

SUPPLEMENT

Table S1: Alignments by taxa. Retrieved sequences were grouped by taxonomic order and aligned with Clustal Omega. The canonical sequence is highlighted in yellow. Common variants are on green, turquoise or blue background. Rare deviations from the consensus sequence have no background color. The putative signal sequence is boxed. 1.1. Primates 1.2. Carnivora 1.3. Artiodactyla (Cervidae and Bovidae) 1.4. Artiodactyla (Camelidae, Suidae and Cetacea) 1.5. Perissodactyla 1.6. Afrotheria and Xenarthra 1.7. Marsupialia 1.8. Chiroptera 1.9. various Eutheria 1.10. Lagomorpha and similar orders 1.11. Rodentia 1.12. Reptilia (Crocodilia and Testudines) 1.13. Reptilia (Squamata) 1.14. Aves 1.15. Fish.

XM_003790097.3:Otolemur garnettii
NC_033688.1:Microcebus murinus
XM_012647256.1:Propithecus coquereli
NW_007247132.1:Carlito syrichta
XM_002745608.4:Callithrix jacchus
XM_003923998.2:Saimiri boliviensis boliviensis
XM_012437737.1:Aotus nancymae
NW_016107492.1:Cebus capucinus
NW_012116577.1:Colobus angolensis palliatus
NW_019322877.1:Ptilocolobus tephrosceles
XM_010366156.1:Rhinopithecus roxellana
XM_017895924.1:Rhinopithecus bieti
NW_012104043.1:Mandrillus leucophaeus
XM_003898941.3:Papio anubis
NC_023648.1:Chlorocebus sabaeus
XM_012040129.1:Cercocebus atys
NM_001261806.2:Macaca mulatta
XM_011737736.1:Macaca nemestrina
XM_005555383.2:Macaca fascicularis
XM_012499285.1:Nomascus leucogenys
CR859846.1:Pongo abelii
NM_001040058.1:Homo sapiens
NC_018428.2:Gorilla gorilla gorilla
NC_006471.4:Pan troglodytes
XM_008963650.1:Pan paniscus

-----DLSTE-----THSKPEPSDMIVSQEHSVSLVETSHE-----
RETSQMDDPSVFAHSHQSRLLKRRKADASSNEHSDVIDSQEHS-----HSHEFLSQEDR
HETSQMDDQSVETHSHSQSRLHKKRADDASNEHSDMIDSQERS-----HSREFHSQEDR
HETSQDDQSAETHSHSQSRLYKRRASDESNEHSDMINSQETSKVSEIHSHEVHSHELD
HEMSQLDDQSAETHSHSQSRLHKKRASDESNEHSDVIDSQEVSKVSRREFHSHEFHSCEDL
HEMSQLDDQSAETHSHSEKSRLHKKRASDESNEHSEVVDSQEVSKVSRREFHSHEFHSCEDM
HEMSQLDDQSAETHSHSQSRLHKKRASDESNEHSDVIDSQEVSKVSRREFHSHEFHSCEDM
HEMSQLDDQSAETYSHSQSRLHKKRASDESNEHSDVDSQEVSKVSRREFHSHEFHSCEDM
HETSQLDDHSAETHSHKQSRLYKRRASDDSNEHSDVIDSQERSKVSREFHSHEFHSHEDM
HETSQLDDHSAETHSHKQSRLYKRRASDDSNEHSDVIDSQERSKVSREFHSHEFHSHEDM
HETSQLDDHSAETHSHKQSRLYKRRASDDSNEHSDVIDSQERSKVSREFHSHEFHSHEDM
HETSQLDDHSAETHSHKQSRLYKRRASDDSNEHSDVIDSQERSKVSREFHSHEFHSHEDM
HETSQLDDHSAETHSHKHSRLYKRRASDDSNEHSDVIDSQERSKISREFHSHEFHSHEDM
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HETSQLDDHSAETHSHKHSRLYKRRASDDSNEHSDVIDSQERSKISREFHSHEFHSHEDM
HETSQLDDHSAETHSHKHSRLYKRRASDDSNEHSDVIDSQERSKISREFHSHEFHSHEDM
HETSQLDDHSAETHSHKHSRLYKRRASDDSNEHSDVIDSQERSKISREFHSHEFHSHEDM
HETSQLDDQSAETHSHKQSRLYKRRKQP-----QSHEFHSHEFHSHEDT
HEMSQLDDQSAETHSHKKSRLYKRRASDESNEHSDVIDSQELSKVSRREFHSHEFHSHEDM
YETSQLDDQSAETHSHKQSRLYKRRKANDESNEHSDVIDSQELSKVSRREFHSHEFHSHEDM
YETSQLDDQSAETHSHKQSRLYKRRASDESNEHSDVIDSQELSKVSRREFHSHEFHSHEDM
YETSQLDDQSAETHSHKQSRLYKRRASDESNEHSDVIDSKELSKVSRREFHSHEFHSCGDM
YEMSQLDDQSAETHSHKQSRLYKRRASDESNEHSDVIDSKELSKVSRREFHSHEFHSCGDM

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XM_003790097.3:Otolemur garnettii
NC_033688.1:Microcebus murinus
XM_012647256.1:Propithecus coquereli
NW_007247132.1:Carlito syrichta
XM_002745608.4:Callithrix jacchus
XM_003923998.2:Saimiri boliviensis boliviensis
XM_012437737.1:Aotus nancymae
NW_016107492.1:Cebus capucinus
NW_012116577.1:Colobus angolensis palliatus
NW_019322877.1:Ptilocolobus tephrosceles
XM_010366156.1:Rhinopithecus roxellana
XM_017895924.1:Rhinopithecus bieti
NW_012104043.1:Mandrillus leucophaeus
XM_003898941.3:Papio anubis
NC_023648.1:Chlorocebus sabaeus
XM_012040129.1:Cercocebus atys
NM_001261806.2:Macaca mulatta
XM_011737736.1:Macaca nemestrina
XM_005555383.2:Macaca fascicularis
XM_012499285.1:Nomascus leucogenys
CR859846.1:Pongo abelii
NM_001040058.1:Homo sapiens
NC_018428.2:Gorilla gorilla gorilla
NC_006471.4:Pan troglodytes
XM_008963650.1:Pan paniscus

---DLESKEEDKLLKFRVSHELDSASSEVN
LVDPDQE-----
LVDPKSKKEEDKHLKFRISHELDSASSEVN
LVLDPKSKEEDTHLKFRISHELDSASSEVN
LVVDPKSTEEKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
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LVVDPKSKKEEDKHLKFRISHELDSASSEVN
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LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN
LVVDPKSKKEEDKHLKFRISHELDSASSEVN

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Table S1.1: Osteopontin in Primates. As alternative splicing of exons 4 or 5 has been shown to occur in humans, the respective splice junctions are marked by vertical lines. Of note, full-length sequences for *Otolemur garnettii* or *Pongo abelii* were not found; there is no experimental evidence that osteopontin is actually spliced in these animals. The available *Colobus angolensis palliatus* sequence likely reflects transcription or translation from an alternative start site.

XM_003985184.5: *Felis catus*
XM_015073631.1: *Acinonyx jubatus*
XM_019464775.1: *Panthera pardus*
XM_007074695.2: *Panther tigris*
XM_003434024.4: *Canis lupus familiaris*
XM_004756106.2: *Mustela putorius furo*
XM_002913580.3: *Ailuropoda melanoleuca*
XM_008707124.1: *Ursus maritimus*
NW_019154087.1: *Enhydra lutris kenyonii*
NW_004450264.1: *Odobenus rosmarus divergens*
XM_021702336.1: *Neomonachus schauinslandi*
NW_006383049.1: *Leptonychotes weddellii*

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MRIAVICFCLLGIAYAIPKQ TDSGSSEEKQLYNKYPVAVATWPKPDPSQKQTFLALQNA
MRIAVICFCLLGIAYTIPIKQ TDSGSSEEKQLYNKYPGAVATWPKPDPSQKQTFLALQNA
MRIAVICFCLLGIAYAIPKQ TDSGSSEEKQLYNKYPGAVATWPKPDPSQKQTFLALQNA
MRIAVICFCLLGIAYAIPKQ TDSGSSEEKQLYNKYPGAVATWPKPDPSQKQTFLALQNA
MRIAVICFCLLGIAYAIPKHADSGSSEEKQLYNKYPGAVATWLKPDPSQKQTFLALQNA
MKIAVICFCLLGIAYAIPKQADSGSSEEK-----QNT
MRIAVICFCLLGIAYAIPKQ PDSGSSEEKQLYHKYPGAVATWLKPDPSQKQTFLALQNT
MRIAVICFCLLGVAFAPKQ PDSGSSEEKQLYHKYPGAVATWLKPDPSQKQTFLALQNT
MKIAVICFCLLGIAYAIPKQADSGSSEEKQLYHKYPGAVATWLKPDPSQKQTFLALQNT
MRLAVICFCLLGIAYAIPKQADSGSSEEKQLYNKYPGAVATWLKPDPSQKQTFLALQNT
MRLAVICFCLLGIAYAIPKQADSGSSEEK-----QNT
MRLAVICFCLLGIAYAIPKQADSGSSEEKQLYNKYPGAVATWLKPDPSQKQTFLALQNT
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XM_003985184.5: *Felis catus*
XM_015073631.1: *Acinonyx jubatus*
XM_019464775.1: *Panthera pardus*
XM_007074695.2: *Panther tigris*
XM_003434024.4: *Canis lupus familiaris*
XM_004756106.2: *Mustela putorius furo*
XM_002913580.3: *Ailuropoda melanoleuca*
XM_008707124.1: *Ursus maritimus*
NW_019154087.1: *Enhydra lutris kenyonii*
NW_004450264.1: *Odobenus rosmarus divergens*
XM_021702336.1: *Neomonachus schauinslandi*
NW_006383049.1: *Leptonychotes weddellii*

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VLSEETDDFKQKTLASKSNESHVDVDEDDDDVDSQDSVDSHDTDDDSNQSDSEDELVTD
VLSEETDDFKQKALASKSNESHVDVDEDDDDVDSQDSVDSHDTDDDSNQSDSEDELVTD
VLSEETDDFKQKTLASKSNESHVDVDEDDGDDVDSQDSVDSHDTDDDSNQSDSEDELVTD
VLSEETDDFKQKTLASKSNESHVDVDEDDGDDVDSQDSVDSHDTDDDSNQSDSEDELVTD
VLTEETDDFKQKTFSSKSNESHDDVDEDDGDDVDSQDSVDSNDLDDDSNESDESDELVTD
VLSQENDDFQKTLSSKSNESHEDVDDDDDDVDSQDSVDSDDVDDSKQSDSEDEVVTD
VLSQETDDFRQKTLSSKSNESHDDVDEDDDDVDSQDSVDSDDSDGDDSNQSDSEDELVTD
VLSQETDDFKQKTLSSKSNESHDDVDEDDGDDVDSQDSVDSNDVDDSNQSDSEDELVTD
VLSQENDDFQKTLSSKSNESHEDVDDDDDDVDSQDSVDSNDVDDSNQSDSEDEVVTD
VLSQENDDFQKTLSSKSNESHEDVDEDDGDDVDSQDSIDSNDVDDSNQSDSEDELVTD
VLSQENDNFQKTLSSKSNESHEDVDEDDGDDVDSQDSIDSNDVDDSNQSDSEDELVTD
VLSQENDNFQKTLSSKSNESHEDVDEDDGDDVDSQDSIDSNDVDDSNQSDSEDELVTD
**::* *:::****:****: ** ***** ** * **:::*****:***
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XM_003985184.5: *Felis catus*
XM_015073631.1: *Acinonyx jubatus*
XM_019464775.1: *Panthera pardus*
XM_007074695.2: *Panther tigris*
XM_003434024.4: *Canis lupus familiaris*
XM_004756106.2: *Mustela putorius furo*
XM_002913580.3: *Ailuropoda melanoleuca*
XM_008707124.1: *Ursus maritimus*
NW_019154087.1: *Enhydra lutris kenyonii*
NW_004450264.1: *Odobenus rosmarus divergens*
XM_021702336.1: *Neomonachus schauinslandi*
NW_006383049.1: *Leptonychotes weddellii*

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FPTDV PATQFFTPAVPTRDSYDGRGDSVAYGLRSKSKKSHRYEDQYPDSTEEDFTSLVKS
FPTDV PATQFFTPAVPTRDSYDGRGDSVAYGLRSKSKKSHRYEDQYPDSTEEDFTSLVKS
FPTDV PATQFFTPAVPTRDSYDGRGDSVAYGLRSKSKKSHRYEDQYPDSTEEDFTSLVKS
FPTDV PATQFFTPAVPTRDSYDGRGDSVAYGLRSKSKKSHRYEDQYPDSTEEDFTSLVKS
FPTDI PATQLFTPAVPTRGSYDGRGDSVAYGLRSKSKKSHRYEDQYPDSTEEDFTSLVKS
FPTDI PATQFFTPSVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAYGLRSRSMKMSHRYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
FPTDI PATQFFTPAVPTRDSNDGRGDSVAHGLRSRSMKMSHTYEVQYPDSTEEDLTSLVKS
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XM_003985184.5: <i>Felis catus</i>	QSMEDDFNAVLLSHTVRRSPDRD-SHVKDSQETSQVDDHSMETKSRKHSKEYKLGASDEN
XM_015073631.1: <i>Acinonyx jubatus</i>	QSMEDDFNAVLLSHTVRRSPDRD-SHVKDSQETSQVDDHSMETKSRKHSKEYKLGASDEN
XM_019464775.1: <i>Panthera pardus</i>	QSTKDDFNAVLLSHTVRRSPDRD-SHVKDSQETSQVDDHSMETKSRKHSKEYKLGASDEN
XM_007074695.2: <i>Panther tigris</i>	QSTKDDFNAVLLSHTVRRSPDRD-SHVKDSQETSQVDDHSMETKSRKHSKEYKLGASDEN
XM_003434024.4: <i>Canis lupus familiaris</i>	ASMEDDFNAVLLSHTVRRSPDRD-SHAKDSQETSQVDDHSMETKGRKHSQEYKLGASDES
XM_004756106.2: <i>Mustela putorius furo</i>	ESTEDDFNAVLLSQTIVRGTSDDRD-SHARHSQETSQVDDHSMETKDRRHRTREYKLGASDES
XM_002913580.3: <i>Ailuropoda melanoleuca</i>	GSTEDDFNAVLLSQTIVRGTSDDGD-SHAKDSQETSQVDDHSMETKSRRHRTREYKLGASDES
XM_008707124.1: <i>Ursus maritimus</i>	GSMEDDFNAVLLSQTIVRGTSDDGD-SHAKDSQETSQVDDHSMETKSRRHRTREYKLGASDES
NW_019154087.1: <i>Enhydra lutris kenyonii</i>	ESTEDDFNAVLLSQTIVRGTSDDGD-SHARYSQEASQVDDHSMETKSRRYRTREYKLGASDES
NW_004450264.1: <i>Odobenus rosmarus divergens</i>	ESTEDDFNAVLLSHTVRRGTSDGD-SHAKDSQETSQVDDHSMETKSHKHAREYKLGASDES
XM_021702336.1: <i>Neomonachus schauinslandi</i>	ESMEDDFNAVLLSQTIVRGTSDDGD-SHAKDSQETSQVDDHSMETKSHKHAREYKLGASDES
NW_006383049.1: <i>Leptonychotes weddellii</i>	ESMEDDFNAVLLSQTIVRGTSDDGD-SHAKDSQETSQVDDHSMETKSHKHAREYKLGASDES

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XM_003985184.5: <i>Felis catus</i>	NKHSHEIGSQEESDISSELVGGTIVQSNKEKLVQHPESFEQDKHLKFRVSHELDSASSEVN
XM_015073631.1: <i>Acinonyx jubatus</i>	NKHSHEIGSQEESDVSELVGGTIVQSNKEKLVQHPESFEQDKHLKFRVSHELDSASSEVN
XM_019464775.1: <i>Panthera pardus</i>	NKHSHEIGSQEESDVSELVGGTIVQSNKEKLVQHPESFEQDKHLKFRVSHELDSASSEVN
XM_007074695.2: <i>Panther tigris</i>	NKHSHEIGSQEESDVSELVGGTIVQSNKEKLVQHPESFEQDKHLKFRVSHELDSASSEVN
XM_003434024.4: <i>Canis lupus familiaris</i>	NMHSHEIGSQENSEVSELVSQLSQSHEKELIVDSKSEEDKHLKFRVSHELDSASSEIN
XM_004756106.2: <i>Mustela putorius furo</i>	SKHSQEIGSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDNASTEVN
XM_002913580.3: <i>Ailuropoda melanoleuca</i>	DRHSHEIDSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDNASTEVN
XM_008707124.1: <i>Ursus maritimus</i>	DRHSHEIDSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDNASTEVN
NW_019154087.1: <i>Enhydra lutris kenyonii</i>	SKHSHEIGSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDSASTEVN
NW_004450264.1: <i>Odobenus rosmarus divergens</i>	NKHSHEIGSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDSASSEVN
XM_021702336.1: <i>Neomonachus schauinslandi</i>	NKHSHEIGSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDSASSEVN
NW_006383049.1: <i>Leptonychotes weddellii</i>	NKHSHEIGSQENSEVSELVSIYIVQSHENEQVLDGSGVVEEDKHLKFRVSHELDSASSEVN

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Table S1.2: Osteopontin in Carnivora: As alternative splicing of exons 4 or 5 has only been shown to occur in humans, the sequences for *Mustela putorius furo* and *Neomonachus schauinslandi* are likely not accurate reflections of the full transcripts.

HQ161904.1: <i>Cervus nippon</i>	EDFTSHVSESEEMHDAPKKTSQLNDHDKETNSNELSKELKPKAKDESSKHSVDVIESQENSK
MKHE01000017.1: <i>Cervus elaphus hippelaphus</i>	EDFTSHVSESEEMHDAPKKTSQLNDHDKETNSNELSKELKPKAKDESSKHSVDVIESQENSK
XM_020876412.1: <i>Odocoileus virginianus texanus</i>	EDFSSHVSESEEMHDAPKKTSQLNDHDKETNSNELSKELKPKAKDESNKHSVDVIESQENSK
S45840.1: <i>Bos taurus</i>	EDFTSHIESEERCM-STKKTSLRDLTDHDKETNRCLELSKELMPKAKDK-NKHSNLIIESQENSK
DQ295062.1: <i>Bubalus bubalis</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSRELKELTPKAKDKNNKHSNLIIESQENSK
M66236.1: <i>Bos</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSNELSKELTPKAKDK-NKHSNLIIESQENSK
XM_010860191.1: <i>Bison bison bison</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSNELSKELTPKAKDK-NKHSNLIIESQENSK
JH881339.1: <i>Bos grunniens</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSNELSKELTPKAKDK-NKHSNLIIESQENSK
NW_005393912.1: <i>Bos mutus</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSNELSKELTPKAKDK-NKHSNLIIESQENSK
KU985440.1: <i>Bos indicus</i>	EDFTSHIESEEMHDAPKKTSQLTDHDKETNSNELSKELTPKAKDK-NKHSNLIIESQENSK
XM_005972457.1: <i>Pantholops hodgsonii</i>	EDFTSHIESEEMHDAPKKTSQLTDHSEETNSNELSKELMPKAKDE-SKHSNLIIESQENSK
AF152416.1: <i>Ovis aries</i>	EDFTSHIESEEMHDAPKKTSQLTDHSEETNSDELKELTPKAKET-SKHSNRRIESQENSK
KJ789112.1: <i>Capra hircus</i>	EDFTSHIESEEMHDAPKKTSQLTDHSEETNSDELKELTPKAKET-SKHSNRRIESQENSK
	::***. : *****: * *****:*** ** *** ***:***: . ***: *****

HQ161904.1: <i>Cervus nippon</i>	VSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSTISSEVN
MKHE01000017.1: <i>Cervus elaphus hippelaphus</i>	VSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSTISSE--
XM_020876412.1: <i>Odocoileus virginianus texanus</i>	VSQEFHSLSEKLDLDHRSEEDKHLKIRISHELDSTISSEVN
S45840.1: <i>Bos taurus</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
DQ295062.1: <i>Bubalus bubalis</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
M66236.1: <i>Bos</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
XM_010860191.1: <i>Bison bison bison</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
JH881339.1: <i>Bos grunniens</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
NW_005393912.1: <i>Bos mutus</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
KU985440.1: <i>Bos indicus</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSE-N
XM_005972457.1: <i>Pantholops hodgsonii</i>	LSQEFHSLSEKLDLDHKSE-EDKHLKIRISHELDSSASSEVN
AF152416.1: <i>Ovis aries</i>	LSQEFHSLSEKLDLDHKSE-EDKRLKIRISHELDSSASSEVN
KJ789112.1: <i>Capra hircus</i>	LSQEFHSLSEKLDLDHKSE-EDKRLKIRISHELDSSASSEVN
	:*****:*****:*** **:*****:***

Table S1.3: Osteopontin in Artiodactyla, Cervidae and Bovidae. The N-terminus of the sequence for *Odocoileus virginianus texanus* is possibly incomplete. The available *Cervus elaphus hippelaphus* sequence may reflect transcription or translation from an alternative start site.

XM_006198167.2:Vicugna pacos -----
XM_010966141.1:Camelus bactrianus -----
XM_006175474.2:Camelus ferus -----
XM_010983105.1:Camelus dromedaries -----
NM_214023.1:Sus scrofa -----
X16575.1:Sus -----
XM_007102526.1:Physeter catodon -----
NW_006776832.1:Lipotes vexillifer -----
XM_022582289.1:Delphinapterus leucas MTHLSTPCVGGERLEQPLNSETSWSLSTAGRGRAQSAALSTASAPPGTGLFLAAADQGTLI
NW_004438431.1:Orcinus orca -----
XM_004315204.2:Tursiops truncatus -----

XM_006198167.2:Vicugna pacos -MKLAVICFCLLGIASALPVGQTN SGSSEEKQLN NKYPDAVATWLKPDPSQKQTF FLAPQS
XM_010966141.1:Camelus bactrianus -MKLAVICFCLLGIASALPVGQTN SGSSEEKQLN NKYPDAVATWLKPDPSQKQTF FLAPQS
XM_006175474.2:Camelus ferus -MKLAVICFCLLGIASALPVGQTN SGSSEEKQLN NKYPDAVATWLKPDPSQKQTF FLAPQS
XM_010983105.1:Camelus dromedaries -MKLAVICFCLLGIASALPVGQTN SGSSEEKQLN NKYPDAVATWLKPDPSQKQTF FLAPQS
NM_214023.1:Sus scrofa -MRIAVIAFCLWGFASALPVKQTN SGSSEEKLLS NKYTDAVATLLKPDPSQKQTF FLAPQN
X16575.1:Sus -MRIAVIAFCLWGFASALPVKQTN SGSSEEKLLS NKYTDAVATLLKPDPSQKQTF FLAPQN
XM_007102526.1:Physeter catodon -MRIAVICLCLLGIASALPVKQTD SGSSEEKQLY NKYPDAIATWLKPDPSQKQTF FLAPQN
NW_006776832.1:Lipotes vexillifer -MRTAVICFCLLGI V SALPVKQTD SGSSEEKQLY NKYPDAIATWLKPDPSQKQTF LE PQN
XM_022582289.1:Delphinapterus leucas TMRIAVICFCLLGI TSALPVKQTD SGSSEEKQLY NKYPDAVATWLKPDPSQKQTF LE PQN
NW_004438431.1:Orcinus orca -MRIAVICFCLLGI SSALPVKQTD SGSSEEKQLY NKYPDAVATWLKPDPSQKQTF LE PQN
XM_004315204.2:Tursiops truncatus -MRIAVICFCLLGIASALPVKQTD SGSSEEKQLY NKYPDAVATWLKPDPSQKQTF LE PQN
* : *** : ** * : ***** ** : ***** * *** ** : * * ***** : *** ** .

XM_006198167.2:Vicugna pacos TASSEETDNFKQETLPSTSNESPDLTD DVDDDDDDTVDSQDV SNDSDDHTDDTDRSDES
XM_010966141.1:Camelus bactrianus TASSEETDNFKQETLPSTSNESP DHTDDVDDDDDDTVDSQDV SNDSDDHTDDTDRSDES
XM_006175474.2:Camelus ferus TASSEETDNFKQETLPSTSNESP DHTDDVDDDDDDTVDSQDV SNDSDDHTDDTDRSDES
XM_010983105.1:Camelus dromedaries TASSEETDNFKQETLPSTSNESP DHTDDVDDDDDDTVDSQDV SNDSDDHTDDTDRSDES
NM_214023.1:Sus scrofa TTSSSEETDDFKQETLP SKSNESPEQTDDVDDDDDEDHVDSRDTDSEEADHADDADR SDES
X16575.1:Sus TTSSSEETDDFKQETLP SKSNESPEQTDDVDDDDDEDHVDSRDTDSEEADHADDADR SDES
XM_007102526.1:Physeter catodon TVSSEETADNKQETLP RKSSSEPEHTD TVDDEEDGDGQDADA ----N---DDHSDSDES
NW_006776832.1:Lipotes vexillifer TVSSEET-DNKQETLP SKSNESPEHTD TVDDEEDGDSQDTDA ----NDSKDADHSDES
XM_022582289.1:Delphinapterus leucas TVSSEET-DNKQETL SSKSNESPEHTD TVDDEEDGDSQDTDA ----NDSNDTDHSDES
NW_004438431.1:Orcinus orca TVSSEET-VNKQETLP SKSNESPEHTD TVDDEEDGDSQDND ----SNDTDHSDES
XM_004315204.2:Tursiops truncatus TVSSEET-DNKQETLP SKSNESPEHTD TVDDEEDGDSQDTDA ----SDS SDDTDHSDES
* ***** . * : *** : ** ***** : * * : *****

XM_006198167.2:Vicugna pacos
XM_010966141.1:Camelus bactrianus
XM_006175474.2:Camelus ferus
XM_010983105.1:Camelus dromedaries
NM_214023.1:Sus scrofa
X16575.1:Sus
XM_007102526.1:Physeter catodon
NW_006776832.1:Lipotes vexillifer
XM_022582289.1:Delphinapterus leucas
NW_004438431.1:Orcinus orca
XM_004315204.2:Tursiops truncatus

```
HHSDESDEVVTDFFPTDIPATAVFTPAVPTEDTQDGRGDNIGYALRTKSKKFRRSEVEHPE  
HHSDESDEVVTDFFPTDIPATAVFTPAVPTEDTQDGRGDNIGYALRTKSKKFRRSEIEHPE  
HHSDESDEVVTDFFPTDIPATAVFTPAVPTEDTQDGRGDNIGYALRTKSKKFRRSEIEHPE  
HHSDESDEVVTDFFPTDIPATAVFTPAVPTEDTQDGRGDNIGYALRTKSKKFRRSEIEHPE  
HHSDESDELVTDFFPTDIPATDV-TPAVPTGDPNDGRGDSVVYGLRSKSKKFRRSEAAQLD  
HHSDESDELVTDFFPTDIPATDV-TPAVPTGDPNDGRGDSVVYGLRSKSKKFRRSEAAQLD  
HDSDESDEGVTDFFPTDVPATSVFTPPVPTGDTYGRGDSVAYGLRSKSKKFRRSEVQYPD  
HHSDESDEVVTDFFPTDVPATSVFTPPVPTGDTYGRGDSVAYGLRSK-KMFRRSEVQYPD  
HHSDESDEVVTDFFPTDVPATSVFTPPVPTGDTYGRGDSVAYGLRSK-KMFRRSEVQYPD  
HHSDESDEVVTDFFPTDVPATSVFTPPVPTGDTYGRGDSVAYGLRSK-KMFRRSEVQYPD  
HHSDESDEVVTDFFPTDVPATSVFTPPVPTGDTYGRGDSVAYGLRSK-KMFRRSEVQYPD  
HHSDESDEVVTDFFPTDVPATYVFTPPVPTGDTYGRGDSVAYGLRSK-KMFRRSEVQYPD  
*.***** ***** ** : ** *** * :****.:*.*** * ** **: : :
```

