse	STQNNLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
Norway_rat	SSQRNLLKQYENFVLEFQKSFDEPMQKQEMNPLIFADADKENS--QDASTFKLFAQNLS	174
Upper_Galilee_mountains_blind_mole_rat	SDQISLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	153
thirteen-lined_ground_squirrel	SDQSTILKQYENFVLEFQKSFDEPMQKQEMNPLMNTKVDKGDNS--QDASTFKLFAQNLS	164
rabbit	PNENITMLKQYENFVLEFQKSFDEPMQKQEMNPLMNTKVDKGDNS--QDASTFKLFAQNLS	175
American_pika	PNQAMLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Chinese_tree_shrew	SDKRTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Sunda_flying_lemur	ADQSTMLKQYENFVLEFQKSFDEPMQKQEMNPLMNTKVDKGDNS--QDASTFKLFAQNLS	175
dog	SDQNTLLKQYEFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	167
domestic_ferret	PDQSSQKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	166
Pacific_walrus	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	167
Weddell_seal	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	167
giant_panda	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	167
polar_bear	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	167
domestic_cat	PNQSTLLKQYEFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	160
Amur_tiger	PNQSTLLKQYEFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	160
Balaenoptera_acutorostrata_scammoni	-----MNPLVNAKVDKRDNFSSQDATTFFHLLAQNLR	32
killer_whale	-----MNPLMNAKVDKRDNFSSQDATTFFHLLAQNLR	32
bottlenosed_dolphin	-----MNPLMNAKVDKRDNFSSQDATTFFHLLAQNLR	32
Yangtze_River_dolphin	-----MNPLVNAKVDKRDNFSSQDATTFFHLLAQNLR	32
sperm_whale	-----MNPLVNAKVDKRDNFSSQDATTFFHLLAQNLR	32
chiru	-----MNRLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
Bison_bison_bison	-----MNRLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
cattle	-----MNRLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
wild_yak	-----MNRLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
water_buffalo	-----MNHLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
goat	-----MNHLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
sheep	-----MNHLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
mouflon	-----MNHLVNTKVDKEDNFSSQNASMFHLLAQNLR	32
pig	PDQSAALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
Bactrian_camel	PDESALLEQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Arabian_camel	PDESALLEQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Wild_Bactrian_camel	PDESALLEQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
alpaca	PDESALLEQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
black_flying_fox	PDQNALLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
large_flying_fox	PDQNALLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
big_brown_bat	SEQSALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