XM_006198167.2:Vicugna pacos
XM_010966141.1:Camelus bactrianus
XM_006175474.2:Camelus ferus
XM_010983105.1:Camelus dromedaries
NM_214023.1:Sus scrofa
X16575.1:Sus
XM_007102526.1:Physeter catodon
NW_006776832.1:Lipotes vexillifer
XM_022582289.1:Delphinapterus leucas
NW_004438431.1:Orcinus orca
XM_004315204.2:Tursiops truncatus

```
A-----MTHVESEEAEAHKAIFDAQGLHTASDWNSQWKDSQETSQPGDHSVETHSQEHS  
A-----MTHVESEEAEAHKAIFDAQGLHMASDWNSQWKDSQETSQPSDHSVETHSQEHS  
A-----MTHVESEEAEAHKAIFDAQGLHMASDWNSQWKDSQETSQPSDHSVETHSQEHS  
A-----MTHVESEEAEAHKAIFDAQGLHTASDWNSQWKDSQETSQPSDHSVETHSQEHS  
ATEEDLTSHVSEETDGTTPKAILVAQRLHVASDLDSQEKDSQETSQPDDRSVETRSQEQS  
ATEEDLTSHVSEETDGTTPKAILVAQRLHVASDLDSQEKDSQETSQPDDRSVETRSQEQS  
AREEDISSHLESEEVGDAPKAILVAQRLHRASDWNSRGKDSQETSQPEERMETHSREHS  
ATEEDVTSHVSEEEVGDAPKAILVAQRLHRASDWNSHGKDSQETSQPDDRSMETHSHEHS  
ATEEDVTSHVSEEEVGDAPKAILVAQRLHRASDWNSRGKDSQETSQPDDRSMETHSHEHS  
ATEEDVTSHVSEEEVGDAPKAILVAQRLHRASDWNSRGKDSQETSQPDDRSMETHSREHS  
ATEEDVTSHVSEEEVGDAPKAILVAQRLHRASDWNSRGKDSQETSQPDDRSMETHSREHS  
* :*****.:***: ** ** ** *: :*****.: : ** **: *
```

XM_006198167.2:Vicugna pacos
XM_010966141.1:Camelus bactrianus
XM_006175474.2:Camelus ferus
XM_010983105.1:Camelus dromedaries
NM_214023.1:Sus scrofa
X16575.1:Sus
XM_007102526.1:Physeter catodon
NW_006776832.1:Lipotes vexillifer
XM_022582289.1:Delphinapterus leucas
NW_004438431.1:Orcinus orca
XM_004315204.2:Tursiops truncatus

```
EEYKLLKADDEGRHSDVVIDSQENSQVSPPEIHSQELPshedklvLDPKSEEDTHLKFrvs  
EEYKLLKADDEGRHSDVIDSQENSQVSPPEVHSQELPshedklvLNPkSEEDTHLKFrvs  
EEYKLLKADDEGRHSDVVIDSQENSQVSPPEVHSQELPshedklvLNPkSEEDTHLKFrvs  
EEYKLLKADDEGRHSDVIDSQENSQVSPPEVHSQELPshedklvLNPkSEEDTHLKFrvs  
KEYTIKTYDGSNEHSNVIESQENPKVSEQE----FHshedklvPDSKSE-EDKHLKlrvs  
KEYTIKTYDGSNEHSNVIESQENPKVSEQE----FHshedklvPDSKSE-EDKHLKlrvs  
KEFKLKAEEVSENERSDVTDSDNSKVSQE----FHshedkVVPDLKSE-EDKHLKlrvs  
KEFKLKAEDDSKEHSDVIESQDNKVSQ----EFHSREDKLVpDLKSE-EDKHLKlrvs  
KEFKLKEDDSDNEHSNVIESQDNKVSHEFHSHQEFHSREDKLVpDLKSE-EDKHLKlrvs  
KEFKLKAEDDSVEHSDVIESQDNKVSHEFHSHQEFHSREDKLVpDLKSE-EDKHLKlrvs  
KEFKLKAEDDSVEHSDVIESQDNKVSHEFHSHQEFHSREDKLVpDLKSE-EDKHLKlrvs  
*: :* . . :*: :*: :* : : ***** : * ** ** ** :*** :***
```

XM_006198167.2: <i>Vicugna pacos</i>	HELDSASSEVN
XM_010966141.1: <i>Camelus bactrianus</i>	HELDSASSEVN
XM_006175474.2: <i>Camelus ferus</i>	HELDSASSEVN
XM_010983105.1: <i>Camelus dromedaries</i>	HELDSASSEVN
NM_214023.1: <i>Sus scrofa</i>	HELESASSEIN
X16575.1: <i>Sus</i>	HELESASSEIN
XM_007102526.1: <i>Physeter catodon</i>	HELDDASSEVN
NW_006776832.1: <i>Lipotes vexillifer</i>	HELDSASSEVN
XM_022582289.1: <i>Delphinapterus leucas</i>	HESDASSEVN
NW_004438431.1: <i>Orcinus orca</i>	HELDSASSEVN
XM_004315204.2: <i>Tursiops truncatus</i>	HELDSASSEVN

** :.*****:

Table S1.4: Osteopontin in Artiodactyla (Camelidae, Suidae and Celaceae).

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

MRIAVICLLGLIAYALPVQANSGSSEEKLLYNKSPDAVGTWLKPDPSQKQTL LAPQTV
MRIAVICLLGLIAYALPVNQADSGSSEEKQLYNKHSDAVSIWLKPDPSQKQNL LAPQTV
MRIAVICLLGLIAYALPVNQADSGSSEEKQLYNKHSDAVSIWLKPDPSQKQNL LAPQTV
MRIAVICLLGLIAYALPVNQADSGSSEEKQLYNKHSDAVSIWLKPDPSQKQNL LAPQTV
*****:*****:***** ***** ** . *****:*****:*****

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

SSEETDLDKQETLPSKSNESPDHTDDVDDDDGDHVDSDQSDIDSDDSDETDPTDDPDQSE
SSEETDNLKQETLPSQSNESHDTDDVDDDDVDGHEDDQSDIDSDDSDETDPTDDPDNSD
SSEETDNLKQETLPSQSNESHDTDDVDDDDVDGHEDDQSDIDSDDSDETDPTDDPDNSD
SSEETDNLKQETLPSQSNESHDTDDVDDNDGDHEDDQSDISNDSDETPTDDPDNSD
*****:*****:***** *****:*****:***** *****:*****:*****

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

ESHHSDESELVTFPTDLPATPVFTPAVPTS DTYDGRGDSVGYGPRSKSKKVRSEVQY
ESHHSDESELVTFSTDPATPVFTPAVPTRDTYDGRGDSL SYGLKSKSRKFRSEQY
ESHHSDESELVTFSTDPATPVFTPAVPTRDTYDGRGDSL SYGLKSKSRKFRSEQY
ESHHSDESELVTFSTDPATPVFTPAVPTRDTYDGRGDSL SYGLKSKSRKFRSEQY
*****:*****:***** *****:*****:***** *****:*****:*****

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

PDATEEDLTSHVKSKEVGVHKA ILVAQGLHVASDWDSRGKDSL ETSQLDDHVS VETHSLE
PDATEEDLTSPVESKDIDDVHKAVLVAQGLHVASDWDSRGKDSQETS QLDHVS VETHSRE
PDATEEDLTSPVESKDIDDVHKAVLVAQGLHVASDWDSRGKDSQETS QLDHVS VETHSRE
PDATEEDLTSPVESKDIDDVHKAVLVAQGLHVASDWDSRGKDSQETS QLDHVS VETHSRE
*****:*****:***** *****:*****:***** *****:*****:*****

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

HSKEYQLKANDETSEHSDVIDSHENSKFSHERHSQEFHSREDKLVLD RKSEEDKYLKFR
HSKEYQLKANDETSEHSDVIDSRENSKVSQEFPSQEFHSSEGLVDRDRKSEDEDKYLKFR
HSKEYQLKANDETSEHSDVIDSRENSKVSQEFPSQEFHSSEGLVDRDRKSEDEDKYLKFR
HSKEYQLKANDETSEHSDVIDSL ENSKVSQEFPSQEFHSSEGLVDRDRKSEDEDKYLKFR
*****:*****:***** *****:*****:***** *****:*****:*****

XM_014787875.1:*Ceratotherium simum simum*
XM_001496152.4:*Equus caballus*
XM_008523685.1:*Equus przewalskii*
XM_014842441.1:*Equus asinus*

VSHELDSASSEVN
TSHESESASSEVN
TSHESESASSEVN
TFHESESASSEVN
. ** :*****

Table S1.5: Osteopontin in Perissodactyla.

XM_013004835.1: <i>Echinops telfairi</i>	MRAAVLCCLLGLIAYALPVKHPADSGSSEEKQT-----
NW_016536240.1: <i>Manis javanica</i>	MRIAVICFSLGLIACITLQVKK--QADSRSSSEEKQLYQKYPDAVASWLKSDPSHKQILLALQN
NW_006408627.1: <i>Chrysochloris asiatica</i>	MRIAVICFCLLGLIAYALPAKYHTESGSSEEKQLHIKYPDAVATWLKPDPSQKQILLAPQK
XM_003414088.3: <i>Loxodonta africana</i>	MRTAVICFCLLGLIAYALPVKYQADSGSSEEKQLHSHKHPDVTATWLKPDVSYKQILLAPQN
XM_012559624.2: <i>Trichechus manatus latirostris</i>	MRIAVIYFCLLGLIAYALPVKHQADSGSSEEKQLYSKYPDAVDTWLKPDPSPYKQILLAPQN
	** *: .***** :**.* ::* *****
XM_013004835.1: <i>Echinops telfairi</i>	-----FPSKSYQSHDQTTDDVDA-DDSDHKSQSQSVESDDSDDDHDADEPDH
NW_016536240.1: <i>Manis javanica</i>	TVSSEETDNFKQETLPSRSNESHD---DVDDEEDGDNRDSQDSADASKSDDVDHTDDPDD
NW_006408627.1: <i>Chrysochloris asiatica</i>	AISSEEDHLKQETLPSKSNESQDLTDDVDDEDDSDHVNNQDSVESDDSEDDHTDDPDR
XM_003414088.3: <i>Loxodonta africana</i>	AVSSEENDKLLQETLPSKSNESQDTNDDVDEDDGDHVDSDQSVESDDLDHDDHTDDPYH
XM_012559624.2: <i>Trichechus manatus latirostris</i>	AVSSEETDDLKQETLPSKSNESQDTNDSVDEDDGEQVDSQDPIDSDDTHEDDHTDDSNH
	:***: :**.* :** :*.: :..* :... :*.:*
XM_013004835.1: <i>Echinops telfairi</i>	SDSHHSDESDEVT-----DVPATVLFVTSALPTDFYSDDGRGDSLGYAVRSKLRRIHEAV
NW_016536240.1: <i>Manis javanica</i>	S-----DESDELVT-----DVPATPVFTPADPTG-DTNDGRGDSVAYGLRSKSKKFYRSA
NW_006408627.1: <i>Chrysochloris asiatica</i>	SDSHHSDESDELVTDFPTDMSATPVFTPVVPTV-DIYDGRGDSVAYGQKRSRKKI STPV
XM_003414088.3: <i>Loxodonta africana</i>	SDSHHSDESDELVTGFPTDDPGTPVFTPAVPTV-DTYDGRGDNVYRLSSKSKKSHKSV
XM_012559624.2: <i>Trichechus manatus latirostris</i>	SNESNHSDESDELVTDFPTDDPATVFTPAVPTV-DTYDGRGDSVVYRLRSKSKKIPRSD
	* *****.* * .* :** . ** *****.* * * : :
XM_013004835.1: <i>Echinops telfairi</i>	IQFPDDFASD-----ENVKAIFFPSQVLKKVSSSESQQRDSRETRQPD--HSVE
NW_016536240.1: <i>Manis javanica</i>	LQYPDATEDLTSQMESKEIDKARKATLVARSLRVPDWDSDQET-----SQLDQSQSAE
NW_006408627.1: <i>Chrysochloris asiatica</i>	ILYPDD----LTSLKKSEAFGDEHKAMSVQAMKKVSNWDSQQQGSSETSQED--HSVE
XM_003414088.3: <i>Loxodonta africana</i>	IQFPDATEDFTSRMESKELDDAHKAIKRVVKSRLKASDWDSDHQDSETSQLDD--HSVE
XM_012559624.2: <i>Trichechus manatus latirostris</i>	IQHPHATEEDSISQMESKMLDDAHKAIKPVISLKKPFWDSDYQQDSRETSQDD--HSVE
	: .* . ** : : . : * * * :*.*
XM_013004835.1: <i>Echinops telfairi</i>	TQSHERSKESALETEVESSERSDLNSQESSKVSQEAQSQEFHSHED-----
NW_016536240.1: <i>Manis javanica</i>	TNSQGYKEYTLKAKDESNEHADVI GNKEDSKVSQ----EFS-HEDKLVFDPKSREED-
NW_006408627.1: <i>Chrysochloris asiatica</i>	THSLEQSKYKLRKANDVSSSEHSDMIDSLNSKVSQ----EFHSHEDKHLPSKSEDEDQ
XM_003414088.3: <i>Loxodonta africana</i>	THSLEQSKYKLRKANDVSSSEHSDMIDSLNSKVSQ----EFHSHEDKLRPDPESEEQDK
XM_012559624.2: <i>Trichechus manatus latirostris</i>	THSLEQSKYKLRKANDVSSSEHSDTIHSQEDSRVSD----ELHSREDKYYDPKSEEDK
	: * : : * .* : . * .* : * * : * : *
XM_013004835.1: <i>Echinops telfairi</i>	-----
NW_016536240.1: <i>Manis javanica</i>	KLKFRISHELDSESEAN
NW_006408627.1: <i>Chrysochloris asiatica</i>	QLKFRISHELESTSYEIN
XM_003414088.3: <i>Loxodonta africana</i>	HLKFRISHELES-----
XM_012559624.2: <i>Trichechus manatus latirostris</i>	HLKFRISHELES-----

Table S1.6: Osteopontin in Afrotheria and Xenarthra.

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

-MRTAVICFCLLGIVSALPVKHQINSGSSEERRLYNKHPNLVATWLNADPSQKQTLLATQ
MMRTAVICFCLLGIVSALPVKQQINSGSSEEEKQLYSKHPNFVATWLNADPSQKQTLLATQ
-MRTTIVICFCLLGIISAWPVKQQINSGSSEEEKPLYSKHPDFVATWLNDDPSQKQTLLATQ
:**:*** ***:*****: ** .***:***** *****

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

NSVSSEESTEDLQOTLPSNSNESPDTTDDVDDDDDDGHKSTDSDDSDDESDEVVTDFTP
NSLSSEESTEDLQETLPRNSSESPDDIDDEDDDDGDH-NKSIDSDDSDDESDEVVTDLPTD
NSVSSEESTEDLQETLPTNSDEIPDDIDDDDNEDGDGEGHKSTDSDDSDDESDEVVTDFTP
:*:***:*** **.* ** ** *:*:*.* .:** *****:***

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

IPTTSSFLPDGPTRGDNSGRGDSVAYGLRSKVGAPDISSAETHVTEEDLTSQMESYESE
TPATPSFLPDGPTRGDNGGRGDSVAYGLRSKLGAPYRSSEQVHDVTEEDLTSQIESYESE
TPVTSSFLPDGPTRGDNGGRGDSVAYGLRSKVGVPYRSSEQVHDITEEDLTSQMESYESE
. *****.*****:*. * ** :.*:*****:*****

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

KAHKAFPLSQNLPKVSAWGSNSKESNEASHPDEYSVETYSHEQFKSYQLEETNPDSQQQG
KTHKAIPLSQTFPKVSSWESNGQESNEASQADEYSVETHSHEQLKSSQLERNIYDSQQQS
KIHKVFPLSQNLAKVSAWNSNSKDSNEASHPDEHSVETQSHEQLKSYRLEQNSYDSQQQS
* ** .:****. : ***:* ** .:*****: **:* ** ***:** :**.. *****.

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

DSHDSQENDKVSQEFR-----TQEVNKLQEFQSQESHVPNDPESVENTKYLK
DSHGSQENDKVSQEFHNREVDKDSQEFHKKQVVGKLSQEFYHSQEVHLVSDPESVENIKPLK
DSHGSQENDKVSQEFHSP EVDKDSQEFRKLVNKLQEFYHSQEVHLVSDPESVENAKHLK
.**: . :*.*:*****:*** * ..***** * **

XM_001370458.3:Monodelphis domestica
XM_003772957.3:Sarcophilus harrisii
XM_020988577.1:Phascolarctos cinereus

LHSFPEADSASYEAH
LHS-HEVDSASFETH
LHSSHEIDSASSEVH
*** * ***** *.*

Table S1.7: Osteopontin in Marsupialia.

XM_008574253.1: *Galeopterus variegatus*
XM_016213045.1: *Miniopterus natalensis*
XM_019668067.1: *Hipposideros armiger*
XM_019719344.1: *Rhinolophus sinicus*
XM_016161109.1: *Rousettus aegyptiacus*
XM_011356310.2: *Pteropus vampyrus*
XM_006910714.2: *Pteropus alecto*
XM_014452112.2: *Myotis lucifugus*
NW_007370672.1: *Eptesicus fuscus*
KE161812.1: *Myotis brandtii*
KB104739.1: *Myotis davidii*

-----MRIAVICSCLLGIYALPVKQPDSGSSEEKQLYNKYPDAMA AWLKPDPSPQKQ
-----MRAAVICFCLLGIAYALPVKCRADSGSSEERQLY-KHPDAVATWLKPDPAQKQ
-----MRIAVVCFCLLGIAYTLPVKHIDSGSSEEKQLYQKYPDAVATWLKPDPSQKQ
-----MRIAVICFCLLGIAYTLPVKHADSGSSEERQLYNKYPDAVATWLKPDPSQKQ
-----MRIAVICFCLVGIAYALPVKHADSGSSEERQLFNKYPDAVATWLKPDPSQKQ
-----MRIAVICFCLVGMAYALPVKHADSGSSEERQLFNKYPDAVATWLKPDPSQKQ
-----MRIAVICFCLVGMAYALPVKHADSGSSEERQLFNKYPDAVATWLKPDPSQKQ
----MTCTVDTSQPLSPPPSPKGLMNKVTMVAAMELYNKHPDAVATWLKPDPSQKQ
-----MRTAVIFFCFLAITTAFPVKHADSGSSEERQLYNKHPDAVATWLKPDPSQKQ
-----MRIAVICFCLLGIAYALPVKHADSGSSEERQLYNKHPDAVATWLKPDPSQKQ
-----MRIAVICFCLLGITSA L PVKHADSGSSEEKQLYNKHPDAVATWLKPDPSQKQ
* : : : : : : : * : * : * : * : * : * : * : * : * : * : *

XM_008574253.1: *Galeopterus variegatus*
XM_016213045.1: *Miniopterus natalensis*
XM_019668067.1: *Hipposideros armiger*
XM_019719344.1: *Rhinolophus sinicus*
XM_016161109.1: *Rousettus aegyptiacus*
XM_011356310.2: *Pteropus vampyrus*
XM_006910714.2: *Pteropus alecto*
XM_014452112.2: *Myotis lucifugus*
NW_007370672.1: *Eptesicus fuscus*
KE161812.1: *Myotis brandtii*
KB104739.1: *Myotis davidii*

NLLAPQNAVSS EIDNFKQETLPSKSNESHDLTDDVDDDDGDHVDSQDSIDSDFDDT-
NLLAPQNTVSSEETDDFKQETLPSKSNESHDLTDDVDDDDSNHVDSQDSTDSNDSDDA-
NLLAPQNAVSS EETDDLKQETLPSASHESHDLTDDMDDDD--DHVDSQDSTDSIDSDDA-
NLLAPQNAVSS EETADFKQETLPSKSNESHDLTDDVDDDD--EHVDSQDSIDSNESDDAD
NLLAPQNTVSSEETD NFKQETLPSKSNESHDLTDDVDDDEDEDHVDSQDHIDSIDSDDA-
NLLAPQNTVSSEETD NFKQETLPSKSNESHDLTDDVDDDEDEDHVDSQDHIDSIDSDDA-
NLLAPQNTVSSEETD NFKQETLPSKSNESHDLTDDVDDDEDEDHVDSQDHIDSIDSDDA-
SLLAPQNTVSSEETD DFKQETLPSKSNES QDHTDDVDD--DEDRVDSQDSIDSNDSDDD-
NLLAPQNTVSSEETD DFKQETLPSKSNES QDHTDDVDD--DEDHVDSQDSIDSNDSDDD-
SLLAPQNTVSSEETD DFKQETLPSKSNES QDHTDEVD--DEDHVDSQDSIDSNDSDDD-
SLLAPQNTVSSEETD DFKQETLPSKSNES QDHTDDVDD--DEDHVDSQDSIDSNDSDDD-
.***** :***** : :***** * : * : * : * : * : * : * : * : *

XM_008574253.1: *Galeopterus variegatus*
XM_016213045.1: *Miniopterus natalensis*
XM_019668067.1: *Hipposideros armiger*
XM_019719344.1: *Rhinolophus sinicus*
XM_016161109.1: *Rousettus aegyptiacus*
XM_011356310.2: *Pteropus vampyrus*
XM_006910714.2: *Pteropus alecto*
XM_014452112.2: *Myotis lucifugus*
NW_007370672.1: *Eptesicus fuscus*
KE161812.1: *Myotis brandtii*
KB104739.1: *Myotis davidii*

DHTDDSHHSDESHHSDESDELVTDF----PTRVPATPV-ATPAVPTIDTYDGRGDSVAYR
DQTDDSDNSDESHHSDESDELVTDF----PTDFPGTLI-VTPPVPTRDTYDGRGDSVAYG
DHTDDSDNSDESHHSDESDELVTDF----PTDLPGTPI-VTPAPPTRDTYNGRGDSVAYG
DRTDDSDNSDESHHSDESDELVTDF----PTDLPGTGTVVTPVPTRTYNGRGDSVAYG
DNTDDSDNSDESHHSDESDELVTDF----PTDIPETPV-ATPAIPTRTDNDGRGDSVAYR
DHTDDSDNSDESHHSDESDELVTDF----PTDFPGTPV-VTPAVPTRDTNDGRGDSVAYR
DHTDDSDNSDESHHSDESDELVTDF----PTDFPGTPV-VTPAVPTGDTNDGRGDSVAYR
DRTDDSDNSDESHHSDESDELVTDF----PTDFPGTPF-ATPAVPTIDTNDGRGDSVAYG
DHTDDSDNSDESHHSDESDELVTDF----PTDFPGTPF-ATPAVPTIDTNDGRGDSVAYG
GHTDDSDNSDESHHSDESDELVTDF----PTDFPGTPF-ATPAVPTIDTNDGRGDSVAYG
DHTDDSDNSDESHHSDESDELVTDFPTDFPTDFPGTPF-ATPAVPTIDTNDGRGDSVAHG
..** .***** :***** :***** ** . * * ** ** * :***** :

XM_008574253.1: <i>Galeopterus variegatus</i>	LRSKSKKFHRADVQYPDTTEEDLTSHVSEEFDDAH---KATPVAQGLSVPSDWDSHGKD
XM_016213045.1: <i>Miniopterus natalensis</i>	LKSKSKKFHRPAAQYPPATEEDLTSHVSENEADEAH---KAVLVAQGLHVASDWDSHGRE
XM_019668067.1: <i>Hipposideros armiger</i>	LRSKSKKFHRSAIQYPPATEEDLTSHMSEEMDDAH---KAVLVAQGLQVASDWDSHGKD
XM_019719344.1: <i>Rhinolophus sinicus</i>	LRSKSKKFHRSAVQYPPATEEDLTSHVSEEDVDDAH---KAILVAQGLQVASDWDSHGKD
XM_016161109.1: <i>Rousettus aegyptiacus</i>	LKSKSKKFHRSVVQYPPATEEDLTSHVSEKEMDDVRKAVKAVFVAQGLHVASDWDSPGKD
XM_011356310.2: <i>Pteropus vampyrus</i>	LKSKSKKFHRSVVKYPPATEEDLTSHVSEKVVDDARKAVKAVFVAQGLRVASDWDSPGKD
XM_006910714.2: <i>Pteropus alecto</i>	LKSKSKKFHRSVVKYPPATEEDLTSHVSEKVVDDARKAVKAVFVAQGLHVASDWDSRPRKD
XM_014452112.2: <i>Myotis lucifugus</i>	LRLKSKKLHRSVVQYPPATEEDLTSHMSEDEMDDAH---RAILVAQGLPVASDWDSRGKD
NW_007370672.1: <i>Eptesicus fuscus</i>	LRLKSKKLHRSVGVQYPPATEEDLTSHMSEDEMDDAH---RAILVAQGLPVASDWDSRGKD
KE161812.1: <i>Myotis brandtii</i>	LRLKSKKLHRSVVQYPPATEEDLTSHMSEDEMDDAH---RAILVAQGLPVASDWDSQGKD
KB104739.1: <i>Myotis davidii</i>	LRLKSKKLHRSVVQYPPATEEDLTSHMSEDEMDDAH---RAVLAQGLPVASDWDSRGKD
	*: ***** :*****:***: .:.: :*: ***** * **** ::
XM_008574253.1: <i>Galeopterus variegatus</i>	SHETSKLDDQSVETYSYKQSKLHKRKASDESNEHSDGIDSREHSKDSPEFHSEEFHSHED
XM_016213045.1: <i>Miniopterus natalensis</i>	SQETISLLDDHDSVETHSLKLEKEYQLKAIGQSNHSDGIDSPENVKISHEFHSEELGSEYED
XM_019668067.1: <i>Hipposideros armiger</i>	SQETSQQLDDHDSVETLSRKLKSEYKCLKANDESHHPDVIDSQESSKVSHEFHSEEFHSHED
XM_019719344.1: <i>Rhinolophus sinicus</i>	SQETSQQLDDHDSVETYSHKHKEYKCLKAKANDESHSDVIDSQENSKVSEFHSEEFHSHED
XM_016161109.1: <i>Rousettus aegyptiacus</i>	SQETSQQLNDHSTETRSLEHSEAYKCLKANDESNHGADVIDSRENSKVSHEFHSEEFHSHED
XM_011356310.2: <i>Pteropus vampyrus</i>	SQETSQQLDDHSTETHSLEHSEYKCLKANDESNHGADVIDSQENSKVSEFHSEEFHSHED
XM_006910714.2: <i>Pteropus alecto</i>	SQETSQQLDDHSTETHSLEHSEYKCLKANDESNHGADVIDSQENSKVSEFHSEEFHSHED
XM_014452112.2: <i>Myotis lucifugus</i>	SQETSQQLDDHDSVETHSHEAAKEYKCLKAMDASNEHSDGIDSQENSRVSEFHSEELQSHED
NW_007370672.1: <i>Eptesicus fuscus</i>	SQETRHLDDHDSVEIHSQELAKEYKCLKAMDASNEHSDGIDSQENSRVSEFHSEELHSHED
KE161812.1: <i>Myotis brandtii</i>	SQETASQQLDDHDSVETHSREAAKEYKCLKAMDASNEHSDGIDSQENSRVSEFHSEELQSHED
KB104739.1: <i>Myotis davidii</i>	SQETSQQLDDHDSVETHSHELAKGYKCLKAMDASNEHSDGIDSQENSRVSEFHSEELQSHED
	** * :*:*. * * : : : : * * . * : * * * * * : * * * * * : * * *
XM_008574253.1: <i>Galeopterus variegatus</i>	KLVIDPKSKEEDKQLKFRISHELESASSEVD
XM_016213045.1: <i>Miniopterus natalensis</i>	KPALHPKSEEQDKHLKFRVSHELESASSTEVN
XM_019668067.1: <i>Hipposideros armiger</i>	KLVPDPKSQEQDKHLKFRISHELESASSEVN
XM_019719344.1: <i>Rhinolophus sinicus</i>	KLVIDPKSSEEQDKHLKFRVSHELESASSEVN
XM_016161109.1: <i>Rousettus aegyptiacus</i>	KLALDPKSEEQDKHLKFRISHELESASSEVN
XM_011356310.2: <i>Pteropus vampyrus</i>	KLALDPKSEDQDKHLKFRISHELESASSEVN
XM_006910714.2: <i>Pteropus alecto</i>	KLALDPKSEDQDKHLKFRISHELESASSEVN
XM_014452112.2: <i>Myotis lucifugus</i>	KLASAPQSEEQDKHLKFRISHELESASSEVN
NW_007370672.1: <i>Eptesicus fuscus</i>	KLASDPQSEEQDKHLKFRISHELESASSEVN
KE161812.1: <i>Myotis brandtii</i>	KLASAPQSEEQDKHLKFRISHELESASSEVN
KB104739.1: <i>Myotis davidii</i>	KLASDPQSEEQDKHLKFRISHELESASSEVN
	* . * :*:*:*:*:*:*:*:*:*:*:*:*:*

Table S1.8: Osteopontin in Chiroptera. The *Myotis lucifugus* sequence possibly reflects transcription or translation from an alternative start site. The duplication of PTFD in only one representative of *Myotis* could be a mutation or an error in data entry.