little_brown_bat	SEQSALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Brandts_bat	SEQSALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Myotis_davidii	SEQSALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
European_shrew	PYQSTMLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	168
star-nosed_mole	IDQNTLMRQYEDIVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174
horse	PKDRTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	169
Przewalskis_horse	PKDRTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	169
southern_white_rhinoceros	PDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	170
Cape_golden_mole	SNQRALLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	173
Cape_elephant_shrew	SEQNTMLKQYEFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	179
African_savanna_elephant	SDQNTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
Florida_manatee	SDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	175
small_Madagascar_hedgehog	SDQSILLKQYEFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	169
Orycteropus_afer_afer	SDQSTLLKQYENFVLEFQQSFGGPTKQKMSPPMNKTVDKGDNS--QDASTFKLFAQNLS	174

Fig. S1 (continued)

human	NET--NQSQGFQEKALADPNQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
chimpanzee	NET--NQSQGFQKALADPNQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
pygmy_chimpanzee	NET--NQSQGFQKALADPNQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
western_lowland_gorilla	IET--NQSQGFQEKALADPNQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	204
Sumatran_orangutan	NET--NQSQGFQEKALADPNQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	228
northern_white-cheeked_gibbon_a	NET--KVSSKRH*-----	186
northern_white-cheeked_gibbon_b	-----MMDNLPDLITQCIQLDKKHSRPELLOQ--ETQL	32
sooty_mangabey	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
green_monkey	NET--NQNGQFKKTVDLLQDEESVTDMDNLPDLITQCIQLDKKQSDRPELLOQ--ETQL	232
crab-eating_macaque	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
rhesus_monkey	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
pig-tailed_macaque	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
drill	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
olive_baboon	NET--SQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
Colobus_angolensis_palliatus	NAT--NQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
golden_snub-nosed_monkey	NAT--NQNGQFEKAVDDLQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
Mas_night_monkey	NET--NQNGRFEKALAGPNQDEESVTDIMDNLDPDLITQCIQLDKKHSRPELLOQ--ETQF	89
common_marmoset	NET--NQNGQFEKALAGPNQDEESVTDITDNLDPDLITQCIQLDKKHSRPELLOQ--ETQF	155
Bolivian_squirrel_monkey	NET--NQNDQFEKALAGPNQDEESVTRGIMDNLDPDLITQCIQLDKKHSRPELLOQ--ETQF	89
Philippine_tarsier	NET--NQGEQFQKGLADP IQDEESVTDNMDNLPDLITQCIQLDKKHSRPELLOQ--HTQL	234
gray_mouse_lemur	HET--NQSCHFKQGLDSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
Coquerels_sifaka	HET--SQSCDFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
small-eared_galago	HET--NQSQGFQKGLADP IQHEKIDTMMNDLPDLITQCIQLDKKHSRPELLOQ--GNQL	232
Damara_mole-rat	NKT--NQGEKFKQERLSDP IQDEEGNVTGMRRNPDLITQCIQLDKKYNDRPELLOQ--ETQF	89
naked_mole-rat	NKT--NHREKFKQGLADSD IQDEKSVTGMVGNLPDLITQCIQLDKKHSRPELLOQ--ETQF	89
domestic_guinea_pig	NVT--NHKEKFKHRLCDHIQDEKSVTGMENIPDLITQCIQLDKKSNKPELLOQ--ETQL	89
long-tailed_chinchilla	NET--NHREKFKHRLADP IQDEKSAATAMENLPDLITQCIQLDKKCNKPELLOQ--ENQL	121
degu	NET--NPKKIKQERLSDNIQDQKSVTAMMANLPDLITQCIQLDKKHSRPELLOQ--EAQL	126
lesser_Egyptian_jerboa	NET--NQNDSLQEGLNDP IQDEE-ITDIMGNLPDLITQCIQLDKKLSNRPELLOQ--ETHV	231
Ords_kangaroo_rat	NVTNTNQSNQFQKGLADP IQVESSITDMMNLPDLITQCIQLDKKY-DKPELLQ--ETQV	233
prairie_vole	SES--SQSDFQKGLADP IQDEE-ITDIMSNDLPDLITQCIQLDKKYSRPELLOQ--ESQV	230
Chinese_hamster	SET--SQSDQFQKGLADP IQDEE-ITDIMGNLPDLITQCIQLDKKHKDRPELLOQ--ETQV	230
golden_hamster	SET--SQSDQFQKGLADP IQDEE-ITDIMGNLPDLITQCIQLDKKHKDRPELLOQ--ESQV	230
prairie_deer_mouse	SET--SQSDQFQKGLADP IQDEE-ITDIMGNLPDLITQCIQLDKKYSRPELLOQ--ESQV	230
house_mouse	RET--NQSDQFQKGLADP IQDEE-ITDIMGNLPDLITQCIQLDKKHKDRPELLOQ--ESHV	230
Norway_rat	SET--DQRDQLQ---ADSTHDEE-ITDIMGNLPDLITQCIQLDKKHKDRPELLOQ--ESHV	227
Upper_Galilee_mountains_blind_mole_rat	NDT--NQSDQFQKGLADP IQDEE-ITDIMGNLPDLITQCIQLDKKYSRPELLOQ--ETQV	209
thirteen-lined_ground_squirrel	SET--NPSDQFQKGLADP IQDKESVADMMGNLPDLITQCIQLDKKHSRPELLOQ--ETQL	221
rabbit	NEI--NKNDLQFQKGLADP IQDEESVTDMDNLPDLITQCIQLDKKHSRPELLOQ--ETQL	231
American_pika	NEA--NQSDQFQKGLADP IQDEESVTDMDNLPDLITQCIQLDKKHSRPELLOQ--ETQL	231
Chinese_tree_shrew	NEA--NQSDQFQKGLADP IQDEESVTDMDNLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
Sunda_flying_lemur	NEI--SQNDQFQKGLADP IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	232
dog	NEA--NQSDHLEQEGLDSD IQDEESVTDMMNLPDLITQCIQLDKKHSRPELLOQ--ETQF	224
domestic_ferret	NET--SQSDHFQKGLADP IQDDLSGTMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	223
Pacific_walrus	NET--NLSGNFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKQSDRPELLOQ--ETQL	224
Weddell_seal	NET--NLSDNFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	224
giant_panda	KET--DQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETHL	223
polar_bear	KET--DQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETHL	223
domestic_cat	NET--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--ETQL	217
Amur_tiger	NET--TQRDHFQKGLADSD IQDEESVTDMMGNLPDLITQCIQLDKKHSRPELLOQ--ETQL	217
Balaenoptera_acutorostrata_scammoni	NET--NQSDHFQKGLADSD IQAEVSGTDLMDNLPDLITQCIQLDKKQSDRPELLOQ--EAQI	89
killer_whale	NET--NQSDHFQKGLADSD IQAEVSGTDLMDNLPDLITQCIQLDKKHSRPELLOQ--EAQI	89