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
MKPLEQLNSGQCCLPAASQRRQTRTASSRTGFSLCKQGPTTMRVTVICLCLLGIV
-----YARPCTRNLTLLSFFIF
-----MRIAVICFCLLQVA
-----MRIAVICFCLLQIA
      .: : .: .: :
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
SAFPVKQ-TDSGSSEETH-----NAVS---TEDFSQET
SVSKVKHQADSGSSEKQLYDKYPDAVAWLKPDPSQKETTLLAPQNAVSSSEETDNFKQDT
STFPVKRQADSGSSEKQLYNKYPAVATWLKPDPSHKQTLLASQNTLSSEETDDLKQET
SALPVKH-TDSGSSEKQLYNKYPAIATWLKPDPSQKQTFLAPQNTVSSEETADNKQET
* .  ** : :***** : .          . : * : * : *:
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
APSSNESPEHTDDADDRDGDLSQDALDSHNSDEDDDDDEAEDTSSDESHESSDESDET
LPKSNESHDTNADDEDGDHVD---SRDSDSNESDHNDPPDHSDESHHSESDEEVV
LPKSNESLDQTDVDEDDGDHVD---SQESDSEDHDTDDPYHSDESHHSESDELV
LPKSNESPEHTDQVDEDDGDSQD---TDAN-----DSNDADHSDSHHSESDEEVV
** .*** : :** .**.* . . . * : . . . : * ***** .
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
TEFPTDNPATIVFTPAPTGD-YDGRGDSVAYGLRSKAKKLHRLDVQ---ETEEDLTSYM
TDFTTDAPATP----VVPTEDAYNGRGDSVAYGLESKS-KLYRSKIQFDATEEDLTSHM
TDFPTEVPATPVFTPAVPTVETDYDGRGDSVASRLKSKSKKIYRSVIQYPPDTE-ELTSHM
TDFPTDVPATSVFTPPVPTGDTYDGRGDSVAYGLRSKSKKFRRSEVQYPPATEEDVTSHV
*: * : * * . * * : :***** * . ** : * : * : * * ** : : *:
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
ESREGGDPK---VAKHLQVSATWDSDESPGKS-----
ERGLDDAHRVIHVARRLNRASDWDSHGKDSQETRQLD-DHSVETHSHEQSKS--RKASH
RSKELDDVPKAVISVVHLKRASDWDSHPQDSHEVSQLEISHSVETHSHEQSK--ELEAKD
ESEEVDAPKAILVAQLHRSSDWDSRGKDSQETSQPD-DRSVETHSREHSKEFKLKAED
. . . * : . . : * : : * * . . .
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
-----GVSH----ESHSLNSLPEPQS-QEDRQLKFRVSHIELDSASSE
ESNEHSDVIDSRENSKVSHEFNQSESHSHEDKLVLGPKSKEEDKHLKFHTSHELESASSE
ESNERSDMIQSQEIFSKVSHEFNQSQEFHSQEDKPHRDPKSVESQHLKFRVSHIELDSASSE
ESSERSDVIESQDNSKVSHELHSQEFHSREDKLVPLKSEEDKHLKFRVSHIELDSASSE
          ***       * * * : .   : * : : : * * : * * * * * *
```

XM_016191814.1:*Erinaceus europaeus*
 XM_012523397.2:*Dasypus novemcinctus*
 XM_007951712.1:*Orycteropus afer afer*
 XM_007184118.1:*Balaenoptera acutorostrata scammoni*

```
VN
IN
TN
VN
*
```

Table S1.9: Osteopontin in various Eutheria. The available *Dasypus novemcinctus* sequence may be reflective of transcription or translation from an alternative start site.

XM_012934005.1:*Sorex araneus*
XM_004681418.2:*Condylura cristata*
XM_006885312.1:*Elephantulus edwardii*
XM_012928520.1:*Ochotona princeps*
KB320503.1:*Tupaia chinensis*
D11411.1:*Cryctolagus cuniculus*

MARLWVQVQRPLRGLRAHVYDEGQAMSGMERGIGPIESAVTFKAREDQAAGSRQQPEEAG

XM_012934005.1:*Sorex araneus*
XM_004681418.2:*Condylura cristata*
XM_006885312.1:*Elephantulus edwardii*
XM_012928520.1:*Ochotona princeps*
KB320503.1:*Tupaia chinensis*
D11411.1:*Cryctolagus cuniculus*

-----MRTAVICLCLLGIASALPVKTT-
-----MRIAVICFCLLGIIVSALPVKQG-
-----MRIAVICFCLLGIAYALPVKHQA
-----MRIAMISFCLLGMAYALPIKHS-
-----ASHVGT AQLLVGTRPGEP AVRSAAVRAFQGF PWKNHNMRVAVICFCLIGIAYALPVKQP-
-----MRIAVICFCLLGMAYALPVKHA-
** *:*.:***:*. **:*

XM_012934005.1:*Sorex araneus*
XM_004681418.2:*Condylura cristata*
XM_006885312.1:*Elephantulus edwardii*
XM_012928520.1:*Ochotona princeps*
KB320503.1:*Tupaia chinensis*
D11411.1:*Cryctolagus cuniculus*

DSGSSEEKQ-----TLPSKSTESE
DSGSSEEKQ-----SLPSVSDASN
TSGSSEEKQLNLYKYPDAVATWLKPDPSHKQALLPPQTAVSSEETDLLKQETLPSQSNESP
DSGSSEEKQLYQKSPDDLAAWLS PDPSQKQNL LSVKDDASSEKSDFKQQTLP SKLQESH
DSGSSEERQLYNKY PDAVATWLKPDPSL KQNL LAPQH AVSSEETDDLKQETLP STSNESH
DSGSSEEKQLYHKHPDALATWLNPDPSQKQNL LTPQNA MSSEKDDLKQETLP SKSIESH
*****:.* :*** **

XM_012934005.1:*Sorex araneus*
XM_004681418.2:*Condylura cristata*
XM_006885312.1:*Elephantulus edwardii*
XM_012928520.1:*Ochotona princeps*
KB320503.1:*Tupaia chinensis*
D11411.1:*Cryctolagus cuniculus*

DHTDDLDDDDQADSQ---DSVDEADDDDDDD-----NNSDHSDESEETTTDSSMD
----DVDDVDDGDNTE---ESRDSTDSDDDDHSDD-----SDESHHSDESEDEMATDSPTD
DHTDDVDEDDIDHV---DSKDSTESDDSEDHTDDDPYHSDESHHSDESEDELPTDSPTD
DHMDDIDEDEDHNDSHSFI DSNDADDDDDDD-NQADD SHHSDESHHSDESEVVTDL LLE
DHMDDVDEDDGNHV---DSQDS-DDSDDT-DHPDDSHHSDESHHSDESEDELVTDFPTD
DHMDDIDEDEDDHV---DNRDS-NESDDA-DHPDDSHHSDESHQSDSEDEV-TVYPTD
:: : : :. * : : .* : * . . : : : : : : : : *

XM_012934005.1:*Sorex araneus*
XM_004681418.2:*Condylura cristata*
XM_006885312.1:*Elephantulus edwardii*
XM_012928520.1:*Ochotona princeps*
KB320503.1:*Tupaia chinensis*
D11411.1:*Cryctolagus cuniculus*

VPATLVFTPAVPTRDTNDGRGDSVDYGLR-LKSKKLLSSETQYSE----DLTSHMESEDED
LPATVDYTPVVFTRDTYDGRGDSVAYGLK-SKSIKFYSAEDQYPDATKEDLASQMESREM
DPSTPVFSPAMPTVDPYDGRGDSLGYGLK-SRSRP----QIQYSD-ETEDFFSHVSKSKEL
SPATTAFTTEVVPTIETYDGRGDSVAYRLK-SKSKVLRISTAQFLGAAEDDLLSSHVDSQDM
GPVTPVFTPAAPTMDAYDGRGDSVYRVR-SKPKTFRMSDVQYPPATEEDLASHLESKEL
DAATTVFTEVVPTVETDYDGRGDSVAYRLKR SKSKM FHVSN AQYPGASEEDLLSSHVDS EDL
* : : . * : ***** : * : : . * : * : * : : * :

XM_012934005.1: <i>Sorex araneus</i>	TQE-----SAPSLQMTSDGSDSHQEPAKSP-----
XM_004681418.2: <i>Condylura cristata</i>	RNGPKATLVALNLQSTSDVDSQGEDSFQEK---DDSL-ENNGFEHSQEQYKLIKANDESSQ-
XM_006885312.1: <i>Elephantulus edwardii</i>	KDAHKIIPVVQALKKSSVWDSYQQDSHEPSQLSDLHSMETHSQEQSKEYTLKTDDVSSE-
XM_012928520.1: <i>Ochotona princeps</i>	DDARKAVLVAQHLNAPSDWDNHD-----DSKMDDHGMESQSRERVKQYKRDVKDDSMER
KB320503.1: <i>Tupaia chinensis</i>	DDEHKTIPARALHVPDWDSDHCKGKSQE-TSQLDDHSVETHSGEQAKRYKQKASVESNE-
D11411.1: <i>Cryctolagus cuniculus</i>	DDTPRAIPVAQHLNVPDWDSDQEKDSDH-VSQVDDHSVETQSHEQARQYKREANDNSVE-
	: . * : * * .
XM_012934005.1: <i>Sorex araneus</i>	-----ASLESHSRESQSLEGDA---QSPRVEEAHLKFRVSHELSESASSEAK
XM_004681418.2: <i>Condylura cristata</i>	-----KTPESSHLSHSQEFHNQEEKLDDLDPKSVVEEDTHLKFRVSHELDSTISSEVN
XM_006885312.1: <i>Elephantulus edwardii</i>	HSDMLNSQEISKSNLEFHSQEFHSHEDKLHPDPKSTEE-EHLKFRNSHELESASSEAN
XM_012928520.1: <i>Ochotona princeps</i>	HSYSVDSRESSKVSQESH-----SHEDMLAIEPKSTEEDKPGKSSVSQELDSASSEIN
KB320503.1: <i>Tupaia chinensis</i>	HSDVIESQESAKVSHEFHSHREFLSHEDKLVLNKSKQEEDKHLKFRVSHELDSASSEVN
D11411.1: <i>Cryctolagus cuniculus</i>	HSHSIDSQESSKVSQESQSREFRSHEDKLAIEPKSEEDEEHRQLRVSHELDSTISSEIN
	. : . * . : : * : * : * : * : * : *

Table S1.10: Osteopontin in Lagomorpha and similar orders. As alternative splicing of exons 4 or 5 has only been shown to occur in humans, there is no experimental evidence that osteopontin actually misses an internal sequence in *Sorex araneus* or *Condylura cristata*.

XM_013029816.1:*Dipodomys ordii*
XM_023564932.1:*Cavia porcellus*
XM_004629257.2:*Octodon degus*
NW_004955474.1:*Chinchilla lanigera*
KN124024.1:*Fukomys damarensis*
JH171653.1:*Heterocephalus glaber*
XM_005341895.3:*Ictidomys tridecemlineatus*
XM_015499141.1:*Marmota marmota marmota*
AB001382.1:*Rattus norvegicus*
XM_021211046.1:*Mus pahari*
J04806.1:*Mus musculus*
XM_021162825.1:*Mus caroli*
HM626723.1:*Apodemus agrarius*(partial)
XM_021659705.1:*Meriones unguiculatus*
XM_013350872.1:*Microtus ochrogaster*
XM_006975432.2:*Peromyscus maniculatus bairdii*
AJ890352.1:*Mesocricetus auratus*
HQ647182.1:*Cricetulus barabensis*(partial)
XM_007638075.2:*Cricetulus griseus*
NW_004504357.1:*Jaculus jaculus*
XM_020154612.1:*Castor canadensis*
XM_008830194.2:*Nannospalax galili*

-----MRIEVIFFCLIGITHSLPI---ESGSSEENQIFNKKYPISEASWLKLDLSEKNNL
-----MRVTVICFCLLGIASSFPVKQADSGSSEKLLHD-NKLPEAASSWLKSDPSQKQNL
-----MRIAGICFCLLGIAYSLPVKEADSFSSDHLRD-NKFPAMALWLKTDPSLKENI
-MMLMLYFSLSGATATGQRWQKRTHNITSAAEELDFLY-NKLPEAMSSWLKSDPSQKENL
-----MRIALICFCLLGIAYSLPVKQADSGSSEKLLY-NKLPEAVSSWLKPDPSQKQNL
-----MRIAVICFCLLGIYSLPVNOADSGSSEKPLY-NKLPEAVSSWLKPDPSQKQNL
-----MRFVAVIFFCLLGIAYSPVKQADSGSSEERQLY-NKHDAVATWLKPDPSQKQNL
-----MRFVAVIFFCLLGIAYSPVKQADSGSSEERQLY-NKHDAVATWLKPDPSQKQNL
-----MRLAVVCFCLFGLASCLPVKVAEFGSSEKHAHY-SKHSDAVATWLKPDPSQKQNL
-----MRLAVICFCLFGIASSLPVKVTDSGSSEK-----
-----MRLAVICFCLFGIASSLPVKVTDSGSSEK-LY-SLHDDPIATWLVPDPSQKQNL
-----MRLAVICFCLFGIASSLPVKVTDSGSSEKMLY-SLHDDPIATWLVPDPSQKQNL
-----PDPSPQKQTL
-----MRFVAVICFCLFGIAAALPVKVSVSGSSEKLLY-NKHDAVATWLRPDPSEKQNL
-----MRFVAVICFCLLGIASSFPVKVTDSGSSEENLLS-SKHTDAVATWLEPDPSPQKQNL
-----MRFVAVVCFCLFGIASSLPVKVADSGSSEKLLY-SKHSDAVATWLEPDPSPQKQNL
-----MRFVAVICFCLFGIASSLPVKVADSGSSEKLLHY-SKHTDAVATWLEPDPSPQKQNL
-----MRLAVVCFCLFGIASSLPVKVADSGSSEKLLHY-SKHTDAVATWLEPDPSPQKQNL
-----MRFVAVICFCLFGIASSLPVKVADSGSSEKLLHY-SKHTDAVATWLEPDPSPQKQNL
-----MRAAMLCVCLFGLASCLPVKQADSGSSEETLIY-NKHLDAVATWLKPDPSQKQNL
-----MRIAVIFFCLLGIAYSLPVKQADSGSSEKQLFNNKHADAVALWLKPDPSQKQNL
-----MKIAVICFCLFGIASSLPVKLIDSGSSEKQLH-SKHDAVATWLKPDPSQKQNL

XM_013029816.1:*Dipodomys ordii*
XM_023564932.1:*Cavia porcellus*
XM_004629257.2:*Octodon degus*
NW_004955474.1:*Chinchilla lanigera*
KN124024.1:*Fukomys damarensis*
JH171653.1:*Heterocephalus glaber*
XM_005341895.3:*Ictidomys tridecemlineatus*
XM_015499141.1:*Marmota marmota marmota*
AB001382.1:*Rattus norvegicus*
XM_021211046.1:*Mus pahari*
J04806.1:*Mus musculus*
XM_021162825.1:*Mus caroli*
HM626723.1:*Apodemus agrarius*(partial)
XM_021659705.1:*Meriones unguiculatus*
XM_013350872.1:*Microtus ochrogaster*
XM_006975432.2:*Peromyscus maniculatus bairdii*
AJ890352.1:*Mesocricetus auratus*
HQ647182.1:*Cricetulus barabensis*(partial)
XM_007638075.2:*Cricetulus griseus*
NW_004504357.1:*Jaculus jaculus*
XM_020154612.1:*Castor canadensis*
XM_008830194.2:*Nannospalax galili*

LAPQNVLSSEETDVLQPETFSSNSNESH--MDELNE--DDIGNHMSQDFTESDSDHDS
LAPQNAVMSSEETNDLKQETLPSNESHSHDMDDLDEDD--GDL-----DTD---DPN
IVPQNVVSSEEDNGLQOETLPSNESHSHDMDDDDDDRDE-----DSVDT----
LAPQNAVVSSEETDVLKQETLPSNESHSHDMDDVDDDD--GDC-----DTAD\$ADTD
LESQNAVVSSEETDVLKQETLPSNERNRHDHMDVDDDD--GDC-----DSVDTDDDD
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDVDEDD--GDC-----DSVVDVDDDD
LAPQNAVVSSEERDDFKQETLPSKSNESHSHDMDDVDDDD--GDHVNNQDSTDSDD\$DED-
LAPQNAVVSSEERDDFKQETLPSKSNESHSHDMDDVDDDD--GDHVNNQDSTDSDD\$DDD-
----NAVSSSEKDDFKQETLPSNESHSHDMDDDDDDDDDDGDHAESEDSVDS-----
LAPQNAVVSSEKDDFKQETLPSNESHSHDMDDDDDDDDDDGDHAESEDSVDS-----
LAPQNAVVSSEKDDFKQETLPSNESHSHDMDDDDDDDDDDGDHAESEDSVDS-----
LALQNAVVSSEKDDFKQETLPSNESHSHDMDDDDDDDDDDGDHAESEDSVDS-----
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDDDDDDDDGDHTE\$KDSLSDSDSDS--
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDD--DDDDGDHAE\$QDSVDSDE\$SDD-
LAPQNVVSSEETDALKQETLPSNESHSHDMDDDD--DDDRHAD\$QDSVDSDE\$SDED-
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDN--DDDDGDHANS\$QDSVDSDE\$SDDD
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDD--DDNDGDHANS\$QDSVDSDE\$SDEDD
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDD--DDNDGDHANS\$QDSVDSDE\$SDEDD
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDDD--DDDDGDHVD\$SHDSVDSDE\$SDDTD
LAPQNVVSSEETDVLKQETLPSNESHSHDMDDMD--DEDDGDHVD\$QDSVDSDE\$SDDTD
LAPQNAVVSSEETDVLKQETLPSNESHSHDMDDDD--DDDRDHVDS\$QDSVDSDE\$D\$DAD
: :**** : : **: * . : : : * : : : : :

XM_013029816.1:*Dipodomys ordii*
 XM_023564932.1:*Cavia porcellus*
 XM_004629257.2:*Octodon degus*
 NW_004955474.1:*Chinchilla lanigera*
 KN124024.1:*Fukomys damarensis*
 JH171653.1:*Heterocephalus glaber*
 XM_005341895.3:*Ictidomys tridecemlineatus*
 XM_015499141.1:*Marmota marmota marmota*
 AB001382.1:*Rattus norvegicus*
 XM_021211046.1:*Mus pahari*
 J04806.1:*Mus musculus*
 XM_021162825.1:*Mus caroli*
 HM626723.1:*Apodemus agrarius*(partial)
 XM_021659705.1:*Meriones unguiculatus*
 XM_013350872.1:*Microtus ochrogaster*
 XM_006975432.2:*Peromyscus maniculatus bairdii*
 AJ890352.1:*Mesocricetus auratus*
 HQ647182.1:*Cricetulus barabensis*(partial)
 XM_007638075.2:*Cricetulus griseus*
 NW_004504357.1:*Jaculus jaculus*
 XM_020154612.1:*Castor canadensis*
 XM_008830194.2:*Nannospalax galili*

DHEHSHHHHDHHEH HKNSHSHSESEEVISL-PPPLTLETVPVFTPVFPAMSTLE-SHGDSN
 D-----EDDAHHSNESDHSDESEDEVVTGGPPRIGSETPTSQPIVLTIIETFD-GRGDSL
 -----DDPDHHSDES DHSDESEDEVVTEAP-TEGPETPAFSPIVPTVEIYD-GRGDSL
 D-----ADDSHHSDES DHSDESEDEVVTEAP-TNGPETPVFTPIVPTVETVD-GRGDSL
 H-----PDDSHHSDES DHSSESEDEVTDAP-TNSPETPVFTPIVPTIETIYDDGRGDS
 H-----PDDSHHSDES DHSDESEDEVVTDAP-TNGPETPVFTPIVPTVETVD-GRGDSL
 -----DSHHSDES SHHSDESEDEVVTEAP-TDGPDTVPVFTQIVPTVETVD-GRGDSV
 -----DSHHSDES SHHSDESEDEVVTEAP-TDGPDTVPVFTQIVPTVETVD-GRGDSV
 -----DESDES SHHSDESEDESFTAS---TQADVLTPVIAPTVDVDPD-GRGDSL
 -----EESDES SHHSDESEDETFTAS---TQADTFTPIVPTVDVDPD-GRGDSL
 -----DESDES SHHSDESEDETFTAS---TQADTFTPIVPTVDVDPN-GRGDSL
 -----DESDES SHHSDESEDETFTAS---TQADTFTPIVPTVDVDPD-GRGDSL
 -----NESDESH-----
 -----DSHHSDESEESVTA---TLQTDVFTPLVPTVDTPA-ARGDSL
 -----D-QPDDSHHSDESESVTA---TTQTEIIFTPVPTVEIIPD-GRGDSL
 -----D-HPDDSHHSDESESFDT---TTQTEVFTPVPTVDIPD-GRGDSL
 H-----PDDD-HPDDSHHSDESESVTA---TTQTEVFTPAVPTVEIIPD-GRGDSL
 -----HPGDSHHSDESEDESITV---TTQTEVFTPAVPTVEIPN-GRGDSL
 -----HPDDSHHSDESEDESITV---TTQTEVFTPAVPTVEIPN-GRGDSL
 H-----HDDSHHSDES SHHSDESEDELVTDVP-TNGEQTQDFTPVPTVETFD-GRGDSV
 H-----PDDSHHSDES SHHSDESEDELFTSSP-TTNGEQTQDFTPVPTVETFD-GRGDNV
 D-----PDDSHHSDES SHHSDESEDELFTDTP-TTIPQTEVFTPVPTVYITVD-ARGDSL

.*.

XM_013029816.1:*Dipodomys ordii*
 XM_023564932.1:*Cavia porcellus*
 XM_004629257.2:*Octodon degus*
 NW_004955474.1:*Chinchilla lanigera*
 KN124024.1:*Fukomys damarensis*
 JH171653.1:*Heterocephalus glaber*
 XM_005341895.3:*Ictidomys tridecemlineatus*
 XM_015499141.1:*Marmota marmota marmota*
 AB001382.1:*Rattus norvegicus*
 XM_021211046.1:*Mus pahari*
 J04806.1:*Mus musculus*
 XM_021162825.1:*Mus caroli*
 HM626723.1:*Apodemus agrarius*(partial)
 XM_021659705.1:*Meriones unguiculatus*
 XM_013350872.1:*Microtus ochrogaster*
 XM_006975432.2:*Peromyscus maniculatus bairdii*
 AJ890352.1:*Mesocricetus auratus*
 HQ647182.1:*Cricetulus barabensis*(partial)
 XM_007638075.2:*Cricetulus griseus*
 NW_004504357.1:*Jaculus jaculus*
 XM_020154612.1:*Castor canadensis*
 XM_008830194.2:*Nannospalax galili*

APEGKKS KSSDITNVQVSPFTDMFNGSKQSSLLGMQAVHIQLSFSKHKHNIFSKEGKEGKE
 A-YGLRSRS-KKLPV-----
 A-YLSRSRS-KKLHI-----
 A-YRLRSRS-TKLHI-----
 A-YGLRSRS-KKFSI-----
 A-YGLRSRS-KKFHI-----
 D-YGVRSKS-KKFYI-----
 D-YGVRSKS-KKFYI-----
 A-YGLRSRS-RSFPV-----
 A-YGLRSRS-RSFQV-----
 A-YGLRSRS-RSFQV-----
 A-YGLRSRS-RSFQV-----

 A-YGLRA--RKLVL-----
 A-YGLQSKS-RKIHI-----
 A-YGLRSRS-RKFHI-----
 A-YGLRAKS-RKFHI-----
 A-----
 A-YGLRSRS-RKFHI-----
 V-YRLKSKS-RTFHI-----
 A-YGLRSRYLKKFDI-----
 A-YGLRSRS-RKIHI-----

XM_013029816.1:dipodomys_ordii GKEGKEGKEGKEGKEGKESHDEHLEHKLHDTLRVPIPIPHITHEDFSHPWES-K
XM_023564932.1:Cavia porcellus -----SDSQFSDVITDEDLTSHVKSQE
XM_004629257.2:Octodon degus -----SDAQDPDATDEDLTSHVSESQE
NW_004955474.1:Chinchilla lanigera -----SDAQDPDATDEDLTSHVSESQE
KN124024.1:Fukomys damarensis -----SDAQYRDATDEDLTSHAESQE
JH171653.1:Heterocephalus glaber -----SDPQYPAATDKDLTSNVSESQE
XM_005341895.3:Ictidomys tridecemlineatus -----SEVQYDPATDEDLTSHMESSE
XM_015499141.1:Marmota marmota marmota -----SEVQYDPATDEDLTSHMESAE
AB001382.1:Rattus norvegicus -----SDEQYDPATDEDLTSRMKSQE
XM_021211046.1:Mus pahari -----SDEQYDPATDEDLTSHVNSGE
J04806.1:Mus musculus -----SDEQYDPATDEDLTSHMKSGE
XM_021162825.1:Mus caroli -----SDEQYDPATDEDLASHVNSGE
HM626723.1:Apodemus agrarius(partial) -----
XM_021659705.1:Meriones unguiculatus -----SDEQYSDATDEDLPSQV----
XM_013350872.1:Microtus ochrogaster -----PSDQFSDIIGEDLTSHLKSKE
XM_006975432.2:Peromyscus maniculatus bairdii -----SDDQYDPATDEDFTSHMKSKE
AJ890352.1:Mesocricetus auratus -----SDDQYDPDTDEDLSSHMKSKE
HQ647182.1:Cricetulus barabensis(partial) -----
XM_007638075.2:Cricetulus griseus -----SDDQDPDATDEDLSSHMKSKE
NW_004504357.1:Jaculus jaculus -----SDAKYDPATEEDLTSHMESSE
XM_020154612.1:Castor canadensis -----SDAQFSDATEEDLTSHIESSE
XM_008830194.2:Nannospalax galili -----SDIQYDPATHEDLTSHMESKD

XM_013029816.1:Dipodomys ordii PHDTLKVPIPIPHIRFPTTEWDTLELEQHGLELRRSESKGSES-----NNNNHNNGDQ
XM_023564932.1:Cavia porcellus SHEAHQAVLLAQHLNVPDSDWDSHGKDSHESSQLDDELSVETHSQEHPREHTRKARDHSG--
XM_004629257.2:Octodon degus SSSAAHKAVLVAQRLNVPDSDWDSHGKDSHESSQLDDELSVETHSQEQRERKRKARDNSG--
NW_004955474.1:Chinchilla lanigera SSSDAHKAVLVAQRLNVPDSDWDSHGKDSHESSQLDDELSVETHSQEKSKEHKRKARDNSG--
KN124024.1:Fukomys damarensis SSSDAHKAVLVAQHLNVPDSDWDSHGKDSHESSQLDDEQNVEHSQEQSREHKRKARDNS--
JH171653.1:Heterocephalus glaber SSSDAQKAVLVAHRLNMPDSDWDSRGKDSHESSQLDDELSVETHSQEQSREHKRKARDNS--
XM_005341895.3:Ictidomys tridecemlineatus LNDAHKAIPVAHRLKVPDSDWDSHGKDSHETSQDDELSVETHSQEQTREYKRNARDN----
XM_015499141.1:Marmota marmota marmota LNDAHKVIPVAHRLKVPDSDWDSHGKDSHETSQDDELSVETHSQEQTREYKRNARDN----
AB001382.1:Rattus norvegicus SDEALKVIPVAQRLSVPDSDQDSNGKDSHESSQLDEFSVETHSLEQSKKEYKQASHESTEIQ
XM_021211046.1:Mus pahari SKEALKVIPVAQRLSVPDSDQDSNGKASHESRQDDEFSLETHSLEQSKENK--ASHESADQ
J04806.1:Mus musculus SKESLDVIPVAQRLSMPDSDQDNGKGSHESSQLDEFSLETHSLEHSHKESQ-----
XM_021162825.1:Mus caroli SKESLDVIPVAQRLSMPDSDQDNGKGSHESSQLDEFSLETHSLEHSHKESH-----
HM626723.1:Apodemus agrarius(partial) -----
XM_021659705.1:Meriones unguiculatus -----YVPSDQDSNGKDSHESSQLDELSAETYRDGQAEHKKQD-SHDS---
XM_013350872.1:Microtus ochrogaster FDDVLKVIPVVRHLNVPDSDQDSHGKDSHESSQLDEFSVETQSEHQEQEDKQKASHES---
XM_006975432.2:Peromyscus maniculatus bairdii LDDALKVIPVAHRLNVPDSDWDSHGKDSHESSQLDEFSVETHSLEQSKEDKQKASHES---
AJ890352.1:Mesocricetus auratus LVDTLKVIPVAHRLNVPDSDQDSHGKDSHESSQLDEFSVETHSLEQSKEDKQKASHES---
HQ647182.1:Cricetulus barabensis(partial) -----
XM_007638075.2:Cricetulus griseus LVDTLKVIPVVRHLNVPDSDQDSHGKDSHESSQLDEFSVETHSLEQSKEDKQKASHES---
NW_004504357.1:Jaculus jaculus SDDALKVVPVAHRLHVPDSDWDSHGKDSHESSQLDEFSVETQSEHQPREYKQKTSHESES---
XM_020154612.1:Castor canadensis SDDALKVIPVAHRLKVPDSDWDSHGKDSHESSQLDEFSVETHSLEQSKEDKQKASHES---
XM_008830194.2:Nannospalax galili LDDLLKAVPVAQRLNVPDSDWDSHGKDSHESSQLDEFSVETHSLEQSKEDKQKASHES---

XM_013029816.1: <i>Dipodomys ordii</i>	FSVSKKSKYKP-----DGPDS-L-----
XM_023564932.1: <i>Cavia porcellus</i>	-----EHSDAVDS-REGARASPAIRSQEHHSQELRSQEHHSQELRSQE
XM_004629257.2: <i>Octodon degus</i>	-----EHSDVVDVDS-QEGAKASQEL-----
NW_004955474.1: <i>Chinchilla lanigera</i>	-----EHSDQIDS-QESARASQEL-----
KN124024.1: <i>Fukomys damarensis</i>	-----EHSDVIES-QEGARASQEL-----
JH171653.1: <i>Heterocephalus glaber</i>	-----EHSDVIDS-QEGARASQEL-----
XM_005341895.3: <i>Ictidomys tridecemlineatus</i>	-----SSEHSDVIDS-QESSRVSQEFQ-----
XM_015499141.1: <i>Marmota marmota marmota</i>	-----SSEHSDVIDS-QESSRVSQEFQ-----
AB001382.1: <i>Rattus norvegicus</i>	S-DAIDS-DAIDSAEKPDATDAERSDAIDS-QASSKASLEHQ
XM_021211046.1: <i>Mus pahari</i>	-----SDVIESADQSDVIDS-QASFKASLEHQ-----
J04806.1: <i>Mus musculus</i>	-----ESADQSDVIDS-QASSKASLEHQ-----
XM_021162825.1: <i>Mus caroli</i>	-----ESADQSDVIDG-QASSKASLEHQ-----
HM626723.1: <i>Apodemus agrarius</i> (partial)	-----TEQSDEMY-SKEKLSKASWEAQ-----
XM_021659705.1: <i>Meriones unguiculatus</i>	-----TELSDGIDS-KESSRASQAHA-----
XM_013350872.1: <i>Microtus ochrogaster</i>	-----TELSDVIDS-KESSKASQEHQ-----
XM_006975432.2: <i>Peromyscus maniculatus bairdii</i>	-----TELSDVIDS-KESSKASQEHQ-----
AJ890352.1: <i>Mesocricetus auratus</i>	-----TELSDVIDS-QESSKASQEHQ-----
HQ647182.1: <i>Cricetulus barabensis</i> (partial)	-----TELSDVIDS-KESSKASQEHQ-----
XM_007638075.2: <i>Cricetulus griseus</i>	-----TELSDVIDS-KESSKASQEHQ-----
NW_004504357.1: <i>Jaculus jaculus</i>	-----IEHSDGIDS-SESSKVSQEFH-----
XM_020154612.1: <i>Castor canadensis</i>	-----REHSDVIDS-QESSKVSQEVH-----
XM_008830194.2: <i>Nannospalax galili</i>	-----SEHADVIDN-RENSKASQESH-----

XM_013029816.1: <i>Dipodomys ordii</i>	--GSSKVSHKLSHNEFLSQEDMLVLDPRSIE-DKHPNFRISHELDSTSSSEAN
XM_023564932.1: <i>Cavia porcellus</i>	LRSQEHHSQELHSPELHSPELHSPVDPKSKEDEHLKIRISHELDSSASSEAN
XM_004629257.2: <i>Octodon degus</i>	-----PSQEFPSHEDPQSKEEGRLEVRVSQELDSASSEAK
NW_004955474.1: <i>Chinchilla lanigera</i>	-----HSQEFHSHEDPQSREEGEHLKMRVSHELDSSASSEAN
KN124024.1: <i>Fukomys damarensis</i>	-----H-----SHEDPKSKQDEHLKMSASRELDSSASSEAN
JH171653.1: <i>Heterocephalus glaber</i>	-----HSQEFPSHEDPKSKEDEHLKIRVSHELDSSVSSEAN
XM_005341895.3: <i>Ictidomys tridecemlineatus</i>	--SHES-----HSKEDKLVLDPKSKE-DKHLIFHVSHEIESASSEVN
XM_015499141.1: <i>Marmota marmota marmota</i>	--SHES-----HSNEDKLVLDPKSKEEDKHMIFRVSHEIESASSEVN
AB001382.1: <i>Rattus norvegicus</i>	--SHEF-----HSHEDKLVLDPKSKEEDRYLKFRISHEIESSSSEVN
XM_021211046.1: <i>Mus pahari</i>	--SHKF-----HSHEDKLVLDPKSKEEDRYLKFRFSHELDSSSSEIN
J04806.1: <i>Mus musculus</i>	--SHKF-----HSHKDKLVLDPKSKEEDRYLKFRISHEIESSSSEVN
XM_021162825.1: <i>Mus caroli</i>	--SHKF-----HSHKDKLVLDPKSKEEDRYLKFRISHEIESSSSEVN
HM626723.1: <i>Apodemus agrarius</i> (partial)	-----SPEF-----HSQEDKLVLDGAEKSKDENSLKFRVSHELDSSSSEVN
XM_021659705.1: <i>Meriones unguiculatus</i>	--SHEF-----HSHEDKLVLDGSKSKEEDANSLKFHISHEIESSSSEVN
XM_013350872.1: <i>Microtus ochrogaster</i>	--SHEF-----HSQEDKLVLDVSKSKEEDTNLKIYISHEIESSSSEVN
XM_006975432.2: <i>Peromyscus maniculatus bairdii</i>	--SHEF-----HSQEDKLVLDVSKSKEEDTNLKIYISHEIESSSSEVN
AJ890352.1: <i>Mesocricetus auratus</i>	--SH-----EDKLVLDVDFKSKEDTNHLKIRISHEIESSSSEVN
HQ647182.1: <i>Cricetulus barabensis</i> (partial)	-----SH-----EDKLVLDVDFKSKEDTNHLKIRISHEIESSSSEVN
XM_007638075.2: <i>Cricetulus griseus</i>	--SH-----EDKLVLDVDFKSKEDTNHLKIRISHEIESSSSEVN
NW_004504357.1: <i>Jaculus jaculus</i>	--SQEFHHSQELHSQEVHSQEDKLVLDVDPKSREEEHLKFRISHELDSTSSSEVN
XM_020154612.1: <i>Castor canadensis</i>	--SHES-----TSLEDKVPVLDPKSQQEDKHLKYRISHELDSSASSEVN
XM_008830194.2: <i>Nannospalax galili</i>	--SHEF-----HSHEDKLVLDPKSKEEDKYLKFRISHELDSSASSEVN

Table S1.11: Osteopontin in Rodentia. The available *Chinchilla lanigera* sequence possibly reflects the transcription or translation from an alternative start site. Uniquely, the *Dipodomys ordii* sequence contains a long repetitive insert. Further downstream a repetitive insert is reported only for *Cavia porcellus*.

AKHW03002540.1:Alligator mississippiensis
NW_017728948.1:Crocodylus porosus
XM_006018107.1:Alligator sinensis
XM_019526454.1:Gavialis gangeticus
XM_006135415.2:Pelodiscus sinensis
XM_005292014.2:Chrysemys picta bellii
XM_007066639.1:Chelonian mydas