bottlenosed_dolphin	NET--NQSDHFQKGLADSD IQAEVSGTDLMDNLPDLITQCIQLDKKQSDRPELLOQ--EAQI	89
Yangtze_River_dolphin	NES--NQSDHFQKGLADSD IQAEVSGTDLMDNLPDLITQCIQLDKKQSDRPELLOQ--EAQI	89
sperm_whale	NET--NQSDHFQKGLADSD IQAEVSGTDLMDNLPDLITQCIQLDKKHSRPELLOQ--EAQI	89
chiru	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	88
Bison_bison_bison	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
cattle	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
wild_yak	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
water_buffalo	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
goat	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
sheep	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
mouflon	DGF--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EVQM	89
pig	NET--NQSDHFQKGLADSD IQAEVSGTMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQI	231
Bactrian_camel	NEP--DQSDHLEQEGLDSD IQDEESVTDMMNLPDLITQCIQLDKKHSRPELLOQ--EAQT	232
Arabian_camel	NEP--DQSDHLEQEGLDSD IQDEESVTDMMNLPDLITQCIQLDKKHSRPELLOQ--EAQT	232
Wild_Bactrian_camel	NEP--DQSDHLEQEGLDSD IQDEESVTDMMNLPDLITQCIQLDKKHSRPELLOQ--EAQT	232
alpaca	NEP--DQSDHLEQEGLDSD IQDEESVTDMMNLPDLITQCIQLDKKHSRPELLOQ--EAQT	232
black_flying_fox	NKA--YQTDLFQKVLADSFQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQT	233
large_flying_fox	NKA--YQTDHFQKVLADSFQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQT	233
big_brown_bat	NET--NESDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EATL	232
little_brown_bat	NET--SESDFHQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	232
Brandts_bat	NET--NESDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	232
Myotis_davidii	NET--NESDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQF	232
European_shrew	NET--NQSDHLEQEGLDSD IQDEESVTDMMNDLPDLITQCIQLDKKCNKPELLOQ--ETQL	225
star-nosed_mole	NET--NQCDYFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	231
horse	NET--NQTDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EPQL	226
Przewalskis_horse	NET--NQTDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EPQL	226
southern_white_rhinoceros	NET--NQSDHFQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	227
Cape_golden_mole	NEN--ILSDQLQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	230
Cape_elephant_shrew	NEI--IVSDQLQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--QAQL	236
African_savanna_elephant	NKT--MLSDHLEQEGLDSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAHL	232
Florida_manatee	NKT--ILSDQLQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	232
small_Madagascar_hedgehog	SDT--ILSDPQLQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--GAQI	226
Orycteropus_afer_afer	NEI--ILSDQLQKGLADSD IQDEESVTDMMNDLPDLITQCIQLDKKHSRPELLOQ--EAQL	231

Fig. S1 (continued)