```
-----MGLINSHIPGKVNITMKI AVLCLCLIGIAFALPVSKSKHQPDSRSSEERDD  
MIFICRYRTDCISGFPCSKVNITMKI AVLCLCLIGIAFALPVNKSKHQPDSRSSEERDD  
-----MTSTYMLWQKGVIMVNITMKI AVLCLCLIGIAFALPVSKSKHQPDSRSSEERDD  
-----MKI AVLCLCLIGIAFALPVSKSKHQPDSRSSEERDD  
-----MKLAVFCLCLIGMTFALPVSKSNHHAI SESSEEKHN  
-----MKI AVLCLCLISIAFALPVSKLKRHAI SESSEENHD  
-----MKI AVLCLCLISIAFALPVSKSKHHAISESSEDNHD  
** *:*****.:*****.* ::: *.***.:.:
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AKHW03002540.1:Alligator mississippiensis
NW_017728948.1:Crocodylus porosus
XM_006018107.1:Alligator sinensis
XM_019526454.1:Gavialis gangeticus
XM_006135415.2:Pelodiscus sinensis
XM_005292014.2:Chrysemys picta bellii
XM_007066639.1:Chelonian mydas

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SRSHHHRRHHL-RVQTESRVSPPPWAQEVHVL PQQTSFSSEESVEVPKRQIFQVA-SRSTE  
SRSHH--RHHH-HVQTESRVSPPPRAQEVHVL PQQTSFSSEESVEVPKRQIFQVA-SRSTE  
SRSHHHHRHHH-RVQTESRVSPPPWAQEVHVL PQQTSFSSEESVEVPKRQIFQVA-SRSTE  
SRSHHHHRHHH-RVQTESRVSPPPRAQEVHVL PQQTSFSSEESVEVPKRQIFQVA-SRSTE  
P-----SESASVSNE  
SRSHHSRHHHQHVHTQSRVRPAQTQEFLLVPPQDCFSDESVD-TEQQSLPEPASVSNE  
SRSHHSRHHHQVHTQSRVRPAKTQELLVPPQQSHFSSEESVENTEQQSLPKPASVSNE  
* * *
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AKHW03002540.1:Alligator mississippiensis
NW_017728948.1:Crocodylus porosus
XM_006018107.1:Alligator sinensis
XM_019526454.1:Gavialis gangeticus
XM_006135415.2:Pelodiscus sinensis
XM_005292014.2:Chrysemys picta bellii
XM_007066639.1:Chelonian mydas

```
SE-DDHDDSDNDTDESDEDAVTDFFPTDFPVTETFPFPPTRGDNSGRGDSVGYRMRAKAK  
SE-DDQDDSDNDTDESDEDAVTDLPTDFPVTETFPFPPTRGDNSGRGDSVGYRMRAKAK  
SE-DDHDDSDNDTDESDEDAVTDFFPTDFPVTETFPFPPTRGDNSGRGDSVGYRMRAKAK  
SE-DD--DSDNDTDESDEDAVTDFFPTDFPVTETFPFPPTRGDNSGRGDSVGYRMRAKAK  
DDGDHDDSDNDTDESDEENVTDFPTDAPITTFPTPALPTRGDNSGRGDSVAYRMGAKAK  
DDGDHDDSDNDTDESDEDDVTDFTDAPVTTPLTPALPTRGDNSGRGDSVAYRMRAKAK  
DDGDHDDSDNDTDESDEDIVTYFPTDAPVTTPLTPAVPTRGDNSGRGDSVAYRMRAKAK  
. : * . :*****: ** :** ::* : * *****.*** **
```

AKHW03002540.1:Alligator mississippiensis
NW_017728948.1:Crocodylus porosus
XM_006018107.1:Alligator sinensis
XM_019526454.1:Gavialis gangeticus
XM_006135415.2:Pelodiscus sinensis
XM_005292014.2:Chrysemys picta bellii
XM_007066639.1:Chelonian mydas

```
LV-----KSSRHYQATGKFIVHDATEEGDSTPDTESQQVDYSKPLPAAHLVPGKYDISV  
LV-----KSSRHYQATGKFIVHDATEEDDSTPDTESQQVDYSKPLPAAHLVPGKYDISV  
LV-----KSSRHYQATGKFIVHDATEEGDSTPDTESQQVDYSKPLPAAHLVPGKYDISV  
LV-----KSSRHYQATGKFIVHDATEEDDSTPDAESQQVDYSKPLPAAHLVPGKYDISV  
LLEVYHKEKPSKLYKSSGKFIVYDVTEEDDSTPDIESQQVDSKRPAAHFPKSNISM  
LADVYHKEKSSKLYKAAGKFIHEVSEEDASKPETESQQVDSFKAQPAHRFPKSDISL  
LVDIYHKEKSSKLYKALGKFIVHDTVTEEDDSTPDAESQQVDSKAPCAACHFPKGFDMSM  
* * * : * : * : * : * : * : * : * : * : * : * : * : * : * : * : *
```

AKHW03002540.1:Alligator mississippiensis
NW_017728948.1:Crocodylus porosus
XM_006018107.1:Alligator sinensis
XM_019526454.1:Gavialis gangeticus
XM_006135415.2:Pelodiscus sinensis
XM_005292014.2:Chrysemys picta bellii
XM_007066639.1:Chelonian mydas

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EWDDKSHMKDSNEVTSRSDR-----SHORLESVEVDRDSDSKPDVPEDSHMSNESREQHH  
EWDDKSHMKDSNEVTSRSDR-----SHORLESIEVDRDSDSNPDVPEDSHMSNESREQHH  
EWDDKSHMKDSNEVTSRSDR-----SHORLESVEVDRDSDSKPDVPEDSHMSNESREQRH  
EWDDKSHMKDSNEVTSRSDR-----SHORLESVEVDRDSDSNPDVPEDSHMSNESREQHH  
KLNDKKNVQGSNEVSSRSHDKSMEKDSQQQLDSVAVDSDNNSKSDVTEDSHMSNESTEQQQ  
ELDDKSNMDSNEVNSRSDRDKSMENDSQQQLDSVEADSDNSKRDVSEDSHMSNESTEQLR  
EWDDRSNIQDISEVNRSHDKSMENGSQQQLDSVEADSDNSKPDVTEDSHMSNESTEQQQ  
: : : : : . * * * : * : * : * : * : * : * : * : * : * : * : * : * : *
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AKHW03002540.1: <i>Alligator mississippiensis</i>	TQI-----SASVPETDADSNQTAESAEDIQDHHSLEDNEVTI
NW_017728948.1: <i>Crocodylus porosus</i>	TQI-----SASLPETDADSNQTAESVEDIQDHHSLEDNEVTI
XM_006018107.1: <i>Alligator sinensis</i>	TQI-----SASVPETDADSNQTAESAEDIQDHHSLEDNEVTI
XM_019526454.1: <i>Gavialis gangeticus</i>	TQI-----SASVPETDADSNQTAESVEDIQDHHSLEDNEVTI
XM_006135415.2: <i>Pelodiscus sinensis</i>	VQTEYLQQIDDVPEGNDNSNQTSESTEDIQDHNSIEDNEIIL
XM_005292014.2: <i>Chrysemys picta bellii</i>	AQIEDLQQVDGIPEVN-DSNQTSESTEDTQDHKSIEDNEVIL
XM_007066639.1: <i>Chelonian mydas</i>	AQTEDLQQVDVPEVN-DSNQTAESESTEDTQDHSSIEDNEVIL
	. * : ** : **** : ** ** * : **** : :

Table S1.12: Osteopontin in Reptilia (Crocodilia and Testudines).

XM_015411327.1:Gecko japonicus
XM_020796504.1:Pogona vitticeps
XM_003221296.2:Anolis carolinensis
XM_007443523.2:Python bivittatus
NW_013658771.1:Thamnophis sirtalis
XM_015819303.1:Protobothrops mucrosquamatus
GBEX01002350.1:Crotalus adamanteus cadam

```
MKIAVL LCLCFTTAFALPIPKKTKFHDG-AGSSEDNHSRGGHHVHKHRHHHHHS HSQSQEH  
MKIAIL LCLCLLTITFAHPVVRKSRHHDDGSM SAEGRHDSRGGHHHGHRRH--HHD SHSQEH  
MKIAIL LCLCLLTAFALPISKSRHHDD- SGSLERKHEHRHHAPHHHHR--HNNSQSHEH  
MKIAVL LCLCFTVAFALPISKSRHHDD- SRSAERKHDSREDEAYAHSH--HNNSHSHEH  
MKIAVL LCLCFTVAFALPISQSRHDHN- SMSAESKHDSKENEAAHAAAA--HHHSHSH--  
MKIAVL LCLCFTVALALPISKSTHHDD- SRSAERKHDSRENEAAH--HH--HNNSHSHEH  
MKIAVL LCLCFTVAFALPISKSTHHDD- SRSAERKHDSRENEAAHAAAA--HNNSHSHEH  
****:* :*****:* * : : * * : * * . * : * * . * * :
```

XM_015411327.1:Gecko japonicus
XM_020796504.1:Pogona vitticeps
XM_003221296.2:Anolis carolinensis
XM_007443523.2:Python bivittatus
NW_013658771.1:Thamnophis sirtalis
XM_015819303.1:Protobothrops mucrosquamatus
GBEX01002350.1:Crotalus adamanteus cadam

```
SPEHVNSHE-SQEHC-----LPSHQSSDSDESE EITEQQTLLVHPD--KSAEDDHSVDV  
SQEHSQEHVHSHESQ--EQQVSSQLSAPSS ESE EITEQQTLLVPAVASKSMEDD----D  
SREHVNSHE-SQ-----EQQVSAQLNSMSSEESDEITEQQTLLVPS--RSKEDD----H  
SHEHRNS---QESQEH---ASSQLNSQSLEDRDEITEQQTLLASS--KSHEDD----D  
-----EHSQESPEHHSQESSQLNSQSS EDRDEITEQQTLLASS--KSHEDD----D  
SQEHGNSHEHSQESPEH---ASSQLNSQSLEDRDEITEQQTLLASS--KSNEDD----D  
SQEHGNSHEHSQESPEH---ASSQLNSQSLEDRDEITEQQTLLASS--KSNEDD----D  
.: . : : ***** . : * ** .
```

XM_015411327.1:Gecko japonicus
XM_020796504.1:Pogona vitticeps
XM_003221296.2:Anolis carolinensis
XM_007443523.2:Python bivittatus
NW_013658771.1:Thamnophis sirtalis
XM_015819303.1:Protobothrops mucrosquamatus
GBEX01002350.1:Crotalus adamanteus cadam

```
DHDDVDDHDDVDDSHGEADDSDES HESDDSHQVVEVPTDRPFTPSAAPGPFTGRGDI-  
NHSDVDDD---DDHSD-SDDSDSH-----EGTVTDLPTDSPFTPPVPPDPFTGRGDSA  
DHSDVDDD---DDND--HTDSHES---DESHEVTFDFPTDAPFTLPVTPDFTGRGDSA  
DHSDANND---DHVD---SDES---DESHETVDFPTDAPFTLPVSPDPFTGRGDVA  
DHSDVSKDD---DHSDDSDSSSES---DESHETVTDAPTEAPYT----ESVTNRGDVP  
NHSDVSKDD---DHPD---SDES---DESHENFTDFPTQAPVTF----DSVTYRGDVA  
NHSDVSKDD---DHPD---SDES---DESQENFTEYPTQAPVTL----DSVTYRGDVA  
: * . . . * . * * . . : * : * * : * * . * * *
```

XM_015411327.1:Gecko japonicus
XM_020796504.1:Pogona vitticeps
XM_003221296.2:Anolis carolinensis
XM_007443523.2:Python bivittatus
NW_013658771.1:Thamnophis sirtalis
XM_015819303.1:Protobothrops mucrosquamatus
GBEX01002350.1:Crotalus adamanteus cadam

```
PYGIQHGO---LKF LRSKKSSEQFDSHDTTQEDDSLDPVDSHETHSSKAVSHESQDTS  
PNGIRAKVDLVHFKK---SYKKSQKGFDSHDVTD DFDSTPDVESHE SYSSKAHSLSHDTS  
PYGLKSRVDLVHFEKSKKVKYKKSQKGFDSHDVTD DFDSPDPVESHE SYSSKAHSTESHDT  
PYGIRAKLDRMSLGKSGKAHKKSGKGFDSQDFSDEVDSTPDEDSHEY--SKARSLESHDTS  
SDEFRPNVDFMSLGRS-----GKFDSQSVSDEVDSTPDDSHED--SKARSLESHE--  
PYGF GAKDDQMSLERS-----GKFDSQDVSDEVDSTPDDSHHEY--AKARSLESHE--  
PYGFRAKDDQMSLERS-----GKFDSQDVSDEVDSTPDDSHREY--AKARSLESHE--  
: : : * * . : : * * * * : * * : * * * * * :
```

XM_015411327.1:Gecko japonicus
XM_020796504.1:Pogona vitticeps
XM_003221296.2:Anolis carolinensis
XM_007443523.2:Python bivittatus
NW_013658771.1:Thamnophis sirtalis
XM_015819303.1:Protobothrops mucrosquamatus
GBEX01002350.1:Crotalus adamanteus cadam

```
TESEDKSNLQDSNEVHSASHDKSVENDSRQKLDVSEEDH-----DNSKADISQESDGIDH  
VE---SDLRESNEVHSTSHDRSLERASQOTLESVEDDQDDADHDNSKITASLESHE---  
VEKDDASHLRDSNEVLRASRDKSLENNSRQKLESAYLHDDADHDN IKLAIALASHE---  
VERVDKSNLRDSNEVHSASHERSLEDNSQEKPEVEDS-----HDNSKVTISLESTE---  
--SDDKSDLTDSNEVHSASHDISLEDHSPEKPEVEDS-----SDHKSASLSLESTE---  
--GDDKSNLRDSNEVHSASHDTSLEDHSPEKAESVEDS-----HDHKSQSVSLESTE---  
--RDDKSNLRDSNEVHSASHDTSLEDHSPEKPEVEDS-----HDHKSQSVSLESTE---  
* . : * * * : * : * * * * . : * * : * * .
```

```

XM_015411327.1:Gecko japonicus      ITELKARERGEPEADHDHDVDND-----
XM_020796504.1:Pogona vitticeps     STELQKDYHDGLQQVAHDRSIDDVSNQILESTEDHHSVEDRHS AEDKHSVEDH-SIENHH
XM_003221296.2:Anolis carolinensis  SREYLKDRSVELRQVDHHDVDVDSNQSLENVEDHHSVEDHHSVEDHHSIEDHHSVEDKH
XM_007443523.2:Python bivittatus    SREEKKDRSEELQQLP--DVDDVSNQILESTESHHSVEDHHS AEDHHS AEDHHS AEDHH
NW_013658771.1:Thamnophis sirtalis  SREQKDHSEEPQQLDS--NPDDASNQIVESAESQHSS-----
XM_015819303.1:Protobothrops mucrosquamatus  SGEQKDHSEELQQLDS--NPDDVSNQILESAENHHS A-----
GBEX01002350.1:Crotalus adamanteus cadam  SGEQKDHSEELQQLDS--NPDDVSNQILESTENHHS T-----
          * *      : :      . * :      : **

```

```

XM_015411327.1:Gecko japonicus      -----HHSVED-----NEIEY
XM_020796504.1:Pogona vitticeps     SVEN-----HSTEDHHSVEDHHSIEDNEVIL
XM_003221296.2:Anolis carolinensis  SVEDKHSVEDHHSIEHPLSVEDHHSVEDHHSIEDNEVIL
XM_007443523.2:Python bivittatus    -----EDHHSAEHHSVEDNEVIL
NW_013658771.1:Thamnophis sirtalis  -----EDHHSVEHHSVEDNEVIL
XM_015819303.1:Protobothrops mucrosquamatus  -----EDHHSVEHHSVEDNEVIL
GBEX01002350.1:Crotalus adamanteus cadam  -----EDHHSVEHHSVEDNEVIL

```

Table S1.13: Osteopontin in Reptilia (Squamata).

M59182.1:Gallus	---HVVKASKLRKAARKLI	EDDATA	----	EVGDSQLAGL	-----
XM_003205565.3:Meleagris gallopavo	---HMVKASKLRKTARKLI	EDDATA	----	EAGGSQLAGL	-----
XM_021395699.1:Numida meleagris	---HVVKASKLRKVKARKLI	EDDATE	----	EVGDSQPVLG	-----
NM_001323234.1:Coturnix japonica	---HVVKASKLRKAARKLI	EDDAT	----	EDGDSQPAGL	-----
XM_010218705.1:Tinamus guttatus	---AVMKPSKLRKAARKLMVHDVTEE			DLSALAADSHQEGFSREAFG	AHRSAEKYADSL
XM_009676586.1:Struthio camelus australis	---LVVKPSKLRKAARKLIVHDATEE			DESALAADSRQAGLSREDLG	AHRSAGKYADSG
XM_013957376.1:Apteryx australis mantelli	---TVVKSSKLRKAARKLIVHDATEE			DESALVTDSSHQAGLSQEDLG	ARHLGAGKYADSG
XM_021526515.1:Lonchura striata domestica	---ALLKYIKFHKDAKKLI	YDATEE		DESMDADSQR-PLSRENEFA	FRRSLTKPASSV
XM_002190366.1:Taeniopygia guttata	---ALLKYIKFHKDAKKLI	YDATEE		DESMDADSQR-SLSRENEFA	FRRSLTKPSSSV
NW_008240042.1:Corvus brachyrhynchos	---ALLKSIKLYKAAKKLI	YGATEE		DESMDADSQR-SVSREDSA	SRRSLRKHASSV
XM_010412044.2:Corvus cornix cornix	---ALLKSIKLYKAAKKLI	YGATEE		DESMDADSQR-SVSREDSA	SRRSLRKHASSV
XM_015623543.2:Parus major	---TLKSIKLRKAARKLI	YDATEE		DESYMDADSQR-SVSREDSA	SRRSLRKHASS-
XM_005525626.2:Pseudopodoces humilis	---TLKSIKLRKAARKLI	YDATEE		DESYMDADSQR-SVSREDSA	SRRSLRKHASS-
XM_014878941.1:Sturnus vulgaris	AKAALLKSVKLRKAARKLI	YDATEE		DESMDADSQR-SVSREDDAA	PRRSLRKKHARSV
XM_016297843.1:Ficedula albicollis	AKAKLLKSVKLRKAARKLI	YDATEE		DESMDADSQR-SVSREDSA	SRRSLRKHASSV
NW_007931124.1:Serinus canaria	---ALLKSIKLRKAARKLI	YDATEE		DESMDADSQR-SVSREDSA	SRRSLRKHASSM
XM_005418195.1:Geospiza fortis	---ALLKSIKLRKAARKLI	YDATEE		DESMDADSQR-SVSREDSA	SRRSLRKHASSV
XM_005485296.1:Zonotrichia albicollis	---ALLKSIKLRKAARKLI	YDATEE		DESMDADSQR-SVSREDDAA	SRRSLRKHASSV
XM_009904975.1:Picoides pubescens	---RLKSSKLRKAARKLQKHCKATRSNQTAES	EQARD	-----	RLS	SIERNEVTL
XM_005012779.3:Anas platyrhynchos	---SMVKSSKLRKAARKLIADDATEE			DESALPGDSQQVGLWQELLA	AHRAPGKRAVSG
XM_013190510.1:Anser cygnoides domesticus	---SMVKSSKLRKAARKLIADDATEE			DESALHGDSQQVGLWQELLA	AHRAPGKRAVSG
KZ506572.1:Limosa lapponica baueri	---AVVKSSKLRKAARKLIVDASED			GESALDAGSQAGLSQEGMA	ARRSLGKHVISG
XM_005498492.2:Columba livia	---TVVKSSKLRKAARKQVIAYDTKEE			DESALDADSQRGRLSQEDLS	ARRSLGKLSITG
LSYS01006159.1:Patagioenas fasciata monilis	---TVVKSSKLRKAARKQVIVYDTEE			DESALDADSQRGHLSREDLS	ARRSLGKLSITG
XM_008500834.1:Calypte anna	---TALQSSKLRKAARKLIVYDATEE			DESALDADSQRGHLSQEGFY	---VLGKHTVSE
XM_009993754.1:Chaetura pelagica	---VALKSSKHLKAARKLVVGEDSEE			DESLEAASQQAELSQEARA	QGFPRKHGIRG
XM_008942236.1:Merops nubicus	---TVVRSKLRKAARKQLGYDTAEE			DESALDADSQQAGLPGWGAFA	ARRSLGKHDISG
XM_010019624.1:Nestor notabilis	---TVVKSSKLRKAARKLIAYDATEE			DESALDADSQQVGLSQEHFA	AHRSLVK-HISR
XM_005146580.1:Melospittacus undulatus	---TVVKSSKLRKAARKLIAYDATEE			DESALDADSQQVGLSQEHFA	AHRSLVK-HISR
XM_009559526.1:Cuculus canorus	---IVMKASKLRKHPAKKLTIVHDATEE			NNSALDADSQQ-GLSQEDSA	SDRSLGHTHTIIG
XM_005444503.1:Falco cherrug	---TVKSSKLRKAARKLIAYDATEE			DESVPDADSQQAGLSQEDSA	TRHSLGKHTVSG
XM_005233595.1:Falco peregrinus	---TVKSSKLRKAARKLIAYDATEE			DESVPDADSQQAGLSQEDSA	TRHSLGKHTVSG
XM_009073853.1:Acanthisitta chloris	---ALVKAIKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDSA	SRRSLGKHASSM
XM_008930247.2:Manacus vitellinus	---ALVKSIKLRKDAKKVM	YDATEE		DESALDADSQRAGFSREDSA	SRRSLEKHAISV
NW_016690259.1:Lepidothrix coronata	---ALVKSIKLRKDAKKVM	YDATEE		DESALDADSQRAGFSREDSA	SRRSLEKHAISV
XM_010202192.1:Colius striatus	---TVVKSSKLRKAARKLIAYDATEE			DVSLDADSQQAGSQ-EGH	AALRSLGKHGISG
XM_010173470.1:Caprimulgus carolinensis	---AMVKASKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDFA	VRRALGK-YISG
XM_010181850.1:Mesitornis unicolor	---TLVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSWEDSA	AHRSLGKHISG
XM_009868641.1:Apaloderma vittatum	---TAVKSSKLRKAPKPKLI	YDATEE		DESALDADSQRARSLE	---VPAARVSLGKHISG
XM_009958978.1:Leptosomus discolor	---TMVSSKLRKAARKLIAHDATEE			DEGALDADSQQVGLAQEDLA	APRSLGKHAISR
XM_010079868.1:Ptarmicon gutturalis	---AVKASKLRKAARKLIVYDATEE			DESALDADSQQQAI-SR	EAVARRSLGKHTLSG
XM_010119303.1:Chlamydotis macqueenii	---ALVKAIKLRKAARKLIAYDATEE			DESALDADSQQAGLSQEDFA	VRRTLGKHTISR
XM_009970430.1:Tyto alba	---TVVKSSKLRKAARKQVIEYDATEE			DESALDADSQQAGLSQEHFA	ARRSLGKHAISG
XM_009932280.1:Opisthocomus hoazin	---TAVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSWEDFA	ARRSLGKHAISG
XM_010145609.1:Buceros rhinoceros silvestris	---AVLKSSKLRKAARKLIAYDATGE			D-----DADSQQAGLSREDA	VHSLGKHTISG
XM_009978083.1:Tauraco erythrolophus	---AVVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDFA	ARRSLRKHAVSG
XM_010154680.1:Eurypyga helias	---TAVKASKLRKVAKKLILYDATNE			DEGLDADSQQAGLSQEDSAAAHL	LSLAKHAISR
XM_009639993.1:Egretta garzetta	---AVVKPSKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDFA	AYRSLGKQAISR
XM_009327481.1:Pygoscelis adeliae	---TVVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDFA	ACRSLGKHAISG
XM_009280227.1:Aptenodytes forsteri	---TVVKPSKLRKAARKLIVYDATEE			DESALDADSQQAGLSREDF	ACRSLGKHAISR
XM_009512482.1:Phalacrocorax carbo	---TVVKSSKLRKAPKPKLIVYDATEE			DESALDADSQQAGLSQEDFA	AHRSLGKHPISG
XM_014961493.1:Calidris pugnax	---AVVKSRKLRKAARKLIVYDASED			DESALDADSQQAGLSWEDFA	ARRSLGKHAISG
XM_009813620.1:Gavial stellata	---SVVKSNKLRKAARKLIEYDATEE			DESALDADSQQAGLSREDA	VRRSLGKHAISG
XM_009916485.1:Haliaeetus albicilla	---TVVSSKLRKAARKLIVYDASEE			DESALDAHSQQTGLSRE	-----KHAISR
XM_010569846.1:Haliaeetus leucocephalus	---TVVSSKLRKAARKLIVYDASEE			DESALDAHSQQTGLSRE	-----KHAISR
XM_011600806.1:Aquila chrysaetos canadensis	---TVVESRKLKAARKLIVYDASEE			DESALDADSQQQTGLSREDF	AHSLGKHAISR
XM_009490811.1:Pelecanus crispus	---TVVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSQEDFA	AHRSLEKHAISG
XM_009694723.1:Carriama cristata	---TVVKSSKLRKAARKLIVYDASEE			DESALDADSQQAGLSQEDSA	VRRSLGKHAISR
XM_010311221.1:Balearica regulorum gibbericeps	---AMVKSSKLRKAARKLIVYDTTEE			DESALDADSQQAGLSREDF	ARRSLGKHAISR
XM_010287426.1:Phaethon lepturus	---TVVKPSKLRKAARKLIVYDPTTE			DESALDADSQQAGLSREDF	AHRSLGKHTISE
XM_009890748.1:Charadrius vociferus	---AVVKPSKLRKAARKLIVYDATEE			DDSALDADSQQAGLSWEDFA	ARRSLGKHAISG
XM_009584852.1:Fulmarus glacialis	---TVVKSSKLRKAARKLIVYDATEE			DKSALDADSQQAGLSREDF	AHSLGKHAISG
XM_009467655.1:Nipponia nippon	---TMVKSSKLRKAARKLIVYDATEE			DESALDADSQQAGLSREDF	AHRSLGKHAISR

M59182.1:Gallus	WLPKESREQ---DSRELAQHQSVENDSRPF--DSPEVGGGD-SKASAG-----
XM_003205565.3:Meleagris gallopavo	WWPKESREQ---DSRELTOHQSVENDSRPF--DSPEVDGGD-SKASAG-----
XM_021395699.1:Numida meleagris	WWPKESREQ---ESRELAQHQSVENDSRPF--DSREVDGGD-SKASAG-----
NM_001323234.1:Coturnix japonica	WWPKESREQ---NSRELPOHQSVENDSRPF--DSREVDGGD-SKASAG-----
XM_010218705.1:Tinamus guttatus	EWGDKSHGHDSNEVGRKLPERSLEKDSRQKF--DSPERD--S-GEWGARGDPPPS----
XM_009676586.1:Struthio camelus australis	EWDRKSRGQDSDEVVRKVPDRSLENDSRQKL--DSLAEAVGD-SR-----
XM_013957376.1:Apteryx australis mantelli	EWGHKSRGRQDSNEVVRKLPDWSVENDSRQKF--DSPEVERDS-SERGARGGIPLS----
XM_021526515.1:Lonchura striata domestica	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSREAQSDS-SKPGVVRDSDHPSVESR
XM_002190366.1:Taeniopygia guttata	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKWFHP--SSMPFLPAQ
NW_008240042.1:Corvus brachyrhynchos	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKSGVVRDSDHPSVESR
XM_010412044.2:Corvus cornix cornix	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKSGVVRDSDHPSVESR
XM_015623543.2:Parus major	VWADSHGRDSEQDSSEPHRSLENDNSWPKS--ASHEAQSDS-SKSGVVRDSDHPSVESR
XM_005525626.2:Pseudopodoces humilis	VWSESHGRDSEQDSSEPHRSLENDNSWPKS--ASHEAQSDS-SKSGVVRDSDHPSVESR
XM_014878941.1:Sturnus vulgaris	AWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKSGVVRDSDHPSVESR
XM_016297843.1:Ficedula albicollis	AWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKSGVVRDSDHPSVESR
NW_007931124.1:Serinus canaria	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--HE--AEQDS-SESGIRGDSHPSVESR
XM_005418195.1:Geospiza fortis	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKPGM-----
XM_005485296.1:Zonotrichia albicollis	VWSDSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKSGM-----
XM_009904975.1:Picoides pubescens	EWLDKSHERDRSKEELTS---HQS MENDSRQKF--DSPEVEGGD-SRDGVRD-DHLS
XM_005012779.3:Anas platyrhynchos	EWLDKSHERDRSKEELTS---HQS MENDSRQKF--DSPEVEGGD-SQDQARGDGRHS----
XM_013190510.1:Anser cygnoides domesticus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
KZ506572.1:Limosa lapponica baueri	EWAAKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_005498492.2:Columba livia	EWAAKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
LSYS01006159.1:Patagioenas fasciata monilis	KWAAKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_008500834.1:Calypte anna	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009993754.1:Chaetura pelagica	EWADRSHQDSSELDKQHDQSTENDSRQKF--NSHEVEADG-SKFGARWDSHQSS----
XM_008942236.1:Merops nubicus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010019624.1:Nestor notabilis	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_005146580.1:Melospitta undulatus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009559526.1:Cuculus canorus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_005444503.1:Falco cherrug	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_005233595.1:Falco peregrinus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009073853.1:Acanthisitta chloris	EWSDKSHGQDSSELDKQHDQSTENDSRQKF--DRHEAQSDS-SKSAVRGDSHFSS----
XM_008930247.2:Manacus vitellinus	EWSDKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
NW_016690259.1:Lepidothrix coronata	EWSDKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010202192.1:Colius striatus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010173470.1:Caprimulgus carolinensis	EWSDKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010181850.1:Mesitornis unicolor	KWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009868641.1:Apaloderma vittatum	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009958978.1:Leptosomus discolor	EWADKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010079868.1:Pterocles gutturalis	EWADKSHGQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010119303.1:Chlamydotis macqueenii	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009970430.1:Tyto alba	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009932280.1:Opisthocomus hoazin	EWADKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010145609.1:Buceros rhinoceros silvestris	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009978083.1:Tauraco erythrolophus	EWADKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010154680.1:Eurypyga helias	EWADKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009639993.1:Egretta garzetta	EWADKSHGQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009327481.1:Pygoscelis adeliae	EWADKSHGQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009280227.1:Aptenodytes forsteri	EWADKSHGQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009512482.1:Phalacrocorax carbo	EWADKSHRQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_014961493.1:Calidris pugnax	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009813620.1:Gavia stellata	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009916485.1:Haliaeetus albicilla	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010569846.1:Haliaeetus leucocephalus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_011600806.1:Aquila chrysaetos canadensis	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009490811.1:Pelecanus crispus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--NSHEVEADD-SKAGVRGDSHQSS----
XM_009694723.1:Carriama cristata	EWADKSHGRDSEQDSSEPHRSLENDNSWPKS--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010311221.1:Balearica regulorum gibbericeps	EWADKSHRQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_010287426.1:Phaethon lepturus	EWADKSHRQDSSELDKQHDQSTENDSRQKL--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009890748.1:Charadrius vociferus	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009584852.1:Fulmarus glacialis	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----
XM_009467655.1:Nipponia nippon	EWADKSHGQDSSELDKQHDQSTENDSRQKF--DSHEAQSDS-SKVSIRGDSHQSS----

M59182.1:Gallus	-----
XM_003205565.3:Meleagris gallopavo	-----
XM_021395699.1:Numida meleagris	-----
NM_001323234.1:Coturnix japonica	-----
XM_010218705.1:Tinamus guttatus	-----
XM_009676586.1:Struthio camelus australis	-----
XM_013957376.1:Apteryx australis mantelli	-----
XM_021526515.1:Lonchura striata domestica	ERGDSHPSVE-----SRERGDSHPSVESRERGDSHPSES
XM_002190366.1:Taeniopygia guttata	KKNM-----
NW_008240042.1:Corvus brachyrhynchos	E-----RGDSHPSES
XM_010412044.2:Corvus cornix cornix	E-----RGDSHPSES
XM_015623543.2:Parus major	E-----REDSHPS---
XM_005525626.2:Pseudopodoces humilis	E-----RGDSHPS---
XM_014878941.1:Sturnus vulgaris	-----
XM_016297843.1:Ficedula albicollis	E-----RGDSHPS---
NW_007931124.1:Serinus canaria	EKGDSLSSVESRERGDLSLSSVESREKGDLSLSSVESREKGDLSLSSVESREKGDLSLSSVESR
XM_005418195.1:Geospiza fortis	-----RGDNLSSVESR
XM_005485296.1:Zonotrichia albicollis	-----RGDSLSSVESR
XM_009904975.1:Picoides pubescens	-----
XM_005012779.3:Anas platyrhynchos	-----
XM_013190510.1:Anser cygnoides domesticus	-----
KZ506572.1:Limosa lapponica baueri	-----
XM_005498492.2:Columba livia	-----
LSYS01006159.1:Patagioenas fasciata monilis	-----
XM_008500834.1:Calypte anna	-----
XM_009993754.1:Chaetura pelagica	-----
XM_008942236.1:Merops nubicus	-----
XM_010019624.1:Nestor notabilis	-----
XM_005146580.1:Melopsittacus undulatus	-----
XM_009559526.1:Cuculus canorus	-----
XM_005444503.1:Falco cherrug	-----
XM_005233595.1:Falco peregrinus	-----
XM_009073853.1:Acanthisitta chloris	-----
XM_008930247.2:Manacus vitellinus	-----
NW_016690259.1:Lepidothrix coronata	-----
XM_010202192.1:Colius striatus	-----
XM_010173470.1:Caprimulgus carolinensis	-----
XM_010181850.1:Mesitornis unicolor	-----
XM_009868641.1:Apaloderma vittatum	-----
XM_009958978.1:Leptosomus discolor	-----
XM_010079868.1:Pterocles gutturalis	-----
XM_010119303.1:Chlamydotis macqueenii	-----
XM_009970430.1:Tyto alba	-----
XM_009932280.1:Opisthocomus hoazin	-----
XM_010145609.1:Buceros rhinoceros silvestris	-----
XM_009978083.1:Tauraco erythrolophus	-----
XM_010154680.1:Eurypyga helias	-----
XM_009639993.1:Egretta garzetta	-----
XM_009327481.1:Pygoscelis adeliae	-----
XM_009280227.1:Aptenodytes forsteri	-----
XM_009512482.1:Phalacrocorax carbo	-----
XM_014961493.1:Calidris pugnax	-----
XM_009813620.1:Gavial stellata	-----
XM_009916485.1:Haliaeetus albicilla	-----
XM_010569846.1:Haliaeetus leucocephalus	-----
XM_011600806.1:Aquila chrysaetos canadensis	-----
XM_009490811.1:Pelecanus crispus	-----
XM_009694723.1:Cariama cristata	-----
XM_010311221.1:Balearica regulorum gibbericeps	-----
XM_010287426.1:Phaethon lepturus	-----
XM_009890748.1:Charadrius vociferus	-----
XM_009584852.1:Fulmarus glacialis	-----
XM_009467655.1:Nipponia nippon	-----

M59182.1:Gallus	-----VDSRESL--ASR---SAVDTSNQTLESAEDAEDRHSIENNEVTR
XM_003205565.3:Meleagris gallopavo	-----VDSRESQ--GSV---PAVDTSNQTLESAEDAEDRHSIENNEVTR
XM_021395699.1:Numida meleagris	-----VDSRESQ--GSV---PAVDTSNQTLESAEDAEDRHSIENNEVTR
NM_001323234.1:Coturnix japonica	-----VDSRESQ--GSV---PAVDASNQTLESAEDAEDRHSIENNEVTR
XM_010218705.1:Tinamus guttatus	-----RESRESQARVSAE-VPDGDNSNQTLESAEDAQDHLSEIKHNEVIF
XM_009676586.1:Struthio camelus australis	-----RESRESQARVSAE-VPDGDNSNQTLESAEDAQDHLSEIKHNEVIF
XM_013957376.1:Apteryx australis mantelli	-----RESRESPAHVLRTRVIVVDNSNQTLESAEDAQDLRSIKHNEVAL
XM_021526515.1:Lonchura striata domestica	ERGDSHPSVESRESR--DRVSAELADDISSQTLESAEDSQDRHSIESNEVTL
XM_002190366.1:Taeniopygia guttata	-----ERGDSHPSAESRESQ--DRVSAELSDDISNQTLESAEDSQDRRSIESNEVTL
NW_008240042.1:Corvus brachyrhynchos	ESRDHSHPSAESRESQ--DRVSAELSDDISNQTLESAEDSQDRRSIESNEVTL
XM_010412044.2:Corvus cornix cornix	ESRDHSHPSAESRESQ--DRVSAELSDDISNQTLESAEDSQDRRSIESNEVTL
XM_015623543.2:Parus major	-----VESRESR--DRVSAELSDGISNQTLESAEDSQDRHSIESNEVTL
XM_005525626.2:Pseudopodoces humilis	-----VESRESR--DRVSAELSDGISNQTLESAEDSQDRHSIESNEVTL
XM_014878941.1:Sturnus vulgaris	-----GVESR--DRVSEELSDDISNQTLESAEDSQDRHSIESNEVTL
XM_016297843.1:Ficedula albicollis	-----VESRESR--DRVSAELSDDISNQTLESAEDSQDRHSIESNEVTL
NW_007931124.1:Serinus canaria	ERGDHSHPSVESRESR--DRVSAELSDDIITQTLENAEDSQDRHSIESNEVTL
XM_005418195.1:Geospiza fortis	ERGDHSHPSVESRESR--DRVSAELSDHISIQTLESAEDSQDRHSIESNEVTL
XM_005485296.1:Zonotrichia albicollis	E---SHLSVESRERF--DSHSTELSDHISIQKLESAEDSQDRHSIESNEVTL
XM_009904975.1:Picoides pubescens	-----MESRERRRVSAAGIPADDTSNQTLESAENTQEHHSIENNEVTI
XM_005012779.3:Anas platyrhynchos	-----LESRERRRVSAAGSIPITDDTSNQTLESAENAREHHSIENNEVTI
XM_013190510.1:Anser cygnoides domesticus	-----MESRESQ--VRSVAENTNDNSNQTLESAEDAQDHHHSIENNEVTL
KZ506572.1:Limosa lapponica baueri	-----AESRESQ--ARILPEIPDEDSNQTLESAEDAQDRHSIENNEVTL
XM_005498492.2:Columba livia	-----VESRESQ--ARVLPPEIPDDNSNQTLESAEDAQDRHSIENNEVTL
LSYS01006159.1:Patagioenas fasciata monilis	-----MESKESQ--VQVPAEVPDDNSNQTLESAEDAQDRHSIENNEVTI
XM_008500834.1:Calypste anna	-----RESRESF---PAGIPEDNSTQTLESAEDAQDHHHSIDTNEVTL
XM_009993754.1:Chaetura pelagica	-----LESRESQ--VRSVAEIPDDKSNQTLESAEDARDRHSIKNEVTL
XM_008942236.1:Merops nubicus	-----VESRESQ--VRSVAEIPDDNSNQTLESIEDARDRHSIENNEVTL
XM_010019624.1:Nestor notabilis	-----VESRESQ--VRSVAEIPDDNSNQTLESIEDARDRHSIENNEVTL
XM_005146580.1:Melopsittacus undulatus	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDARQGHHSIENNEVTL
XM_009559526.1:Cuculus canorus	-----VESRERQSSRVSAESPDDNSNQTLESAEDAHDRHSIENNEVTL
XM_005444503.1:Falco cherrug	-----VESRERQSSRVSAESPDDNSNQTLESAEDAHDRHSIENNEVTL
XM_005233595.1:Falco peregrinus	-----VESRERQSSRVSAESPDDNSNQTLESAEDAHDRHSIENNEVTL
XM_009073853.1:Acanthisitta chloris	-----VESRESQ--DQASSEISDDTSNQTLESAEDSQDRHSIENNEVTL
XM_008930247.2:Manacus vitellinus	-----VESRESQ--VRSVAEVSDDNSNQTLESAEDSQDRHSIENNEVTL
NW_016690259.1:Lepidothrix coronata	-----VESRESQ--VRSVAEVSDDNSNQTLESAEDSQDRHSIENNEVTL
XM_010202192.1:Colius striatus	-----MESRESQ--VLSVAEIPDDNSNQTVESTEDAQDRPSIENNEVTL
XM_010173470.1:Crimulmus carolinensis	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDAQDRHSIENNEVTR
XM_010181850.1:Mesitornis unicolor	-----IESKESQ--VHVSAEIPDDNSSQMLSAEDAQEHHSIKNEVTL
XM_009868641.1:Apaloderma vittatum	-----MESRESQ--VRI SAEVPPDDNSNQTLESAEDARDRHSIENNEVTL
XM_009958978.1:Leptosomus discolor	-----IESRESQ--VHS SAEFPDDNSNQTLESAEDARDRHSIENNEVTL
XM_010079868.1:Pterocles gutturalis	-----VESRESQ--VHVSAEIPDDNSNQTLESAEDARDRHSIENNEVTL
XM_010119303.1:Chlamydotis macqueenii	-----LESKESQ--VHV SSEIPDDNSNQTLESAEDAQDHHHSIENNEVTF
XM_009970430.1:Tyto alba	-----MESRESQ--AHV SAE SRDDNSNQTLESTEDAQDHHHSIENNEVTL
XM_009932280.1:Opisthocomus hoazin	-----VESRESQ--VRI SAEVPPDDNSNQTLESAEDAQDRHSIENNEVTL
XM_010145609.1:Buceros rhinoceros silvestris	-----VESRESQ--VRSVAEIPDDNSNQTLESAEDAQDRHSIENNEVTL
XM_009978083.1:Tauraco erythrolophus	-----VESRESQ--VRI SAEIPDENSNQTLESAEDARDRHSIENNEVTL
XM_010154680.1:Eurypyga helias	-----TESKESQ--VRSVAEIPDDNSNQTLESAEDAQDRHSIENNEVTH
XM_009639993.1:Egretta garzetta	-----MESKESQ--VHVSAEIPDDNSNQTLESTEDAQDHHHSIENNEVTL
XM_009327481.1:Pygocselis adeliae	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDAQDRHSIENNEVTL
XM_009280227.1:Aptenodytes forsteri	-----MESKESQ--VHVSAEIPDDNSNQTLESAEDARDRHSIENNEVTL
XM_009512482.1:Phalacrocorax carbo	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDAQDHHHSIENNEVTL
XM_014961493.1:Calidris pugnax	-----MESRESQ--VRSVAENPKDNSNQTLESAEDAQDHHHSIENNEVTL
XM_009813620.1:Gavial stellata	-----VESRESQ--VRSVAEIPDDNSNQTLESAEDAQDRHSIENNEVTL
XM_009916485.1:Halialaetus albicilla	-----MESRESQ--VRSVAETPDDNSNQTLESAEDARDRHSIENNEVTL
XM_010569846.1:Halialaetus leucocephalus	-----MESRESQ--VRSVAETPDDNSNQTLESAEDARDRHSIENNEVTL
XM_011600806.1:Aquila chrysaetos canadensis	-----MESRESQ--VRSVAEIPDDNSNQTLESAEDARDRHSIENNEVTL
XM_009490811.1:Pelecanus crispus	-----MESRESQ--VRSVAEIPDDNSNQTLESAEDARDRHSIENNEVTL
XM_009694723.1:Cariama cristata	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDSRDHSIENNEVTL
XM_010311221.1:Balearica regulorum gibbericeps	-----VESRENQ--DRVSAEIPDNDNSNQTLESAEDAQDHHHSIENNEVTL
XM_010287426.1:Phaethon lepturus	-----MESRESQ--VRSVAEIPDDNSNQTLESAEDAQDHHHSIENNEVTL
XM_009890748.1:Charadrius vociferus	-----MESRESQ--VRSVAEIPDDNSNQTLESAEDAQDHHHSIENNEVTL
XM_009584852.1:Fulmarus glacialis	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDAQDHHHSIENNEVTL
XM_009467655.1:Nipponia nippon	-----MESRESQ--VHVSAEIPDDNSNQTLESAEDAQDHHHSIENNEVTL

Table S1.14: Osteopontin in Aves. The large number of available sequences reveals 4 distinct subgroups (separated by free lines). The *Limosa lapponica baueri* sequence has a long unique N-terminal stretch, which requires corroboration.