human	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
chimpanzee	PLLASL-IQHQAL-FSPTDPPPKKGIHLQEGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
pygmy_chimpanzee	PLLASL-IQHQAL-FSPTDPPPKKGIHLQEGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
western_lowland_gorilla	PLLASL-IQHQAL-FSPIDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	262
Sumatran_orangutan	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQQLPLTPAKRAHQOETQLCLYCSQSGHFT	286
northern_white-cheeked_gibbon_a	-----	186
northern_white-cheeked_gibbon_b	PLLASL-IHQHAF-FSPTDPPPKKGIQLREGQLPLTPAKRAHQLETHLCLYCSQCGHFT	90
sooty_mangabey	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
green_monkey	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPGKRARQOETQLCLYCSQSGHFT	290
crab-eating_macaque	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
rhesus_monkey	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
pig-tailed_macaque	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
drill	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
olive_baboon	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
Colobus_angolensis_palliatus	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
golden_snub-nosed_monkey	PLLASL-IQHQAL-FSPTDPPPKKGIQLREGQLPLTPAKRARQOETQLCLYCSQSGHFT	290
Mas_night_monkey	PLLTSL-IQHQAL-VSPTDPPPKKGMQLREGQLPLTPAKRAYQOETQLCLYCNQSGHFT	147
common_marmoset	PLLPSL-IQHQAL-VSPTDPPPKRGMQLREGQLPLTPAKRAYQOETQLCLYCNQSGHFT	213
Bolivian_squirrel_monkey	PMLTSL-IHQHAF-VSPTDPPPKKGMQLREGQLPLTPAKRAYQOETQLCLYCSQSGHFT	147
Philippine_tarsier	PMLASP-IHHRAL-SSPSGPPHKEEPILLRGGQMPLTPAKRARQOENQLCLYCSQAGHFT	292
gray_mouse_lemur	PMLASL-IQNPAL-SSSTGPPPKKEEPIQLRGSQPPLTPAKRARQOETQLCLYCSQADHFT	290
Coquerels_sifaka	PMLASL-IHQHAF-SSFTGPPSKKEEPVQLRGQPPLTPAKRARQOETQLCLYCSQAGHFT	290
small-eared_galago	SVRDPL-IHQHAF-SSSIGLPPKEEPIQOR-SQPPLTPAKRARQOETQLCLYCSQSGHFT	289
Damara_mole-rat	PLLASL-IHQHAF-SSSIGSPKQOETQLRGGQLPLTPAKRAHQOETQLCLYCSQAGHFT	147
naked_mole-rat	PLLGSLL-IHQHAF-SSSTGPPPKKEEPIKLRRGQPLTPAKRAHQOETQLCLYCSQAGHFT	147
domestic_guinea_pig	PVLASL-IHQHAF-SSSTSPRPKEETIQLRGGQLPLTPAKRARQOETQLCLYCSQAGHFT	141
long-tailed_chinchilla	PVLEFL-IHQHAF-SSSTGPPPKKEEPIQLRGGQLPLTPAKRARQOETQLCLYCSQAGHFT	179
degu	PVLEFL-IHQHAF-SSSMCPPKKEEPIQLRGG-LPLTPAKRARQOETQLCLYCSQAGHFT	183
lesser_Egyptian_jerboa	PTFASL-IHQHAF-SSSMCPPKKEEPIQLRGG-LPLTPAKRARQOETQLCLYCSQAGHFT	290
Ords_kangaroo_rat	PMLPSL-IYDKSL-SRPTVLPKDEETQLRGGHRLTPAKRARQOETQLCLYCSQAGHFT	291
prairie_vole	PMFSSSTNHLHF-SRPTIGLQAKDEPKIQQAQLPVTPAKRARQOETQLCLYCSQAGHFT	289
Chinese_hamster	PMFSSST-NHHQSF-LGLMGLPKDELKPFQGAQMPVTPAKRARQOETQLCLYCSQAGHFT	288
golden_hamster	PVFSST-NHRQSF-LSPMVLPKDEFKSLQGAQMPVTPAKRARQOETQLCLYCSQAGHFT	288
prairie_deer_mouse	PIFAST-TKHQSF-FSPKGLPKDEPKQFQGAQMPVTPAKRARQOETQLCLYCSQAGHFT	288