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*Salvelinus fontinalis*
NW_018128285.1:*Monopterus albus*
AY651247.1:*Sparus aurata*
NW_019174336.1:*Seriola dumerili*
JN854244.1:*Oreochromis mossambicus*(partial)
NW_016094914.1:*Kryptolebias marmoratus*
NW_015443488.1:*Nothobranchius furzeri*

-MHFDWLNPEAAGFKSQAAVSIKTKQDLKQETWKVVVDPLSDSSKKVRFRTAAEEQNTPRK

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*salvelinus_fontinalis*
NW_018128285.1:*monopterus_albus*
AY651247.1:*sparus_aurata*
NW_019174336.1:*seriola_dumerili*
JN854244.1:*oreochromis_mossambicus*(partial)
NW_016094914.1:*kryptolebias_marmoratus*
NW_015443488.1:*nothobranchius_furzeri*

MKAVIVFVLLFAAVYCHPVKRSASSSESADL---QPVDTVQV-----LKV
MKSIIVLTLLVATVFCVVPKRSASSSESSEELVIVQRFPPILRKAANVFOVEPT--QTT
MKAATVAVVLLFATVLRPAIRSPGNNPESLEELVKPAPVLRGIAP---AELTEVAVPQNV
MKAATVAVVLLFATVLRPAIRSPGNSPESSEELVKPAPVLRGIAP---AELTEVAVPQNV
MKVAIVTVLLFATVLCGPVRKASYRSESSEEVVRRPAVPAIRKQAAVVPQSRAAHVQNV
MKVAIVFVLLFATVLCRPARKVADSS-ESSEEVVRKPAPPALKKQAAVVPQAPAAPVQDI
MKVAIVFILLFATVLCRPARKVSDSS-ESSEEVVRPAAPAVQTEAD-----AAPQNV
-----ESSEEVVRQPKPALRKQAPVLLKARPPVQNV
MKVAIVFVLLFATVLCRPARKVSVSS-ESSEEVVRRPAAPALRKQALVAPKSRPSPVKV
MKVAIVFVLLFAAVLCRPARKVSDSS-ESSEEVVRRPAAPAVRKQAVVAAKHRAKPVQNV

: :

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NW_019174336.1:*seriola_dumerili*
JN854244.1:*oreochromis_mossambicus*(partial)
NW_016094914.1:*kryptolebias_marmoratus*
NW_015443488.1:*nothobranchius_furzeri*

TAVA---D-----VSSEE-DDDDDD
P----ESNESTD-----SAD-----D
DTAT---TSDESSDK-DETEGADPTS-----DPTSADSADS-----
DTAT---TSDESSDE-DETEGADPTS-----DPTSASTASTDSTDSADSADS
VAAAA-IDSDSEKGSSEDESVVTT-----DGTNTALASDSTSDKSKSDSDDDDDD
VAAA-AAGSDESSESSEDEDAQAAPEA--PVEVQSSDSDTASTSDTASVNSKSDSEDS
VAAAA--GSDESKESSEDELEAAA-----DTSSSDTASVNSDSDSDDDDD--
VAAAA-AGSGESAETSFEHHQQQVAEALPEVKSVVTDTT-SDSP-SVNTQDS-----E
VAAP-AAQSDESTETSSEEDQGVAPVK-DAVKFKAISADPNPPTESPS-VISKDNDDDDDD
VAAAAAGSDESSETSSEENQGVAVEK-ATVEFKAAAGVDTNAAPVSDKGTNSQSDSDDDDD

: :

NC_030431.1:*Ictalurus punctatus*
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NM_001124267.1:*Oncorhynchus mykiss*
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JN854244.1:*Oreochromis mossambicus*(partial)
NW_016094914.1:*Kryptolebias marmoratus*
NW_015443488.1:*Nothobranchius furzeri*

-----DSDSDESDENGEP-----TSSPPIIETT-----
TEEADEESETDEKEEENETDSSSESSEGESDITIIIPVTVDP-----TL
-----ADSADSADSDDTDESSESESEADTTAAPATAE-----PTVEPTMATTEAP-
-----NESKDSADSADSDDTNESSESESEADTTAAPATAE-----PTVEPTMATTEAP-
--DNDDETK-----ETEEDESSESSEGES-STLAPATDTPVITDEPVAETTVEPIVPTI
--DDDDETEE--SETEEDSESSESSEGES-STAVPSTLTPVIVTDAPVAETTPQPIDPTI
-----DEAEE--ADTDEDDSSDSESSEGES-STPAPTASPVIIITEPVIETTSPRIEPTI
DGDDDEAAEESETEEDDESSESSEGES-STPAPSTVAPVVVTEPAPPEPTDSSIVATV
DADDDEGTEETDEDESDSSESSEGES-STPAPGTLSPAVVTAEPVPEPTTVDTILPSI
-----EAEESEAEEDDESSESSEGES-STPAPGTVSPVVVTVPEPLGTTVDTILPTI

: :

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*salvelinus fontinalis*
NW_018128285.1:*monopterus albus*
AY651247.1:*sparus aurata*
NW_019174336.1:*seriola dumerili*
JN854244.1:*oreochromis mossambicus*(partial)
NW_016094914.1:*kryptolebias marmoratus*
NW_015443488.1:*nothobranchius furzeri*

LIPVINGRGRGDSI-GFQSDYKKPVYVVDGNNIEKGPS SHKSYGSD-----KTKYD
GPIINTGRGDSL-GYPSDYKKSIIYVDADFEKLPSPYKSYSSDKLGLTFVSKKTSAYD
--IYDDGRGDSM-GYPSDYKKSIIYVDTNNIEKGPSYKSYGKI--DEGMYAGKKSIVYN
--IYDDGRGDSM-GYPSDYKKSIIYVDTNNIEKGPSYKAYGKM--DEGLYTGKKSIVLYD
VTDADTGHGDNMRGYPGDY-KSIVYVEDKSYHKIPVAYKSYEFV--GTGK----KTAYD
VTDTETRGRGDSYGGYPSDY-KSIDYVEEKTYKVPVPYKSYELV--GTGK----KMAYD
VTDTEARGDNYGGYPGDY-KSIVYVEDKSYHKVPAPYKSYEFV--GAGK----KMAYD
VTD--TARGDNLGGYPSY-KSIVYVEEKSYHKAPYKSYEFV--DTGK----KTAYS
VTDTDSRGRGDSLGGYPGDY-KSIMYVEEKSYHKVPVPYKSYEIV--CAEK----KLGVD
VTDPDAGRGDNLGGYPGDY-KSI-YVEEKTYHKMSGPYKSYEFV--DSGK----KTGYD
.:**.* : :.* * : ** : : * : **.* *

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*salvelinus fontinalis*
NW_018128285.1:*monopterus albus*
AY651247.1:*sparus aurata*
NW_019174336.1:*seriola dumerili*
JN854244.1:*oreochromis mossambicus*(partial)
NW_016094914.1:*kryptolebias marmoratus*
NW_015443488.1:*nothobranchius furzeri*

GA-----DLKVKYKAL--QVHNV-----GLDQGVDASSGTDSDSDASQOEQKAAS
DQSINDVEKEITLYKAL--QVHDL E-DGNTSTSEIDNIEAN-----ERQAALG
TGLGNKIEKTMVFKAL--QVHDL M-EEDTSTPDVESQVLDASSGKA EESSMRKAHVDA
TGLGNEIEKKMTGFKAL--QVHDL M-EEDTSTPDVESQVLDSSSGKA EEPQQRQAHVDA
MTEGNEVEKSLKVKYKAI--QVHSDLVEEDTSTPEVESQGLDASSVITQD--HCEEGASP
MTDGNEVEKSLQVKYKAL--QVHSDILEEDTSTPEVESQGLDTSSGTSQD--QDLRQASLP
MTDGNEVEKSLKVKYKAL--QVHSDILEEDTSTPEVESQGLDATSQ-DQA--ISPRQASLP
MTGGNEVEKLPKVYKTIY--VNPELLEEDTST-----
MTDVNEVEKLPKVYKQVAFQIQSDILEEDTSTPEVESQGLDVSSGTSQDQDINPRQASLP
MTDGNEVEKSPKVYKQVAFHTQSQLLEEDTSTPEVE TQSLDVSSGTSQDQDISHRQASLP
:* : :

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*salvelinus fontinalis*
NW_018128285.1:*monopterus albus*
AY651247.1:*sparus aurata*
NW_019174336.1:*seriola dumerili*
JN854244.1:*oreochromis mossambicus*(partial)
NW_016094914.1:*kryptolebias marmoratus*
NW_015443488.1:*nothobranchius furzeri*

-----SSSAS-----DAVPSQ-ESEEDSQSSEEN
AQEIVPVGDAQA-----TEEGASARDSPSDSASASASQ-EENEESDSEET
SQDRTPSESPESQKAKSLES DATSEL---TSSASSDGTSESTSTASNETDSSNSSEEA
SQDRTPSESPESQKAKSLES DATSVR---TSSASSDGTSESTSTASNETDSSNSSEEA
S-----DA-----TTSTPEEEEEEE-----EESASTSQESEDKESQSSEEA
EEESTSTS-----DATTESESSSTPEEEEEESASTASEDDSTSTSQESEDEESQSSEEA
EEATASTSEASASDATASESESSAPQEEEEED-SASTASDSASTSQESEDEESQSSEEA

FEES-----TAGESSSSTPEEEEEESAST-----TAEEDDEESQSSEEA
EEAS-----TTSES DSSSTPEEEGEEESAST-----SSSASAESDDEESQSNEET

NC_030431.1:*Ictalurus punctatus*
NC_007121.7:*Danio rerio*
NM_001124267.1:*Oncorhynchus mykiss*
AF223388.1:*salvelinus fontinalis*
NW_018128285.1:*monopterus albus*
AY651247.1:*sparus aurata*
NW_019174336.1:*seriola dumerili*
JN854244.1:*oreochromis mossambicus*(partial)
NW_016094914.1:*kryptolebias marmoratus*
NW_015443488.1:*nothobranchius furzeri*

TTAATAIDSNSSSEDESEETNT-----ADQPALLKNENPEVLIA-
TSTPGAADSESNSSQSTESTESQESDSDE-ETTQTTEASIIIVK-
TARPGAADSDSAESNESHDSDSDSAEEAATVATIITDAPVITAK
TARPGAADSDSAESNESHDSDSDSAEEAATVATIITDAPVVITAK
TVTPGAADSDSDESDESDE---S-----EGTGPDATTDPLVITAK
TATPGAADSDSDESDESAG---SDS-DEQAAGPDTTDMPVVITAK
TATPGAADSDSDESDESKE---SDS-DEQGAGPDTTDMPVVITAK

TATPGA S D S D E D --- D S V E --- S D S - D E E A V G P D V T T D M P A V V T A K
TATPGAADSDSDESESESE---GDS-NEEGEGPDATADMPAVLTAK

Table S1.15: Osteopontin in Fish. Alignment after elimination of KX833902.1 (*Polypterus senegalus*) and XM_006007328.1 (*Latimeria chalumnae*).

Table S2: Alignment of the osteopontin amino acids by taxonomic groups. **2.1.** Canonical sequences were derived from each group in Table S1. They were aligned with Clustal Omega, followed by manual adjustments. These adjustments reflect investigator supervision to override the rigid gap creation and gap extension rules of the program and bring common sequences together. The signal sequence (light gray) and the preserved GRGD motif are framed. The transparent blue boxes highlight the SSEE motifs; the transparent green box depicts the histidine-rich, variable-length domain in Reptilia and Aves; the (Q/E)TLP(S/D) sequence marks the beginning of the central domain and is shown dark purple background; the poly-aspartate sequences are on yellow background; the transparent red box covers the GRGD domain with the upstream sequences; the transparent dark purple box shows the potential thrombin cleavage site and heparin binding site; a second heparin binding site in primates (RL(Y/H)KRK) is marked by a light purple box (with a conserved stretch upstream in very light purple); between the heparin binding sites is a conserved domain of unknown function that is shown in a transparent faint orange box; the gray boxes depict the C-terminal domains. The colors match those in Figure 1. Common polymorphisms are indicated by lower case letters in smaller font. Lower case x indicates any amino acid. Variable inserts are within parentheses. **2.2.** From an alignment of all sequences retrieved, shown are two representatives of each group (4 representatives for 2 subgroups of Aves). The horizontal lines separate three clusters of distinct osteopontins. The birds and reptiles on top have high internal similarity. The Fish sequences (middle) are very different from all others. Eutheria and Prototheria (bottom) display a pattern that is internally similar, but clearly distinct from Fish and from Reptilia/Aves. The box covering all entries at the beginning of the alignments represents the putative signal sequence. Among the birds and reptiles, differences include a far N-terminal histidine-rich insert in the Squamata (boxed), a deletion (2nd small box) and a short substitution (3rd small box) in a subset of birds. Cervidae and Bovidae lack a sequence of about 20 amino acids in the downstream part of osteopontin (box across two lines). Reptilia,c+t = Crocodylia and Testudines, Artiodactyla,c+b = Cervidae and Bovidae, Afro+Xen = Afrotheria and Xenarthra, Artiodactyla,ccs = Camelidae Celacea and Suidae.

Fish	MK _{av} A _{iv} VFVLLFATVLC _{CRP} _{av rik rk sv peax} SS _{sep - sed} SSEEVV _{rqp rp ap vp} PALRKQ-----
Prototheria	MRTAVICLCLISIIACALPVKRSGPEANS _{GS} SEEKQLYNKH-----
Marsupialia	MRTAVICFCLLGIVSALPVKQ---QINS _{GS} SEEKxLYSKH-----
Carnivora	MR _{il} AVICFCLLGIAYTIPIK----Q _{tap} DSGSSEEKQLY _{nh} KY-----
Artiodactyla(b)	MRIAVICFCLLGIASALPVK----PTSS _{GS} SEEKQLN _{NN} KY-----
Rodentia	MR _{lfi} AVICFCL _{lfi} GIA _{sy} SLPVK----v _{q at} DSGSSEE _{kr} X _{hl} Y _{sn} K _{hl} -----
Artiodactyla(a)	M _{kr il} AVICFCLLGIASALPV _{gk} ----QT _{dn} SGSSEEKQL _{nys} NKY-----
Lagomorpha(+similar)	MRIAVICFCLLG _{im} AYALPVK----h _q xDSGSSEEKQLYxKY-----
Eutheria(various)	MR _{xx} VICFCLLG _{xx} S _{xx} XPVKx---Q _{at} DSGSSEEKQLYNKY-----
Afrotheria,Xenarthra	MRIAVICFCLLGIAYALPVKx---QADSGSSEEKQL _{yh} SKY-----
Perissodactyla	MRIAVICLCLLGIAYALPVN----QADSGSSEEKQLYNKH-----
Chiroptera	MRIAVICFCL _{lv} GIAYALPVK----HADSGSSEERQL _{yf} NK _{hy} -----
Primata	MRIAVI _{cs} FCLLGI _{at} YALPVK----QADSGSSEEKQLYNKY-----
Reptilia(b)	MKIAVL _{ic} LCLF _T _{vi} AFALPISKSRH _H _{DD} _S _{rgm} SAERKH _S _{SRE} _{nh eh ah} HAHHHHHH _{nh} SHSHEHSQE
Aves(1)	MKLALLCLCFISIAAAWPVSKSKQH _{AI} SASSEEKYDPRS---HH _{at} HR _Y HQ---DHVDSQ-
Reptilia(a)	MK _{ti} AVLCLCLI _{gs} I _A FALPVSKSKH _{hrq pa di} _S _{re} SSEE _{rn dh} DSRS---HH _{sh} HR _H HHH---Q _{rh} V _{qh ti} qe-
Aves(3)	MK _{ve} AVLCLCLISITA _A WPV _{iv qp} SK _{qh} H _{AI} SASSEEKYDSRG---HHL _{hr} RY _{Hnd} ---D _{ny vme} NSQ-
Aves(2)	MKVAVLCLCLISITV _A WPVSKSKQH _{AV} SASSEEKYDSRG---HHS _{HR} ---HH _H HVNSQ-
Aves(4)	MK _{va} AVLCLCLIS _{iv tav atv} _A WPV _{sn} SK _{gk} _{HA} _S _{AS} SEEK _{YD} _{pas rk} G---HH _{s1} HR _{yqh hqr} H(HH) _{hd} _H _{vm} NS _{qh} ---
	* : : : * * : *

Fish	---	A _{va} xV _{pe} x _{re} APVQNV _{vd} AAAA _x at GSD _{st} ES _{ed} S _{ed} EDEG _{av} ad P _{evt} xxxxxxxxxxxx _{td} ap X _{st} sd sd
Prototheria	---	PNQLSSWLNTDPSQKQALLA-----PQNLVSSEESKE-----NIQQQTLPSIS
Marsupialia	---	PNFVATWLNADPSQKQTLA-----TQNSVSSEESTE-----DLQETLPxNS
Carnivora	---	PGAVATW _{pl} KPDPSQKQTF _{late} LA-----LQ _{at} VLS _{eq} E _{tn} DD-----F _{kq} QKTL _{as} SKS
Artiodactyla(b)	---	PDAVATW _{late} LKPDPSQKQTF _{late} LA-----PQNSVSSEETDD-----NKQNTLPSKS
Rodentia	---	_{pt} ed A _{vim} as _{ts} WL _{vek} PDPSQKQ _{sn} LLA-----PQ _x VSSEE _{tk} DD----- _{lf} KQETLPSNS
Artiodactyla(a)	---	PDAVATW _{late} LKPDPSQKQTF _{late} LA-----PQ _{sn} T _{aiv} SSEE _(D) dn----- _{nf} KQETLPS _{tk} S
Lagomorpha(+similar)	---	PDA _{vl} ATW _{late} LKPDPSQKQ _{sn} LLx-----PQ _x AVSSEE _{tk} DD-----LKQETLPSKS
Eutheria(various)	---	PDAVATW _{late} LKPDPSQKQTF _{late} LA-----PQ _{at} VSSEE _{tk} xD-----xKQETLPSKS
Afrotheria, Xenarthra	---	PDAVATW _{late} LKPDPSYKQ _{it} LLA-----PQNAV _{at} SSEE _{tk} TDx-----LKQETLPSKS
Perissodactyla	---	SDAVSIW _{late} LKPDPSQKQ _{sn} LLA-----PQT-VSSEE _{tk} TDN-----LKQETLPSQS
Chiroptera	---	PDAVATW _{late} LKPDPSQKQ _{sn} LLA-----PQ _{at} VSSEE _{tk} TD _{dn} -----FKQETLPS _{gkt} S
Primata	---	PDAVATW _{late} L _{kn} PDPSQKQ _{sn} LLA-----PQNAV _{at} SSEE _{tk} TD _{nd} -----FKQETLPSKS
Reptilia(b)	H _{gv} NSHEHSQES _{pq} EH--(EQQ) _{av} SS-----QLNSQS _{ls} E _{de} rsDE-----ITEQQTL _{Lav} SS	
Aves(1)	-----SQEHLQQTQNDL _{av} SL-----QQTHYSSEENAD-----VPEQPDPFPDIP	
Reptilia(a)	-----SRV _{sr} P _{pa} x _{at} QEV _{hl} V _{pl} P-----QQTSFSSEESVE-----V _{pt} ek qr Qxxxxxx(A)	
Aves(3)	-----SQESQQHPQSDLASS-----QQTL _{lyh} SSEES _{vm} D-----VP _{ev} QLHFPDVS	
Aves(2)	-----SxESLLxPRDDL _{av} ASP-----QQTLYSSEERAV-----VPVxxRFPxVx	
Aves(4)	-----SWE _{sr} lqQH _{pts} Q _{nd} DL _{vam} SP-----QQTLYSSEES _{vm} D-----VP _{ve} qk P _{hq} FDPDVS	

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Fish	TASVNS _{qk} DS-DDDDDDxxDDDDDE _{ta} EES _{ea} X _{des} ----- _{ae de se des ed ds sd sed} SSESGES _{st} T _{ap}
Prototheria	---NESHDDVDDADDQDDSD-----HKD---ESDDSDDES
Marsupialia	---xESPDDIDDxDDDDGDxG-----HKST---DSDDSDDES
Carnivora	--- _{nd} ESH _{de dv vd} DEDD _{egr} DD-----VDSQDSVDS _{hn} D----- _{tv} DD---DSNQSDDES
Artiodactyla(b)	---NESPEQTDDLDDDD _{de} NSQ----- _{de} V _{tn} S _{dn} DSDD _{at de nt pt} DD _{ps} DHS _{dn} ---ESHHSDES
Rodentia	---NESH _{dh} MD _{vd} DDDDDDGD _{hq av edn} SZ _{qe} DSVDS _{de} SD _{de} DD _{hd} PDD _{sd hd he sp} D--- _{de} S _{hd} HSDES
Artiodactyla(a)	---NESP _{de} HTD _{dt} VDD _{de de} D _{deg dt vsh} --- _{dqv ds} ---Qd _{vad} xxxxxx _{dn hd tas dn} D _{ta} D _{rh} SD---ESHHSDES
Lagomorpha(+similar)	---xESH _{dh} DM _{tm} DD _{vi} D _{de de de} Dx _{dn} H---VDSxDSxDxDDD-xxxxxDDSHHS---ESHHSDES
Eutheria(various)	---NES _x DHTDD _{av} DDEDDGDH--- _{qv} DS---xxSDD _{SxDx} DHxDDx _{DH} SD---ESHHSDES
Afrotheria,Xenarthra	---NES _{hg} DQTDDVDEDD _{gs} DH---VDSQDSV _{de} SDDSDDDHTDDPDHSD---ESHHSDES
Perissodactyla	---NESH _{dh} TD _{vd} DDDDGDH---EDDQDSIDSDDSD _{ETDPTDDPD} NSD---ESHHSDES
Chiroptera	---NES _{qh} D _{lh} TDDVDD _{de} DDE _{dh} H---VDSQD _{sh} IDS _{nd} DSDD _{ad} D _{hr tp} DD _{sp} DNSD---ESHHSDES
Primata	---NESH _{dh} MD _{vd} DD _{ed} DDDDH---VDSQDSIDSNDSD _{ed} VDDTDDSHQSD---ESHHSDES
Reptilia(b)	---SKS _{nh} EDDD _{dn} HSDV _{sd kd} DDD-----HxDxxD---DSDESDES
Aves(1)	---SKSQEAVDDDD-D-----DDN---DSNDTDES
Reptilia(a)	---S _{vr} S _{nt} E _{sd ed (G)} D _{hd} ----- _{hd} D _{nd} ---DSNDTDES
Aves(3)	---SKSHEDVDDDDDD-----DDN---DSNDTDES
Aves(2)	---SKSHEDPDDD--V-----DDN---DSNDTDES
Aves(4)	---SKSHEDVDDD-- _{dn} -----DD _{nd} ---DSNDTDES
	* : . :

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Fish	APxT _{val ts} PVI _{vi} TxE _{pav} EPV _{pt} T _{vm da pt} I _{lev pa} TIV-----TDxDTGRGD _{sn lmy(G)} GYP _{gs} DY _(K) KSI _{vi} YV _{ed edt}
Prototheria	-----DEVVTD _F PTDVPATAVFTPAAP-----TRGDNGGRGDRVYR-GLKTKPGVLYKA-
Marsupialia	-----DEVVTD _F PTDTPxTSSFLPDGP-----TRGDNGGRGDSVAY-GLRSKVGAPYRS-
Carnivora	-----DELVTDFPTD _{vif} PATQFFTPAVP-----TRDS _{yn} DGRGDSVA _{yh} -GLRS _{kr} SKKSHRY-
Artiodactyla(b)	-----DE _{va} --DFPTDIPT _{ti} AV _{sf} TP _{pf if} P-----TE _{ns ta} NDGRGDSVAY-GLKS _{kr} SKKFRRS-
Rodentia	-----Dex _{vfi} Tx _{sa} PT _{nd gt pt qe ta epd vt} F _{TP} viaVP-----TV _{ed tvi py} DGRGDS _{vl} AY-GLRS _{rk} S _{rk sk lf hyq vi} S-
Artiodactyla(a)	-----DEVVTD _F PTD _{ivt} PAT _{as} VFT _P apVP-----T _{eg} D _{tp qyn de} GRGD _{ns vi agv} Y-agLR _{ts} KSK _{km} F _{rh} RS-
Lagomorpha(+similar)	-----DE _{lv} xTDSPT _{dex} PATPVFT _P avVP-----TxDTYDGRGDSVAY-rgL _{kr} SKSK _{xfl} XXS-
Eutheria(various)	-----DEVVTD _F PTDVPATPVFTPAVP-----TGDTYDGRGDSVAY-GLRSKSKKLYRS-
Afrotheria,Xenarthra	-----DELVT _(DFPT) D _{dv} PATPVFTPAVP-----TVDTYDGRGDSV _{va} Y-rgLRSKSK _{kr} KIxxS-
Perissodactyla	-----DELVTDFSTDVPATPVFTPAVP-----TRDTYDGRGDSLSY-GLKSKSRKFRRS-
Chiroptera	-----DELVTDFPTD _{f1} PGTP _{fvi avf} TPAVP-----T _{ri} DT _{ny} DGRGDSVAY-rgL _{kr ls} KSK _{f1} HRS-
Primata	-----DELVTDFPTDLPATEVFTPVVP-----TVD _{it} YDGRGDSV _x Y-GLRSKSKKFRRP-
Reptilia(b)	-----HE _{tnv fv} TDxPT _{qd as} P _{vf} Tx _(PVXP) D _{sp fv} -----TGRGD _{vs} APY-G _{ifkr} RAKVD _{lq mv sh} ----
Aves(1)	-----DEVVTD _F PT _E APVT-----PF-----NRGDNAGRGDSVAY-GFRAKAHV-----
Reptilia(a)	-----DEDAVTDFPTD _{af} PVT _{te pt lf pt} P _{af lps} P-----TRGDNSGRGDSV _{ag} Y-RMRAKAKLV _{(DVY-}
Aves(3)	-----EEVVT _{si} FPTDIPVTEPFPTFPF-----T _{rq} GDNAGRGDSVAY-RM _{rk} AKA _(ALLRAKA)
Aves(2)	-----DEVVTx _F PTDAPVTAPFPFPF-----TRGDNAGRGDSVAY-RIKAKAxV-----
Aves(4)	-----DEVVTx _F PTDIPVT _{va} PFPPFPF _(GDSA) TRGDN _{as} GRGDSVAY-RxRAKA _{ats} x-----
	* * * * *

Fish	kn snt yi he K _{vg} P _{vsg} PYKSY _{eg} FV _{gd} TGK(LTGKK)K _{stm} AYDMTDGNEVEK _{sl} pmlK _{sl} VYKALQVH _{sd} dl liimLEEDTST
Prototheria	-----AVQGHIDAS-DDF-T
Marsupialia	-----SEQVHDTVTEEDL-T
Carnivora	-----E _{dv} QYPDSTEED _{f1} -T
Artiodactyla(b)	-----snV _{qe} SPDATEEDF-T
Rodentia	-----D _{aeq} Q _{yfd} psDATDEDL-T
Artiodactyla(a)	-----E _{via} qe hyq pl deA(TEEDV) -tm
Lagomorpha(+similar)	-----xxQYPDAxEEDL-x
Eutheria(various)	-----x _{vi} QYPDATEEDL-T
Afrotheria,Xenarthra	-----VIQ _{fy} PDATEEDL-T
Perissodactyla	-----EDQYPDATEEDL-T
Chiroptera	-----avVQYPDATEEDL-T
Primata	-----DIQYPDATDEDI-T
Reptilia(b)	-----if egk ksSxKSYKKSGKFDS _{hq} DV _{st} D _{ed} fvDST
Aves(1)	-----VKASKLRKAARKLIEDDATAEVG--
Reptilia(a)	HKE)-----KSS _{kr} hl Y _{qk} ATGKFIVHD _{av} TEEDDST
Aves(3)	-----atLLK _{sy} ivKL _{hy} KAAKK-L _{il} YDATEEDES _{dy}
Aves(2)	-----VKPSKLHKAARKLIVHDATEEDES
Aves(4)	-----xK _{spa} si KL _{rh} KAAKKL _{im} XYDA _{ts} EEDES _{adt}

* :

Fish	--PEVESQGLDASSG _{tk sa} QDxxx _{qrs} x _{rae} QA-----S _{lv ap es eq} E _{sr} T _{sp st se} SPE-----
Prototheria	--SRLESLESDESP---EAYPDAHKLQ-----KSSEWH--SNEASHQDDRSMQKSSEWHS
Marsupialia	--SQMESYESEKxH---KAFPLSQNLQ-----KVSAXx--SNSKESNE-----
Carnivora	--SLVKSxS _{mt} EDDF---NAVLLS _{hgr} TVR----- _{gr st sp} D _{rg} D--SH _{va} KDSQE-----
Artiodactyla(b)	--SH _{vi} ESEEMHDAPKK-----
Rodentia	--SH _{vm ken} SxE _{sl} -- _{ls sk de at hl} K _{av vi lp} VA _{hgr rhl} L _{nsk} ----- _{vm} PSD _{wq} D--S _{hnt} GK _{td} SHE-----
Artiodactyla(a)	-- _{st} HVESEE _{avt dg deg at ph} ---KAI _{lf vd} AQ _{rg} LH-----xASD _{dn} --S _{rg gwe} KDSQE-----
Lagomorpha(+similar)	--SH _{vm de} SxD _{lm} DD _{ae ph} ---KAI _{pl} VAQ _{ah} L _{qn} -----x _{pt} SDWD--S _{qh qe kg} DSHE-----
Eutheria(various)	--SHMESEELDDA _{ph} ---KAIxVAXRLx-----RASDWD--SH _{gp} KDSQE-----
Afrotheria,Xenarthra	--SQMESKELDDAH---KAIxVxQSLK-----KVSDWD--SQQQDS _{hr} E-----
Perissodactyla	--SPVESKDIDDVH---KAVLVAQGLH-----VASDWD--SRGKDSQE-----
Chiroptera	--SH _{vm} ES _{kde} E _{mv} DDA _{rh (KAV) kr} A _{vi lf} VAQGL _{phq} -----VASDWD--S _{hpr} GKDSQE-----
Primata	--SH _{vm} ESEELNGAY---KAIPV _{av} QxLN----- _{va} PSDWD--S _{rh} GKDSHE-----
Reptilia(b)	--PD _{vd} ESHE _{sy xx sa} ---KA _{rh} SL-----ES-H _{ed (TS)} VExDDKS _{nd} LRDSNE-----
Aves(1)	-----DSQ _{lp} AGLWWPKESREQDSRE-----
Reptilia(a)	--PD _{at} ESQQVD _{sy} S---K _{ap ql} PAAH _{hl fv} PGK _{sy} NI-S _{mv} EWDDKS _{nh} M _{qk} DSNE-----
Aves(3)	--MDADSQ-RS _{vl} S---RED _{sp} ASR _{rs} SLRKHAS-SVWSE _{qr} SHGRDSSE-----
Aves(2)	--LAADSHQAGLS---REDLGAHRSAGKYAD-SGEWGDKSHGxDSNE-----
Aves(4)	--LDADSQ _{qr vat} G _{lf} S--- _{qrw} ED _{spa} A _{av hr hr} SLGKH _{ats iv} -S _{grv} EW _{as} DKSH _{gre} QDSSE-----

Fish ---saQkdA-tk tas SESedSstSTPEEEEEet es SASS---xsgxSedStaSTSqaEsenEDE--ESQ-----S
 Prototheria SEASHQDDRSVETHSHEEAKGYRLKQEDH---SSQQDDLNDSEQESYK---VSR---ENDS
 Marsupialia --ASHPDEYSVETxSHEQLKSYQLExnXy--DSQQQSDSHGSQENDK---VSQ---EFHx
 Carnivora --TSQVDDHSMETKS_{rh ra}H_{sta kr}EYKL_{kr}ASDE---nsNKHSHEIGSQE_{sn Sde}---VSS---ELV_{gs}
 Artiodactyla(b) --TSQL_{nt}DHS_{ke}ETNS_{nsd}ELSKEL_{ktm}PKAKD_{ek}----snKHS_{dn vlr}IESQENSK---v1SQ---EFH-
 Rodentia --SSQLD_{de ph}SVE_{ts}HS_{hql}EQ_{sp rkq}E_{hy}K_{rc}KA_{rs hd en}SxES_{ats ed qhl}SDVIDS_{qkr ae sg sa rk}---vaS_{q1}---E_{hlf qh}S
 Artiodactyla(a) --TSQP_{ds}D_{rh}S_{mv}ETHS_{rqh}EHS_{ek}E_{fy}KLKA_{edy}D_{edg}---sg dny re HSDVI_{de}SQ_{de}NS_{kq}---VS_{pqh}---E_{vf}HS
 Lagomorpha(+similar) -xxSQxDDHS_{vm}ET_{qh}SxEQ_{as}K_{qe}YK_{rl}KAxDx---SxEHSDSIDSQESSK---vsS_{qhl}---E_{fs}HS
 Eutheria(various) --TSQLDDHSVETHSHEQS---KLKAxDE---SNERSDVIDSQENSK---VSH---EFHS
 Afrotheria,Xenarthra --TSQ_{pl}DDHSVETHSQEQSKEYKLIKAND_{ve}---SSEHSDxIDSQE_{nd}SK---VSQ---EFH-
 Perissodactyla --TSQLDDHSVETHSREHSKEYQLKANDE---TSEHSDVIDSxENSK---VSQ---EFPS
 Chiroptera --TSQLDDHS_{tv}ET_{hy}S_{thr ke lha asp ke}EYKLKA_{nm}Dae---S_{nge}H_{sa dv vg}IDSQENSK_{kr}---VSH---EFHS
 Primata --tmSQLDD_{qh}SAETHSH_{ke qh}SRL_{yh}KRKASD_{de}---SNEHSDVIDSQExSK---viS_{rh}---EFHS
 Reptilia(b) -VHSASHD_{rkt}SLE_{nd nh}S_{qpr eq}K_{pl}ESVED_{sd}(HDDAD)HD_{nh}SK_{av ts vi}SLESTES_{rgt}E---q1KK-----
 Aves(1) ---LAQHQSVENDSRP_{rk}FDSPEVDGGD-----SKASAGV-----DS
 Reptilia(a) -V_{tn}SRSRD_{dk}(SMEND)S_{qh}Q_{qr}L_{de}SVEVD_{rs}D_{nd}-----S_{kn}PDV_{tp}EDSHMSNES_{tr}EQ_{qh qh}TQ-----
 Aves(3) -QDS_{dn pl hr hd}RSLEN_{dn}S_{rw ph}KSDSHEAEGDS-----SKSGVRGDS_{lh sp}SVE_{st kr}ERGDS_{hl ps}S_{va}ES
 Aves(2) -VVRKLPDRSLEND_{SR}QKFDSPEXEXXS-----SExGARGxxxxSRE-----S
 Aves(4) -LDS_{kn ql rhp dh rgw}S_{mlw}ENDS_{rq}QK_{fl}DS_{hr}E_{va}E_{igr}DD(D)-----SK_{as}_{gs}VRGDSH_{qhp}S_{mv1}E-----S

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Fish	SEEATATPGAADSDS-----DESD _{se} SE _x st _x SDS _x DE _{qae} ATG _{pa dt} X-----
Prototheria	QEKT-----AQDA-----
Marsupialia	xEVD-----xDSQEFH-----KQQVNKLSQEFxSQEVHLVN-----
Carnivora	-----Q _{ti} VQS _{nsh} EKE _{lr} V _{lq} -----
Artiodactyla(b)	-----SLEDKLDL-----
Rodentia	-----H _{ek} FHS _{hq} E _{fd} K _{ls} vh _{lep} -----
Artiodactyla(a)	-----QE _{lf} ph _S hrEDKLV _{lp} -----
Lagomorpha(+similar)	-----r _q EFxSHEDKLxI-----
Eutheria(various)	-----QE _{fs} HSxEDKLVx-----
Afrotheria,Xenarthra	-----SHEDKHxP-----
Perissodactyla	-----QEFHSSEGKLVr-----
Chiroptera	-----r _q E _{lf} h _{qd} S _{rh} EDKL _{av} ls-----
Primata	-----HEFHS _{hq} EDMLVV-----
Reptilia(b)	-----D _{rh} SEELQQ _{lv} D _{sh} DHDVDDVSNQ _{ts} LES _{ta} ESHHSVEDHHS _A EDHHSxEDHHSxE
Aves(1)	RESQGSV-----PAVDT-----
Reptilia(a)	-----I--(EDLQQ) _{vs da} SVPE _{lv nd} AD-----
Aves(3)	r _w E _{sr} rgDSHPS _{va} ESRES _{qr} DRVSAELSDDI-----
Aves(2)	RESx-----AxVxx-xxxxxDN-----
Aves(4)	r _k E _{sr} Q-----((xx)V _{hr} viSAE _x psPDDN-----

Fish	-----TTD _{ma} PVVITAK
Prototheria	DSDEFNRKHYLKSHTSHEFDSASSETH-----
Marsupialia	DPESVENxKxLKLHSxxExDSASxExH-----
Carnivora	dhS _{ek} S _{ev} E _{eq} DKHLKF _{rh vi} SHELDSASSEVN-----
Artiodactyla(b)	DHKSE-EDK _{hr} LKIRISHELDS _{ta} SSEVN-----
Rodentia	DPKSKE _{de dte} X _{yh} LK _{ifm} R _{iv} SHE _{li ed} S _{sa} SSE _{va} N-----
Artiodactyla(a)	dn _{pls} KSE _(E) ED _{tk} HLK _{fl} RVSHLDSASSEVN-----
Lagomorpha(+similar)	edPKSxEE _{de ke} HLKFRVSHL _{de} S _{at} SSE _{avi} N-----
Eutheria(various)	DPKSE-EDKHLKFRVSHLDSASSEVN-----
Afrotheria,Xenarthra	DPKSEEDKHLKFR _{ti} SHELESxSxExN-----
Perissodactyla	DRKSEDEDKYLKFR _{TS} HESESASSEVN-----
Chiroptera	DP _{qk} SEEQDKHLKFRISHELESASSEVN-----
Primata	DPKSKEEDKHLKFRISHELDSASSEVN-----
Reptilia(b)	DHHSVE _{xx} SxEDHHSVE _{dh} H _{dh} S _{iv} EDNEV _{it} L---
Aves(1)	-----SNQTL _{ES} AEDAEDRHSIENNEVTR---
Reptilia(a)	-----SNQTAES _{tav} EDIQDHHS _{il} EDNEV _{ti il} ---
Aves(3)	-----SNQTL _{ES} AEDS _{QDR} HSIESNEVTL---
Aves(2)	-----SNQT _x ESAED _{xQD} _{xx} SIK _x NEV _{xx} ---
Aves(4)	-----SNQTL _{ES} AED _{as qr} D _{hr} HSIENNEVTL---

Table S2.1. Alignment of canonical sequences.

XM_015411327.1:Gecko japonicus(Reptilia,Squamata)	MKIAVLCCLCLFT---IAFALPIKTKKFDHG-AGSSEDNHDSSRGHHVHKHRRHHHHHSQSQSEHSPHEHVNSHES---QEH-----Q---LP-
NW_013658771.1:Thamnophis sirtalis (Reptilia,Squamata)	MKIAVLTLCCLFT---VAFALPISQSRDHDN-SMSAESKDKSKENEAAHHHHH---HHHSHSH--- -----EHSQESPEH-----HSQESS-
XM_003205565.3:Meleagris gallopavo (Aves)	MKLALLLCLCFIS---IAAANPVSKSKQHAI-SASSEKYDPRSHHHHRYHQ-----DHDVDSQ--SQEHLQQT-----RNDLDSL-
NM_001323234.1:Coturnix japonica (Aves)	MKLTLCLCFIS---ITAAANPVSKSKQHAI-SASSEKYDPRSHHHHRYHQ-----DHDVDSQ--SQEHLQQT-----QNDLDSL-
XM_010218705.1:tinamus guttatus (Aves)	MKVAVLCLCFIS---ITIAWPLSKSKQHAV-SASSEKYDARGHQSHRHH-----HVTSQ--SLENLLLP-----REDLALP-
XM_013190510.1:Anser cygnoides domesticus (Aves)	MKVTVLCLCLIS---VAAANPI-KSKQHAI-SASSEKYDPRGHSHRQHH-----DLVNSH--SQELQLHP-----QNDLDSL-
NW_017728948.1:Crocodylus porosus (Reptilia,c+t)	MKIAVLCCLLIG---IAFALPVNKSQHQP-SSSEERDDSRSHH---RHHH-----HVQIE--SRVSPRAA-----QEVHVLV-
XM_007066639.1:Chelonian mydas (Reptilia,c+t)	MKIAVLCCLLIS---IAFALPVSKSKHAI-SESSEDNHDSSRHSHRHHH-----QQVHTQ--SRVRPAKT-----QELLVPP-
NM_001124267.1:Oncorhynchus mykiss (Fish)	MKAAIVFVLLFA---TVLGRPAIRSPGNP-ESLEELVKPAVLGIAP-----AELTEVAVQNVDTAT-----
NW_018128285.1:Monopterus albus (Fish)	MKVAIVTVLLFA---TVLGGVPRKASVRS--ESSEEVVRRPAVPAIRKQA-----AVVQSGRAAHPVQVAAAA
XM_001370458.3:Monodelphis domestica (Marsupialia)	MRTAVICFCLLG---IVSALPVKH---QINGSGSEERLYN-KHP-----NLVATWLNADPSQKQTLA-
XM_003772957.3:Sarcophilus harrisi (Marsupialia)	MRTAVICFCLLG---IVSALPVKQ---QINGSGSEEKQLYS-KHP-----NFVATWLNADPSQKQTLA-
XM_004681418.2:Condylura cristata (Lagomorpha et al)	MRIAIVCFCLLG---IVSALPVKQ---GDSGSSEKQ-----DAVATWLKPPDPSHQQTLA-
XM_003985184.5:Felis catus (Carnivora)	MRIAIVCFCLLG---IAYALPIKQ---TDSGSSEEKQLYN-KYP-----VAVATWPKPDPSPKQOTFLA-
NM_021702336.1:Neomonachus schauinslandi (Carnivora)	MRLAIVCFCLLG---IAYALPIKQ---ADSGSSEK-----LNN-KYP-----DAVATWLKPPDPSQKOTFLT-
XM_020876412.1:Odocoileus virginianus texanus (Artiodactyla,c+b)	MRIAIVCFCLLG---IASALPVKQ---TSSGSSEEKQLNN-KYP-----DAVATWLKPPDPSQKOTFLA-
XM_005972457.1:Pantholops hodgsonii (Artiodactyla,c+b)	MRIAIVCFCLLG---IASALPVKQ---TSSGSSEEKQLNN-KYP-----DAVATWLKPPDPSQKOTFLA-
XM_012523397.2:Dasybus novemcinctus(Cingulata)	YARPCTRLTLSSFFIFSVSKVKH---QADSGSSEEKQLYD-KYP-----DAVAAWLKPPDPSQKOTFLA-
XM_007951712.1:Orycteropus afer afer(Tubulidentata)	MRIAIVCFCLLG---VASTFPVKR---QADSGSSEEKQLYD-KYP-----DAVATWLKPPDPSHQQTLA-
NW_001711695.1:Ornithorhynchus anatinus(Prototheria)	MRTAVICLCLIS---IACALPVKRS---GPEANSGSSEEKQLYN-KHP-----NQLSSWLNADPSQKQALLA-
XM_003790097.3:Otolemur garnettii (Primates)	MRLAIVCFCLLG---IAYTLPVKH---VDSGSSEEKQFYN-KYP-----DAVATWLKPPDPSQKQALLA-
NW_016536240.1:Manis javanica (Afro+Xen)	MRIAIVCFCLLG---IACTLPVKQ---ADSGSSEEKQLYN-KYP-----DAVASWLKPPDPSHQQTLA-
D11411.1:Oryctolagus cuniculus (Lagomorpha et al)	MRIAIVCFCLLG---MAYALPVKH---ADSGSSEEKQLYH-KHP-----DALATWLNADPSQKQALLA-
XM_006198167.2:Vicugna pacos (Artiodactyla,ccs)	MRLAIVCFCLLGI---ASALPVGQT---NSGSSEEKQLNN-KYP-----DAVATWLKPPDPSQKOTFLA-
XM_014787875.1:Ceratotherium simum simum (Perissodactyla)	MRIAIVCLCLLGI---AYALPVQO---NSGSSEEKQLYN-KSP-----DAVGTWLKPPDPSQKQALLA-
XM_014842441.1:Equus asinus (Perissodactyla)	MRIAIVCLCLLGI---AYALPVNQ---A---DSGSSEEKQLYN-KHS-----DAVSIWLKPPDPSQKQALLA-
XM_016213045.1:Miniopterus natalensis (Chiroptera)	MRAAIVCFCLLGI---AYALPVK---RA---DSGSSEEKQLYH-KHP-----DAVATWLKPPDPAKQALLA-
KB104739.1:Myotis davidii (Chiroptera)	MRIAIVCFCLLGI---TSALP-VKHA---DSGSSEEKQLYN-KHP-----DAVATWLKPPDPSQKQALLA-
XM_012559624.2:Trichechus manatus latirostris (Afro+Xen)	MRIAIVYFCLLGI---AYALPVKHQ---ADSGSSEEKQLYS-KYP-----DAVDTWLKPPDPSYKQIALLA-
JH171653.1:Heterocephalus glaber (Rodentia)	MRIAIVCFCLLGI---TYSLPVQ---ADSGSSEEKPLYN-KLP-----EAVSSWLKPPDPSQKQALLA-
XM_020154612.1:Castor canadensis (Rodentia)	MRIAIVFCLLGI---AYSALPVK-Q---PDSGSSEEKQLFNKHA-----DAVAIWLKPPDPSQKQALLA-
NM_001040058.1:Homo sapiens (Primates)	MRIAIVCFCLLGI---TCALPVK-Q---ADSGSSEEKQLYN-KYP-----DAVATWLNADPSQKQALLA-

Gecko japonicus	SHQSSDSEDES-EEITEQQT---LVHPD-----KSAEDDHSVDVDDHDDVDDVDD-----DSHGAEADDSDESSESDDSHQ-VVTEVPTDRP-FT---PSAAPG---PF----
Thamnophis sirtalis	QLNSQSSSEDR-DEITEQQT---LASS---KSHEDD---DDHSDVSKDD-----DHSDDSDSSESSESHE-TVTDAPTEAP-YT-----E---SV----
Meleagris gallopavo	QQTHYSSEEN-ADVPEQPDF---PDIPS-----KSQEAV-----DDND-----DDNSNDTDESDE-VVTFDFTEAP-VT-----PF----
Coturnix japonica	QQTHYSSEEN-ADVPEQPDF---PDVPS-----KSQETV-----DDDD-----DDNSNDTDESDE-VVTFDFTEAP-VA-----PF----
Tinamus guttatus	QKTLYSSEER-ADVLVPERF---PAVFS-----KSHEDP-----DDD-----VDDNSNDADESDE-VVTFDFTEAP-VT-----AAFPPY---PF----
Anser cygnoides domesticus	QKTLYSSEENAEVNPVKPHF---PDVPS-----KSHEAV-----DDDN-----DDDDNSNDTDESDE-VVTFDFTEAP-VT-----APSPFF---PF----
Crocodylus porosus	QQTSFSSSEES-VEVPKRQIF---QVAS-----RSTESE-----D-----DQDDSDTDESDEDAVTLPTDFP-VT---ETFPFF---PP----
Chelonian mydas	QQSHFSSSEES-VENTEQQL---PKPAS-----VSNEDD-----GD-----HDDNSNDTDESDEDAVTVYFPTEAP-VT---TPLTPA---VP----
Oncorhynchus mykiss	-TSDESSDK-DETEGADPTS---DPTSADSADS-----A-----D-SADSADSDTDESSESSEADTAAPATAE-----PTVEPTMATTEAP-
Monopterus albus	TDSDSEKGSSEDESIVVTT-DGTNTALASDTTSDKSKDSG---DDDDD---DNDDETK-----ETEDESSESSES-STLAPATDTPVITDEDEVAETTVETPI
Monodelphis domestica	TQNSVSSEES-TEDLQQ-TL---PSNSN-----ESPDTDDVDDDD---DDGKHS-----TSDSDSDESDE-VVTFDFP---TD---IPTSS-FLPDGPT-
Sarcophilus harrisi	TQNSLSEES-TEDLQE-TL---PRNSS-----ESPDDIDDDDD---GDH-NKS-----ISPDDSDDESDE-VVTFDFP---TD---TPATPS-FLPDGPT-
Condylura cristata	PQNSVSSEET-DNFKQE-TL---PSVSD-----ESN---DVDDVD---DGDNTERSDTSDS---DDHSDSDSDESSESDE-MATDSP---TD---LPATVDF-YTPVVFT-
Felis catus	LQNAVLSSEET-DDFKQK-TL---ASKSN-----ESHVDV---DED---DEDDVDSQDSVSDSHDITD-----DSDNSQSDSESDE-LVTFDFP---TD---VPATQV-FTPAVPT-
Neomonachus schauinslandi	-QNTVLSQEN-DNFKQK-TL---SSKSN-----ESHEDV---DED---DGDVDSQDSIDSNDVD-----DSDNSQSDSESDE-LVTFDFP---TD---IPATQF-FTPAVPT-
Odocoileus virginianus texanus	PQNSVSSEET-DDNKQK-TL---PSKSN-----ESPEQIDDLDDDD---DENSQDVT---NDSDDTDDSDSHSNESHHSDESDE---ADFP---TD---VPTIATV-STPPIPT-
Pantholops hodgsonii	PQNSVSSEET-DDNKQK-TL---PSKSN-----ESPEQIDDLDDDD---DENSQEVNS---DDSSD-ANPDDSDSHSNESHHSDESDE---ADFP---TD---IPTIATV-FTPPPT-
Dasybus novemcinctus	PQNAVLSSEET-DNFKQK-TL---PSKSN-----ESHHTDNADDEB---DGDHVDSDSDSDE---SDHNDDPDHSDSHHSDESDE-VVTFDFP---TD---APATP-VVPT-
Orycteropus afer afer	SQNTLSSEET-DDLKQE-TL---PSKSN-----ESLDQTDVDDDEB---DGDHVDSDSDESSED---H-DHTDDPYHSDSHHSDESDE-LVTFDFP---TE---VPATPV-FTPAVPT-
Ornithorhynchus anatinus	PQNLVSSEES-KENIQQT---PSISN-----ESHDDVDDADDQDD---DENSQEVNS---SDHKDESDDSDDESDE-VVTFDFP---TD---VPATV-FTPAAPT-
Otolemur garnettii	PQNTVLSSEET-DNFKQK-TL---PSSTN-----ESHDMDDDDDD---HVD---SHSDSDSDTNDPDDSHHSDESSESDE-MV-----TA---NFPDTPV-PPTPPT-
Manis javanica	LQNAVLSSEET-DNFKQE-TL---PSKSN-----ESHDDVDEED---GDNRSQSDASADSDV---DHTDDPDDSDSESDE-LV-----TD---VPATPV-FTPADPT-
Oryctolagus cuniculus	PQNAVMSSEET-DDLKQE-TL---PSKSI-----ESHDMDDIDEDED---D-DHVDNR---DSNESDADHPDSDSHHSDESSESDE-VTV-YP---TE---DAATTV-FTEVPT-
Vicugna pacos	PQSTASSEET-DNFKQE-TL---PSTSN-----ESPDLTDDVDDDD---DD-DTVDSQD---VSDNSDDHDTDRSDSHHSDESSESDE-VVTFDFP---PTD---IPATV-FTPAVPT-
Ceratotherium simum simum	PQ-TVSSSEET-DDLKQE-TL---PSKSN-----ESPDDTDDVDDDD---DGDHVDSDSIDSDDSDTDDPDDPQSESHHSDESSESDE-LVTFDFP---PTD---LPATPV-FTPAVPT-
Equus asinus	PQ-TVSSSEET-DNFKQE-TL---PSQSN-----ESHDDTDDVDDN---DGDHDDTDDSDSDESDTDDPDDPQSESHHSDESSESDE-LVTFDFP---STD---VPATPV-FTPAVPT-
Miniopterus natalensis	PQNTVLSSEET-DDFKQE-TL---PSTSN-----ESHDLTDDVDDDD---DSDNHVDSQDSDSDSDSDADQTDSDSDSDSHHSDESSESDE-LVTFDFP---PTD---FPGLTI-VTPPVPT-
Myotis davidii	PQNTVLSSEET-DDFKQE-TL---PSQSN-----ESQDHTDDVDDDD---DGDHVDSDSIDSNSDSDDDHTDDPDDSDSDSHHSDESSESDE-LVTFDFPPTDPTD---FPPTP-ATPAAPT-
Trichechus manatus latirostris	PQNAVMSSEET-DDLKQE-TL---PSKSS-----ESQDQSDSVDDE---DGEQVDSQDIDSDDTDDHDDTDDSDSDSHSNESHHSDESSESDE-LVTFDFP---PTD---DPATSV-FTPAVPT-
Heterocephalus glaber	PQNSVSSEET-DDLKQE-TL---PSNSN-----ESHDMDDVDDDD---GDQD---SVDVDDDDHPDSDSHHSDESSESDESSESDE-VVTD---PTN---GPETPV-FTPIVPT-
Castor canadensis	PQNVVSSEET-DDIKQK-TL---PSNSN-----ESHDMDDMDDE---DGDHVDSDSVDSDSDSDTDDPDDSDSHHSDESSESDESSESDE-LFTSS---PTD---NPGTQV-FTPVVPT-
Homo sapiens	PQNAVMSSEET-DNFKQE-TL---PSKSN-----ESHDMDDMDDE---DGDHVDSDSIDSNDSDVDDTDDSHQSDSHHSDESSESDE-LVTFDFP---PTD---LPATEV-FTPVVPT-

Gecko japonicus -----TGRGDI--PYGIQHQQ-----LKFRLRKSXSSEQFDSHDTTQE--DLSLPDVDSHET-----HSSKAVSHESQDTSTES
Thamnophis sirtalis -----TNRGDVP-SDEFRPNVDFM-----SLGRS-----GKFDSQSVSDE--VDSTPDDESHED-----SKARSLESHE---S
Meleagris gallopavo NRGDNAGRGSV-AYGFRAKA-----HMVKASKLRKTARKLIEDDATABA-----GGSQ-----LAGLW
Coturnix japonica NRGDNAGRGSV-AYGFRAKA-----HVVKASKIRKAARKLIEDDATTED-----GDSQ-----PAGLW
Tinamus guttatus TRGDNAGRGSV-AYRIKAEP-----AVMKPSKLHKAARKLMVHDVTEE--DLSALAADSHQEGFSREAFG-AHRSAEKYADSLWE
Anser cygnoides domesticus TRGDNAGRGSV-AYRMKAKA-----SMVKSSKLRKAARKLIEDDATEE--DESALHGDSSQVGLWQKELA-AHRAPGKRAVSGEW
Crocodylus porosus TRGDNSGRGSV-GYRMRKAKLV-----KSSRHYQATGKFIIVHDATEE--DDSTPDTESSQVLDYKPLPA-AHLVPGKYDISVEW
Chelonian mydas TRGDNSGRGSV-AYRMRKAKLV-----DIY-HKEKSSKLYKALGKFIIVHDVTEE--DDSTPDASQVVDSSKAPCA-ACHFPGKFDMSMEW
Oncorhynchus mykiss --IYDDGRGDSM-GYPSDYKKSIIYVDTNNIEKGPSPYKSYGKIDEGMYAGKVKVSYNTGLGNKIEKTMVFKAL--QVHDLMEE-DTSTPDVSEQVLDASSGKAEESMRKAHVVDVAV--
VTDADTGHGDNMRGYPGDY-KSIVYVEDKSYHKIPVAYKSYEFVGTGK-----KTAYDMTEGNEVEKSLKVYKAI--QVHSDLVEE-DTSTPEVESQGLDASSVTTQD--HQEGEGASP--S--
Monodelphis domestica R-GDNSGRGSV-AYGLR-SKV-----GAPDISS--AETHVTEEDLTSQ--MESYSEKAH---K-AFPLSQNLPKVSAW
Sarcophilus harrisi R-GDNGGRGSV-AYGLR-SKL-----GAPYRSS--EQVHDVTEEDLTSQ--IESYSEKTH---K-AIPLSQTPFKVSSW
Condylura cristata R-DTYDGRGDSV-AYGLK-SKS-----IKFYSAE--DQYDPATKEDLASQ--MESREMRNGP--K-ATLVALNQLQSTSDV
Felis catus R-DSYDGRGDSV-AYGLR-SKS-----KKSRYE--DQYPDSTEEDFTSL--VKSQSMEDDF--N-AVLLSHTVRRSPDR
Neomonachus schauinslandi R-DSNDGRGDSV-AHGLR-SRS-----KKSRYE--VQYPDSTEEDLTSQ--VKSSEMEDDF--N-AVLLSHTVRRSPDR
Odocoileus virginianus texanus E-NTNDGRGDSV-AYGLK-SKS-----KKFRSS--IQSPDATEEDFSSH--VESEEMHDAP--K-K-----
Pantholops hodgsonii E-STNDGRGDSV-AYGLK-SKS-----KKFRSS--IESPDATEEDFTSH--IESEEMHDAP--K-K-----
Dasypus novemcinctus E-DAYNGRGDSV-AYGLR-SKS-----KLYRSK--IQFPDATEEDLTSQ--MEREGLDDAH---R-VIHVARRLNRSADW
Orycteropus afer afer V-ETYDGRGDSV-ASRLK-SKS-----KKIYRSV--IQYDDTE-ELTSH--MRSKELDDVDP--K-AISVVHVLKRSADW
Ornithorhynchus anatinus R-GDNGGRGDRV-YRGLK-TKP-----GVLYKAA--VQGH--ASDDFTSR--LESLESDSP---E-AYPDAHKLQKSSEW
Otolemur garnettii E-NIYDGRGDSI-PYGLR-SKS-----KKFRRLD--IQIPDETQEDFTSY--VESEELGHGP--K-VIAPNQGLKVPDDL
Manis javanica G-DTNDGRGDSV-AYGLR-SKS-----KKFYRSA--LQYDPATEEDLTSQ--MESKEDDKAR--K-ATLVAQGLHVPSDW
Oryctolagus cuniculus V-ETYDGRGDSV-AYRLKRSKS-----KMFHVSN--AQYPGASEEDLSSH--VSEDLDDTP--R-AIPVAQHLNVPDSDW
Vicugna pacos EDT-QDGRGDSI-GYALR-TKS-----KKFRRSE--VEHPEAM---TH--VESEEADEAH---K-AIFPAQGLHTASDW
Ceratotherium simum simum SDT-YDGRGDSV-GYGRP-SKS-----KKVRRSE--VQYDPATEEDLTSQ--VKSKEVGGVH--K-ALLVAQGLHVASDW
Equus asinus RDT-YDGRGDSL-SYGLK-SKS-----RKFRRSE--DQYDPATEEDLTSQ--VESKIDDDVH---K-AVLVAQGLHVASDW
Miniopterus natalensis RDT-YDGRGDSV-AYGLK-SKS-----KKFHRPA--AQYDPATEEDLTSQ--VESNEADEAH---K-AVLVAQGLHVASDW
Myotis davidii IDT-NDGRGDSV-AHGLR-LKS-----KLLHRSV--VQYDPATEEDLTSQ--MREGLDDAH---R-AVLVAQGLHVASDW
Trichechus manatus latirostris VDT-YDGRGDSV-VYRLR-SKS-----KKIPRSD--IQHPHATEEDSISQ--MESKMLDDAH---K-AIPVLSISLKKPFDW
Heterocephalus glaber VETYD-GRGDSL-AYGLR-SRS-----KKFHISD--PQYPAATDKDLTSN--VESQESSDAQ---K-AVLVAHRLNMPDSDW
Castor canadensis VEV-YDGRGDNV-AYGLR-SRYL-----KKFDISD--AQFSDATEEDLTSQ--IESEESDDAL---K-AIPVAQHLKVPDSDW
Homo sapiens VDT-YDGRGDSV-VYGLR-SKS-----KKFRRPD--IQYDPATDEDITSH--MESEELNGAY---K-AIPVAQDLNAPSDW