house_mouse	PMFAST-NHHQSF-IGPVRPLPKDGPRLQGAHLPVTPAKRARQOETQLCVYCNQAGHFT	288
Norway_rat	PMVASP-LCSQSF-LSPIRPLPKDGLKPMQGAHLPVTPAKRARQOETQLCLYCNQAGHFT	285
Upper_Galilee_mountains_blind_mole_rat	SMFSSM-NHQHAF-LSPIRLAPKDEETQLRGMQLPVTPAKRARQOETQLCLYCSQAGHFT	267
thirteen-lined_ground_squirrel	PTLASL-TYHQSL-SSSTGLSPREEPSQLRGGQLPLTPAKRARQOETHLCLYCNQADHFT	279
rabbit	PVLASL-IHQHAF-SSSIGLPPKEEPIQLRGGQLPLTPAKRARQOETQLCLYCSQSGHFA	289
American_pika	PVLASS-IHHEAL-SSSLIPSTKEEPIQLRGGQLPLTPAKRARQOETQLCLYCSQSGHFT	289
Chinese_tree_shrew	PMLAPL-IHQHAF-SSSTGLPPKEEKIQLRGGQPLTPHLVNP*-----	273
Sunda_flying_lemur	PMLASL-IHNFAL-SSPTCLLPKEEPIQLRGGQPLTPAKRARQOETKLCYCNQAGHFT	290
dog	PMLASL-IHQHAF-SSPTNLPKEEPIQLRGSQPPLTPAKRARQOETQLCLYCSQAGHFT	282
domestic_ferret	PVLDCM-IHQHAF-SIPTDLPPKEEPIQLRGSQPPLTPAKRARQOEAQLCLYCSQAGHFT	281
Pacific_walrus	PMLASM-IHQHAF-SSPTDLPPKEEPIQLRGSQPPLTPAKRALQOEAQLCLYCSQAGHFT	282
Weddell_seal	PMLASM-IHQHAF-SSPTDLPPKEEPIQLRGSQPPLTPAKRALQOEAQLCLYCSQAGHFT	282
giant_panda	PMFASM-IHQHAF-SGPTDLPPKEEPIQLRGSQPPLTPAKRGRQOEAQLCLYCSQAGHFT	281
polar_bear	PMLASM-IHQHAF-SSPTDLPPKEEPIQLRGSQPPLTPAKRARQOEAQLCLYCSQAGHFT	281
domestic_cat	PVLASL-IHQHAF-SSPTDVSAKEEPIQLRGSQPPLTPAKRARQOEAQLCLYCSQAGHFT	275
Amur_tiger	PVLASL-IHQHAF-SSPTDVSAKEEPIQLRGSQPPLTPAK*-----	255
Balaenoptera_acutorostrata_scammoni	PVLASL-IRHQAL-SNPTGPPPKEDPIQLRGSQPPLTPAKRARQOETQSCLYCSQAGHFT	147
killer_whale	PVLASL-I-----SNPTGPPPKEDPIQLRGSQPPLTPAKRARQOETQSCLYCSQAGHFT	142
bottlenosed_dolphin	PVLASL-I-----SNPTGPPPKEDPIQLRGSQPPLTPAKRARQOETQSCLYCSQAGHFT	142
Yangtze_River_dolphin	PVLASL-IHQHAF-SNPTGPPPKEDPIQLRGSQPPLTPAKRARQOETQSCLYCSQAGHFT	147
sperm_whale	PVLASL-IHQHAF-SNPTGPPPKEDPIQLRGSQPPLTPAKRARQOETQSCLYCSQAGHFT	147
chiru	PVLAHW-IHQHAF-SNPTGTAPKEDPIQLRGSQPPLTPAKRAHQOEVQACLCSQAGHFT	146
Bison_bison_bison	PVLARW-IHQHAF-SNPTGPAPKEDRVQLRGSQPPLTPAKRARQOEVQACLCSQAGHFT	147
cattle	PVLARW-IHQHAF-SNPTGPAPKEDRIQLRGSQPPLTPAKRARQOEVQACLCSQAGHFT	147
wild_yak	PVLARW-IHQHAF-SNPTGPAPKEDRIQLRGSQPPLTPAKRARQOEVQACLCSQAGHFT	147
water_buffalo	PVLARW-IHQHAF-SNPTGPAPKEDRIQLRGSQPPLTPAKRARQOEVQACLCSQAGHFT	147
goat	PVLARW-IHQHAF-SNPTGPAPKEDPIQLRGSQPPLTPAKRAHQOEVQACLCSQAGHFT	147
sheep	PVLARW-IHQHAF-SNPTGPAPKEDPIQLRGNQPPLTPAKRAHQOEVQACLCSQPGLHT	147
mouflon	PVLARW-IHQHAF-SNPTGPAPKEDPIQLRGNQPPLTPAKRAHQOEVQACLCSQPGLHT	147
pig	PVLASL-IHQHAF-SSSTGPPPKEDPVQLRGQPPLTPAKRARQOETHLCLYCSQSGHFT	289
Bactrian_camel	SMLASL-VHHQAL-FSPRGPSSKEDPIHLRRSQPLTPAKRARQOETQLCLYCGQAGHFT	290
Arabian_camel	SMLASL-VHHQAL-FSPRGPSSKEDPIQLRRSQPLTPAKRARQOETQLCLYCGQAGHFT	290
Wild_Bactrian_camel	SMLASL-VHHQAL-FSPRGPSSKEDPIHLRRSQPLTPAKRARQOETHLCLYCGQAGHFT	290
alpaca	SMLASL-VHHQAL-FSPRGPSSKEDPIQLRRSQPLTPAKRARQOETQLCLYCGQAGHFT	290
black_flying_fox	CLLIPT-IKSPS----QVHHWPWKRLYSCKEASHLSLRNPE--TRRNTVCLYCS*-----	280