Gecko japonicus EDKS-NLQDSNEVHS-----ASHDKSVENDSRQKL--DSVEEDH-----DNSKADISQESDGDHITELKAR-----RGEPO---
Thamnophis sirtalis DDKS-DLTDNEVHS-----ASHDISLEDHSPEKP--ESVEDS--S-DHSKASLSLESTE--SREQKKDH-----SEEPQ---
Meleagris gallopavo WPKESREQDSREL-----TQHQSVENDSRPRF--DSPEVDGG--D-SKASAG-----VDSRESQ---
Coturnix japonica WPKESREQDSREL-----PQHQSVENDSRPRF--DSPEVDGG--D-SKASAG-----VDSRESQ---
Tinamus guttatus GDKS-HGHSNEVGR-----KLPERSLKDSRQKF--DSDPERD--S-GEWGARGDSPPS--RESRESQA---
Anser cygnoides domesticus LDKS-HERSDSELTH-----HQSMENTSROKF--DSPEVEGG--D-SQDGARGDGRHS-----LESRRERV---
Crocodylus porosus DDKS-HMKDSNEVTS-----RSRDD--SHQRL--ESIEVDRD--D-SNPDVPEDSHMSNESREHQHTQ-----I---
Chelonian mydas DDSS-NIQDISSEVNT-----RSHDKSMENGSQQQL--DSVEADSD--N-SKPDVTEDSHMSNESTEQQAQ-----TEDLQ---
Oncorhynchus mykiss -----QDRTPSESPE-----SQKAKSLESDA-----TSELTSSASSDGTSESTSTASNETDSSNSEEATARPGAAD-----SDSAESNESHD
Monopterus albus -----DA-----TTSTP-----EEEEEE-----EESASTSQESEDKESQSSEATVTPGAAD-----SDSDESDESDE-
Monodelphis domestica G---SNSKESNEA-----SHP-DEY--SVETYSHEQF--KSYQLEETNP-----D--SQQQ-----QENDKVSQEFR---
Sarcophilus harrisi E---SNGQESNEA-----SQA-DEY--SVETHSHEQL--KSSQLERNIY-----D--SQQQ-----QENDKVSQEFHREVDNRD---
Condylura cristata D---SQGEDSFKE-----RDD--SLENNGFHES--QEYKLLKAND-----E--SSQ-----KTPESHLSH---
Felis catus D---SHVKDSQET-----SQV-DDH--SMETKSRKHS--KEYLKLKASD-----E--SNKHS-----HEIGS--QESSDISSELV---
Neomonachus schauinslandi D---SHAKDSQET-----SQP-DDH--SMETKSHKHA--REYKLRASD-----E--SNKHS-----HEIGS--QENSEVSELV---
Odocoileus virginianus texanus -----T-----SQL-NDH--SKETNSSELS--KELPKAKD-----E--SNKHS-----DVIES--QENSQVKS---
Pantholops hodgsonii -----T-----SQL-TDH--SEETNSNELS--KELMPKAKD-----E--SKHS-----NLIES--QENSKLS-----
Dasypus novemcinctus D---SHGKDSQET-----RQL-DDH--SVETHSHEQS--KSRKA--SH-----E--SNEHS-----DVIDS--RENSKVSHEFN---
Orycteropus afer afer D---SHPQDSHEV-----SQLEISH--SVETHSHEQS--KELBA--KD-----E--SNERS-----DMIDS--QEISKVSHEFH---
Ornithorhynchus anatinus H---SNEASHQDDRRMQKSEWHSSEASHQ-DDR--SVETHSHEEA--KGYRLKQED-----H--SSQQD-----QESYKVSRENDSQEKTAQDA
Otolemur garnettii D---SHETSDDL-----STETHSK-----EPSDMIVS--QESHVSLV-----
Manis javanica D---SQ-----ET-----SQL-DDQSQAETNSQGYG--KEYTLKAND-----E--SNEH-----ADVIGN--KEDSKVSQE-----
Oryctolagus cuniculus D---SQEKDSHDV-----SQV-DDH--SVETQSHEQA--RQYKREAND-----N--SVEH-----SHSIDS--QESSKVSQES-----
Vicugna pacos N---SQWKDSQET-----SQP-GDH--SVETHSHEQS--EYKLLKADD-----E--GDRHS-----DVVDS--QENSQVSPFHSQELP---
Ceratotherium simum simum D---SRGKDSLET-----SQL-DDH--SVETHSLEHS--KEYLKLKAND-----E--TSEHS-----DVIDS--HENSFKFSHERHSQEFH---
Equus asinus D---SRGKDSQET-----SQL-DDH--SVETHSREHS--KEYLKLKAND-----E--TSEHS-----DVIDS--LENSKVSQEFPSQEFH---
Miniopterus natalensis D---SHGRESQEI-----SLL-DDH--SVETHSLKLP--KEYQLKAIG-----Q--SNEHS-----DGIDS--PENVKISHFHSQELG---
Myotis davidii D---SRGKDSQET-----SQL-DDH--SVETHSHELA--KGYKLLKAND-----A--SNEHS-----VGIDS--QENSRVQEFHSRELQ---
Trichechus manatus latirostris D---SYQDSRET-----SQQ-DDH--SVETHSHEQY--KVYKLLKAM-----V--SSEHS-----DTIHS--QEDSRVSDHL-----
Heterocephalus glaber D---SRGKDSHES-----SQL-DDP--SVETHSHEQS--REHKRKARN-----D--SSEHS-----DVIDS--QEGARASQELHSQEFPP---
Castor canadensis D---S-----HES-----SQL-DDH--SVETHSREQS--REHKQKASH-----E--SREHS-----DVIDS--QESSKVSQEVHSHEST---
Homo sapiens D---SRGKDSYET-----SQL-DDQ--SAETHSHKQS--RLYKRRKAND-----E--SNEHS-----DVIDS--QELSKVSREPHSHEFH---

<i>Gecko japonicus</i>	-EADHDHDVDND-----HHSVEDNEIEY-----
<i>Thamnophis sirtalis</i>	-QLDS--NPDDASNQTVESAESQHSS-----EDHHSVEHHDSVEDNEV-----IL
<i>Meleagris gallopavo</i>	---GSVPAVDTSNQTLESA-----EDAEDRHSIENNEVTR
<i>Coturnix japonica</i>	---GSVPAVDASNQTLESA-----EDAEDRHSIENNEVTR
<i>Tinamus guttatus</i>	RVSAAE-VPDGDNSNQTLESA-----EDAQDHLISIKHNEVIF
<i>Anser cygnoides domesticus</i>	SAASAIPTIDDTSNQTLESA-----ENAREHHSIENNEVTI
<i>Crocodylus porosus</i>	--SASLPETDADSNQTAESV-----EDIQDHHSLLEDNEVTI
<i>Chelonian mydas</i>	-QVDVVPEVND-SNQTAESE-----EDTQDHSSIEDNEVIL
<i>Oncorhynchus mykiss</i>	SDSDSAEEAATVATITTDAP-----IVITAK-----
<i>Monopterus albus</i>	--S-----EGTGPDATTDTP-----LVITAK-----
<i>Monodelphis domestica</i>	-----TQ-----EVNKL--SQEFQSQESHVPN-----DPESVENTKYLKLHSFP--EADSASYEAH
<i>Sarcophilus harrisii</i>	-----SQEFHKQ---QVGKL--SQEYHSQEVHLS-----DPESVENIKPLKLS-H--EVDSASFETH
<i>Condylura cristata</i>	-----SQEFHNQEEKLDL-----DPKSVEEDTHLKFRVSH--ELDSTSSEVN
<i>Felis catus</i>	-----GQTVQSNKELVQ-----HPSEEQDKHLKFRVSH--ELDSASSEVN
<i>Neomonachus schauinslandi</i>	-----SQIVQSHEKERV-----DKSVEDKHLKFHISH--ELDSASSEVN
<i>Odocoileus virginianus texanus</i>	-----QEFHSLKLDL-----DHRSEEDKHLKIRISH--ELDSTSSEVN
<i>Panholops hodgsonii</i>	-----QEFHSLKLDL-----DHKSE-EDERLKIRISH--ELDSASSEVN
<i>Dasypus novemcinctus</i>	-----SQESHSHEDKLV-----GPKSKEDKHLKFHTSH--ELESASSEIN
<i>Orycteropus afer afer</i>	-----SQEFHSQEDKPHR-----DPKSVEEQHLKFRVSH--ELDSASFETN
<i>Ornithorhynchus anatinus</i>	-----DSDEFNRKHYLKSHTSH--EFDSASSETH
<i>Otolemur garnettii</i>	-----T--SH---E-----DLESKEDKLLKFRVSH--ELDSASSEVN
<i>Manis javanica</i>	-----FSHEDKLVF-----DPKSREED-KLKFHTSH--ELDSASSEAN
<i>Oryctolagus cuniculus</i>	-----Q--SREFRSHEDKLAI-----EPKSEEDEHRLRVSH--ELDSTSSEIN
<i>Vicugna pacos</i>	-----SHEDKLV-----DPKSEEDTHLKFRVSH--ELDSASSEVN
<i>Ceratotherium simum simum</i>	-----SREDKLV-----DRKSEEDKYLKFRVSH--ELDSASSEVN
<i>Equus asinus</i>	-----SSEGKLV-----DRKSEDEKYLKFRVSH--ESESASSEVN
<i>Miniopterus natalensis</i>	-----SYEDKPAL-----HPKSEEQDKHLKFRVSH--ELESASSEVN
<i>Myotis davidii</i>	-----SHEDKLV-----DPKSEEQDKHLKFRVSH--ELESASSEVN
<i>Trichechus manatus latirostris</i>	-----SREDKYYP-----DPKSEEDKHLKFRVSH--ELES-----
<i>Heterocephalus glaber</i>	-----SH---E-----DPKSEEDKHLKFRVSH--ELDSVSSEAN
<i>Castor canadensis</i>	-----SLEDKPV-----DPKSQEKDKHLKFRVSH--ELDSASSEVN
<i>Homo sapiens</i>	-----SHEDMLV-----DPKSKEDKHLKFRVSH--ELDSASSEVN

Table S2.2. Alignment of representative sequences.

Table S3: Predicted osteopontin sequences in birds. For most avian osteopontin sequences, a long (complete) and short form of the protein are predicted. The records that have NM_ or XM_ 6 or 12+ digit formats, are reference sequences (RefSeqs), which are curated from single or multiple sequence records that have been directly submitted to GenBank. KK and KL indicate NCBI CON division sequences. JJ are Genbank GSS sequences.

bird	complete	short
<i>Acanthisitta chloris</i>	XM_009073853.1	KK835285.1
<i>Apaloderma vittatum</i>	XM_009868641.1	KL382114.1
<i>Aptenodytes forsteri</i>	XM_009280227.1	KL226085.1
<i>Balearica regulorum gibbericeps</i>	XM_010311221.1	KL502968.1
<i>Buceros rhinoceros silvestris</i>	XM_010145609.1	KL509681.1
<i>Calypte anna</i>	XM_008500834.1	KL218525.1
<i>Caprimulgus carolinensis</i>	XM_010173470.1	KL358285.1
<i>Cariama cristata</i>	XM_009694723.1	KK508828.1
<i>Chaetura pelagica</i>	XM_009993754.1	KN125683.1
<i>Charadrius vociferus</i>	XM_009890748.1	KL873122.1
<i>Chlamydotis macqueenii</i>	XM_010119303.1	KK749833.1
<i>Colius striatus</i>	XM_010202192.1	KK544289.1
<i>Corvus brachyrhynchos</i>	NW_008240042.1	KK719673.1
<i>Cuculus canorus</i>	XM_009559526.1	KL447603.1
<i>Egretta garzetta</i>	XM_009639993.1	KK501660.1
<i>Eurypyga helias</i>	XM_010154680.1	KK572170.1
<i>Fulmarus glacialis</i>	XM_009584852.1	KK609601.1
<i>Gavial stellata</i>	XM_009813620.1	JJRM01070990.1
<i>Haliaeetus albicilla</i>	XM_009916485.1	KK651471.1
<i>Leptosomus discolor</i>	XM_009958978.1	KK689572.1
<i>Manacus vitellinus</i>	XM_008930247.2	KL672548.1
<i>Merops nubicus</i>	XM_008942236.1	KK707889.1
<i>Mesitornis unicolor</i>	XM_010181850.1	KK807537.1
<i>Nestor notabilis</i>	XM_010019624.1	KK945799.1
<i>Nipponia nippon</i>	XM_009467655.1	KL409714.1
<i>Opisthocomus hoazin</i>	XM_009932280.1	KK734416.1
<i>Pelecanus crispus</i>	XM_009490811.1	KK496753.1
<i>Phaethon lepturus</i>	XM_010287426.1	JJRF01066258.1
<i>Phalacrocorax carbo</i>	XM_009512482.1	KL444864.1
<i>Picoides pubescens</i>	XM_009904975.1	KL216617.1
<i>Pterocles gutturalis</i>	XM_010079868.1	KL241686.1
<i>Pygoscelis adeliae</i>	XM_009327481.1	KL225236.1
<i>Struthio camelus australis</i>	XM_009676586.1	KL206412.1
<i>Tauraco erythrolophus</i>	XM_009978083.1	KL455818.1
<i>Tinamus guttatus</i>	XM_010218705.1	KL892771.1
<i>Tyto alba</i>	XM_009970430.1	KK369619.1

<i>Anas platyrhynchos</i>	XM_005012779.3	
<i>Anser cygnoides domesticus</i>	XM_013190510.1	
<i>Apteryx australis mantelli</i>	XM_013957376.1	
<i>Aquila chrysaetos canadensis</i>	XM_011600806.1	
<i>Calidris pugnax</i>	XM_014961493.1	
<i>Columba livia</i>	XM_005498492.2	
<i>Corvus cornix cornix</i>	XM_010412044.2	
<i>Coturnix coturnix japonica</i>	AF239805.1	
<i>Coturnix japonica</i>	NM_001323234.1	
<i>Falco cherrug</i>	XM_005444503.1	
<i>Falco peregrinus</i>	XM_005233595.1	
<i>Ficedula albicollis</i>	XM_016297843.1	
<i>Galeopterus variegatus</i>	XM_008574253.1	
<i>Gallus</i>	M59182.1	
<i>Geospiza fortis</i>	XM_005418195.1	
<i>Haliaeetus leucocephalus</i>	XM_010569846.1	
<i>Lepidothrix coronata</i>	NW_016690259.1	
<i>Limosa lapponica baueri</i>	KZ506572.1	
<i>Lonchura striata domestica</i>	XM_021526515.1	
<i>Meleagris gallopavo</i>	XM_003205565.3	
<i>Meleagris gallopavo</i>	NC_015014.2	
<i>Melopsittacus undulatus</i>	XM_005146580.1	
<i>Numida meleagris</i>	XM_021395699.1	
<i>Parus major</i>	XM_015623543.2	
<i>Patagioenas fasciata monilis</i>	LSYS01006159.1	
<i>Pseudopodoces umilis</i>	XM_005525626.2	
<i>Serinus canaria</i>	NW_007931124.1	
<i>Sturnus vulgaris</i>	XM_014878941.1	
<i>Taeniopygia guttata</i>	XM_002190366.1	
<i>Zonotrichia albicollis</i>	XM_005485296.1	
<i>Cathartes aura</i>		KL320674.1
<i>Phoenicopiterus ruber ruber</i>		KK415766.1
<i>Podiceps cristatus</i>		KL257771.1

Figure S1: The domain structure of osteopontin. A search of 198 osteopontin sequences was conducted in Meme Suite with the expectation of 13 motifs (to not exceed the capacity of the software, partial sequences and two bird sequences needed to be eliminated). **A)** List of the identified motifs with statistics. Motifs with a pale red background are very similar to earlier specified motifs. The colored squares in the right column match the color coding in part B) of this Figure. **B)** Top scoring sequences, each of which has an E-value less than 10. The motif matches shown have a position p-value less than 0.0001. The hit p-value is not adjusted for the length of the sequence. Note the similarity to the domain structure identified in Figure 1.

MOTIFS

Logo	Name	Alt. Name	Width	Motif Similarity Matrix												
				1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
	MRIIVICFCLLGIAALVKQADSGSSEEKQLY	MEME-1	33	--	0.45	0.17	0.19	0.22	0.14	0.13	0.19	0.12	0.1	0.17	0.95	0.11
	MKVAVLCLCLISITAAWVSKSKQHAISASSEEKYDRGHSHRYHHHHV	MEME-2	50	0.45	--	0.17	0.16	0.21	0.24	0.14	0.13	0.1	0.16	0.16	0.83	0.12
	EVVTFDFTDIPATEVFTPAVTRDNDGRGDSVAYGLRSKS	MEME-3	41	0.17	0.17	--	0.17	0.91	0.18	0.16	0.15	0.09	0.17	0.86	0.21	0.14
	NKYPDAVATWLKDPQKQFLAQNVSSEE	MEME-4	32	0.19	0.16	0.17	--	0.16	0.83	0.19	0.17	0.14	0.12	0.2	0.18	0.12
	IPATEVFTPAVTRDNDGRGDSVAYGLR	MEME-5	29	0.22	0.21	0.91	0.16	--	0.16	0.13	0.16	0.07	0.13	0.72	0.2	0.12
	QLYNPDAVATWLKDPQKQFLAQN	MEME-6	29	0.14	0.24	0.18	0.83	0.16	--	0.15	0.13	0.13	0.12	0.17	0.21	0.11
	PQNDLASPQQLYSSEESVDVPVPHFPDVSSK	MEME-7	33	0.13	0.14	0.16	0.19	0.13	0.15	--	0.2	0.16	0.13	0.13	0.17	0.12
	YPDATEDITSHVESELBDAYKAIPVAQLNVPDWDWSHG	MEME-8	41	0.19	0.13	0.15	0.17	0.16	0.13	0.2	--	0.17	0.17	0.16	0.26	0.13
	ENSKVSHEFHSHEDKLVDPKSKKEEDKHLKFRHSHELDSASSEVN	MEME-9	50	0.12	0.1	0.09	0.14	0.07	0.13	0.16	0.17	--	0.19	0.12	0.18	0.11
	VSAEIPDDNSNQTLSEAEADRHSIENNEVTL	MEME-10	33	0.1	0.16	0.17	0.12	0.13	0.12	0.13	0.17	0.19	--	0.16	0.1	0.16
	DEVVTFDFTDIPATEVFTPAVTRDNDGRGDS	MEME-11	33	0.17	0.16	0.86	0.2	0.72	0.17	0.13	0.16	0.12	0.16	--	0.19	0.1
	MRIIVICFCLLGIAALVKQ	MEME-12	21	0.95	0.83	0.21	0.18	0.2	0.21	0.17	0.26	0.18	0.1	0.19	--	0.13
	TDDFKQETLSKSNESDWDYDDEDD	MEME-13	29	0.11	0.12	0.14	0.12	0.12	0.11	0.12	0.13	0.11	0.16	0.1	0.13	--

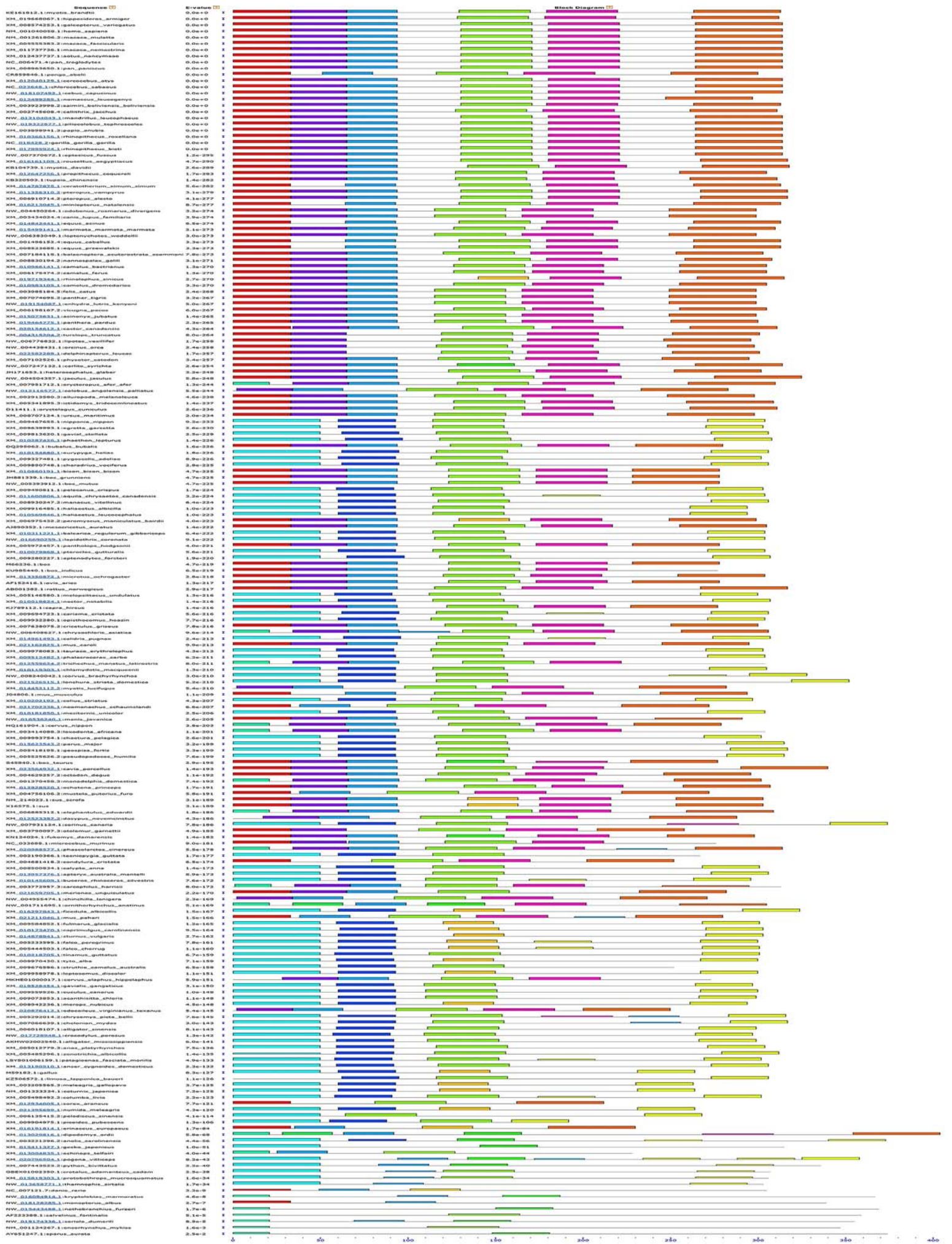
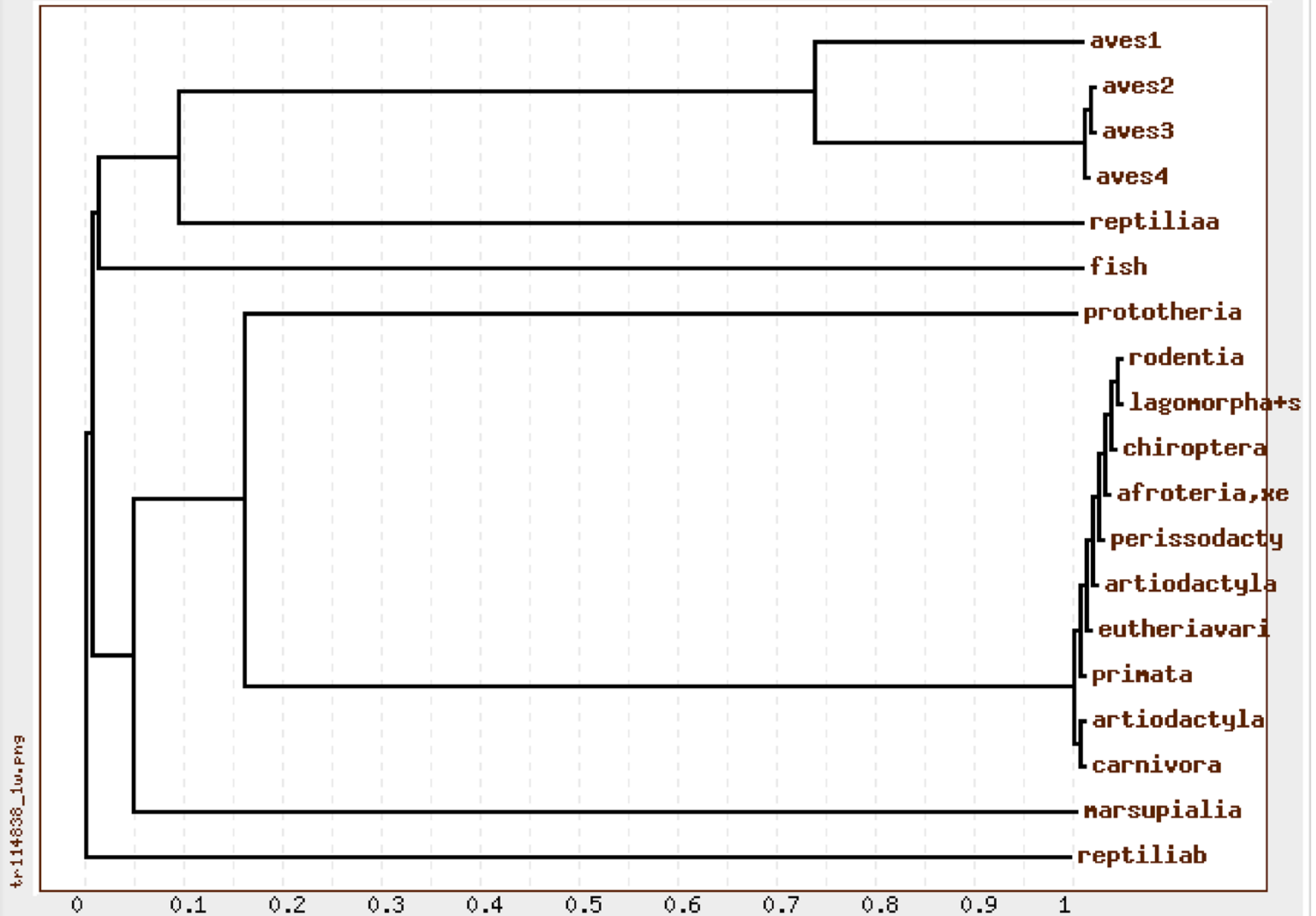


Figure S2: Phylogenetic tree of the canonical osteopontin sequences. The canonical sequences derived from Tables S1 and S2 were used for a taxonomic analysis. In positions with amino acid variation, either the most common allele or X served as placeholders. The tree was generated using the TreeTop option in GeneBee.

Cluster algorithm

PHYLOGENETIC TREE

Phylogram



tr-114838_1u.png

Figure S3: The amino acid composition of osteopontin. Shown are the amino acid compositions (as percent of total) for nine orders of animals. Each bar represents one species, all species available in each order were analyzed. There is little variation within each order, but notable differences among orders of animals. All osteopontins are rich in serine and low in tyrosine. The asparagine content is high (lowest, by comparison, in Marsupials). Squamata have a high histidine content due to the long insert between the SSEE motifs.