large_flying_fox	CLLIPT-IKSPS----QVHHWPWKRLYSCKEASHLSLRNPE--TRRNTVCLYCS*-----	280
big_brown_bat	PVLSSL-IHQHAF-SSPSCPSSK-ELIQLRGSQPPLTPAKRARQOETQLCLYCSQADHFT	289
little_brown_bat	PVLSSL-VHYQTL-SSPSCPSSK-ELIQLRGSQPPLTPAKRARQOETHLCLYCSQADHFT	289
Brandts_bat	PVLSSL-VHYQTL-SSPSCPSSK-ELIQLRGSQPPLTPAKRARQOETHLCLYCSQADHFT	289
Myotis_davidii	PVLSSL-VHYQTL-SSPSCPSSK-ELIQLRGSQPPLTPAKRARQOETHLCLYCSQADHFT	289
European_shrew	PMLTSL-VCNQAL-YNPK-DSCCKENIQLHGHPPLTPVKRAHQOETHLCLYCSQSDHFT	282
star-nosed_mole	TVLASH-IHQHAF-SSPTDPLPKDEMIQLRGSQPPLTPAKRARQOEAHLCLYCSQAGHFT	289
horse	PMLASL-INHQAL-SSPIGLSPKEEPIQLRGSQPPLTPAKRARQOETQLCLYCSQSGHFT	284
Przewalskis_horse	PMLASL-INHQAL-SSPIGLSPKEEPIQLRGSQPPLTPAKRARQOETQLCLYCSQSGHFT	284
southern_white_rhinoceros	PKLASL-IHQHAF-SSPTGLSPKEEPIQLRGSQPPLTPAKRARQOETHLCLYCSQSGHFT	285
Cape_golden_mole	PRLASP-IHQHAF-SIPIGPPIKETSQLRGGQLPLTPAKRVHQDQNLCLYCSQPAGHFT	288
Cape_elephant_shrew	P-----IHHQYV-PSLTGPPAKEEPIQLRGGQLPLTPAKRARQOETELCLYCSQPAGHFT	289
African_savanna_elephant	PRLASL-IHQHAF-SNPTGPPAKEEPIQLRGGQLPLTPAKRARQOETHLCLYCSQAGHFT	290
Florida_manatee	PRLASL-VHHQAL-SSPTGPPAKEEPIQLRGGQLPLTPAKRARQOETHLCLYCSQPAGHFT	290
small_Madagascar_hedgehog	PSLDSS-L-HPYI-STLTGPPAKEEPIQLRGGQPPLTPAKRARQOETHLCLYCSQPNHFT	283
Orycteropus_afere_afere	PRLPSL-IHQHAF-SRPTGPPPKKEEPIQLRGGQLPLTPAKRARQOETQLCLYCSQPAGHFT	289

**Fig. S1 (continued)**

human	RDCLAKRSRAPATTNNTAHQ*-----	310
chimpanzee	RDCLAKRSQAPATTNNTAHQ*-----	310
pygmy_chimpanzee	RDCLAKRSRAPATTNNTAHQ*-----	310
western_lowland_gorilla	RDCLAKRSRAPAMTNNNTAHQ*-----	282
Sumatran_orangutan	RDCLARRSRAPATTNNTAHQ*-----	306
northern_white-cheeked_gibbon_a	-----	186
northern_white-cheeked_gibbon_b	RDCLAKRS*-----	98
sooty_mangabey	RDCLAKRSRAPATTNNTAHQ*-----	310
green_monkey	RDCLAKRSRTPAMTNNNTAHQ*-----	310
crab-eating_macaque	RDCLAKRSRAPAMTNNNTAHQ*-----	310
rhesus_monkey	RDCLAKRSRAPAMTNNNTAHQ*-----	310
pig-tailed_macaque	RDCLAKRSRAPAMTNNNTAHQ*-----	310
drill	EDCLAKRSRAPATTNNTAHQ*-----	310
olive_baboon	RDCLAKRSRAPATTNNTAHQ*-----	310
Colobus_angolensis_palliatus	RDCLAKRSRAPAMTNNNTAHQ*-----	310
golden_snub-nosed_monkey	RDCLAKRSRAPATTNNTAHQ*-----	310
Mas_night_monkey	RDCLAKRSRALAMTNNNTAHQ*-----	167
common_marmoset	RDCLAKRSRALAMTNNNSSTVRRDQESHF*	241
Bolivian_squirrel_monkey	RDCLAKRSRALAVTNNNTAHQ*-----	167
Philippine_tarsier	RDCLAKRSRAPARTNDIAHQ*-----	312
gray_mouse_lemur	RDCLAKRSRAPARTNNNTTHQ*-----	310
Coquerels_sifaka	RDCLAKRSRAPARTNNNTTHQ*-----	310
small-eared_galago	RDCLAKRSRTPTRTNNNTTHQ*-----	309
Damara_mole-rat	RDCLAKRSRAPERTNDTAHQ*-----	167
naked_mole-rat	RDCLAKRSRAPERTDNTAHQ*-----	167
domestic_guinea_pig	RDCLAKRSRAPARTNNPAYQ*-----	161
long-tailed_chinchilla	RDCLAKRSRAPAWTNNPAHQ*-----	199
degu	KDCLAKRSRAPARTNNPDHQ*-----	203
lesser_Egyptian_jerboa	RDCLAKRSRTPSKTKYTHQ*-----	310
Ords_kangaroo_rat	EDCLAKRSRSPSTDNLA-HQ*-----	310
prairie_vole	RECLAKRSRTPARRKM*-----	305
Chinese_hamster	RECLAKRSRTPARRKNVH*-----	307
golden_hamster	RECLAKRSRTPARRKM*-----	304
prairie_deer_mouse	RECLAKRSRTPARRKM*-----	304
house_mouse	RDCLAKRSRTPARRKM*-----	304
Norway_rat	RDCLAKRSRTPARRKM*-----	301
Upper_Galilee_mountains_blind_mole_rat	RDCLAKRSRTPASVKNATNK*-----	287
thirteen-lined_ground_squirrel	RDCLAKRSRAPASTNNPDHQ*-----	299
rabbit	RDCLAKRSRAPARTNNSPYQ*-----	309
American_pika	RDCLAKRSRAPARTNNPPFQ*-----	309
Chinese_tree_shrew	-----	273
Sunda_flying_lemur	RDCLAKRSRAPVRANPAHQ*-----	310
dog	RDCLAKRSRAPARINNSTHQ*-----	302
domestic_ferret	RDCLAKRSRAPARINNPTHQ*-----	301
Pacific_walrus	RDCLAKRSRAPARINNPTHQ*-----	302
Weddell_seal	SDCLAKRSRAPARINNPTHQ*-----	302
giant_panda	RDCLAKRSRAPARINNPTHQ*-----	301
polar_bear	RDCLAKRSRAPARINNPTHQ*-----	301
domestic_cat	RDCLAKRSRAPARINNPTRQ*-----	295
Amur_tiger	-----	255
Balaenoptera_acutorostrata_scammoni	RDCLAKRSRAPARINNPAHQ*-----	167
killer_whale	RDCLAKRSRAPARINNPAHQ*-----	162
bottlenosed_dolphin	RDCLAKRSRAPARINNPAHQ*-----	162
Yangtze_River_dolphin	RDCLAKRSRAPARINNPAHQ*-----	167
sperm_whale	RDCLAKRSRAPARINNPAHQ*-----	167
chiru	LDCLAKRSRAPARINNPTHQ*-----	166
Bison_bison_bison	LDCLAKRSRAPERINNPTHQ*-----	167
cattle	LDCLAKRSRAPERINNPTHQ*-----	167
wild_yak	LDCLAKRSRAPERINNPTHQ*-----	167
water_buffalo	LDCLAKRSRAPARINNPTHQ*-----	167
goat	LDCLAKRSRAPARINNPTHQ*-----	167
sheep	LDCLAKRSRAPARINNPTHQ*-----	167
mouflon	LDCLAKRSRAPARINNPTHQ*-----	167
pig	KDCLAKRSRAPTRTNNSSQQ*-----	309
Bactrian_camel	RDCLAKRFRAPARTNNPAYQ*-----	310
Arabian_camel	RDCLAKRFRAPARTNNPAYQ*-----	310
Wild_Bactrian_camel	RDCLAKRFRAPARTNNPAYQ*-----	310
alpaca	RDCLAKRFRAPARTNNPAYQ*-----	310
black_flying_fox	-----	280
large_flying_fox	-----	280
big_brown_bat	RDCLAKRSRAPARINNPAHQ*-----	309
little_brown_bat	RDCLAKRSRAPARINNPAHQ*-----	309
Brandts_bat	RDCLAKRSRAPARINNPAHQ*-----	309
Myotis_davidii	RDCLAKRSRAPARINNPAHQ*-----	309
European_shrew	RDCLAKRFRAPQRINNPTHK*-----	302
star-nosed_mole	SDCLAKRSRAPARISNPTHQ*-----	309
horse	RDCLAKRSRAPARINDPAHQ*-----	304
Przewalskis_horse	RDCLAKRSRAPARINDPAHQ*-----	304
southern_white_rhinoceros	RDCLAKRSRAPARINNPAHQ*-----	305
Cape_golden_mole	KACLAKRSRAPARTNNPTHQ*-----	308
Cape_elephant_shrew	ADCLAKRSRALTRTNNSTHQ*-----	309
African_savanna_elephant	KDCLAKRSRALARKNNPTHK*-----	310
Florida_manatee	KDCLAKRSRAPARSNNPTHQ*-----	310
small_Madagascar_hedgehog	KDCLAKRSRAPARTSKPTHQ*-----	303
Orycteropus_afer_afer	KDCLAKRSRAPARTNDPTHQ*-----	309

**Fig. S1 (continued)**

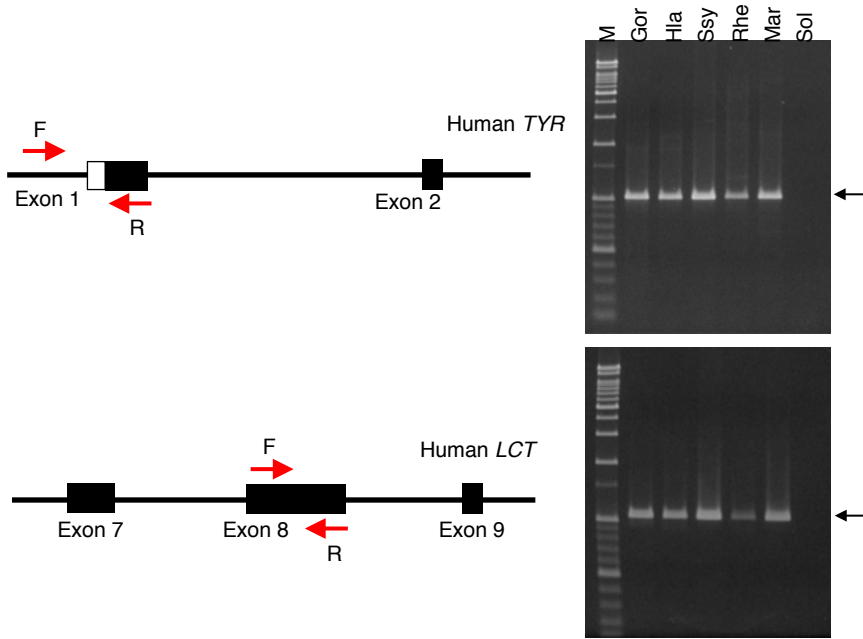


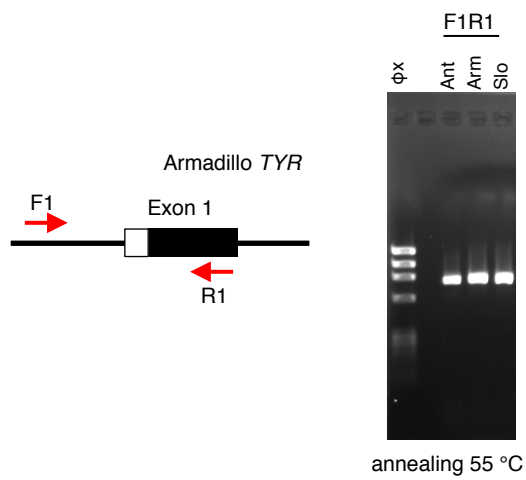
Fig. S2



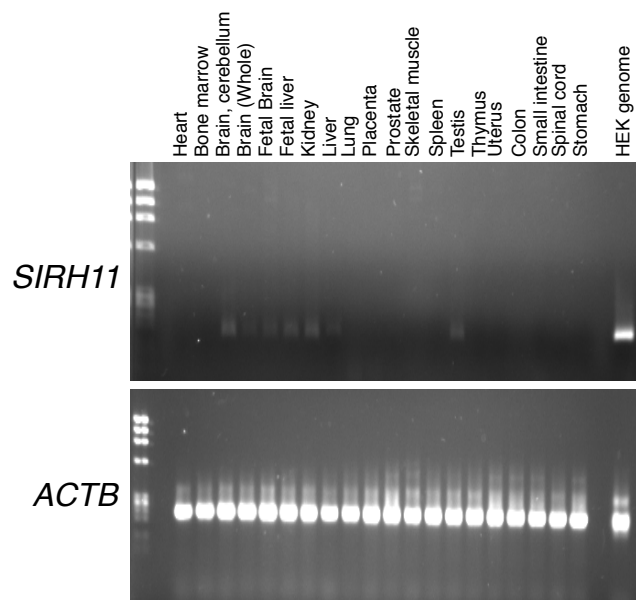








**Fig. S4**



**Fig. S5**