

Evolutionary and developmental analysis reveals *KANK* genes were co-opted for vertebrate vascular development

Monica R. Hensley^{1*}, Zhibin Cui^{1*}, Rhys F.M. Chua¹, Stefanie Simpson¹, Nicole L. Shammass¹, Jer-Yen Yang^{2,3}, Yuk Fai Leung^{4,5}, GuangJun Zhang^{1,2,5,6#}

Supplementary Information

Supplementary Figures

Figure S1. Maximum likelihood phylogeny of *KANK* proteins, as obtained with JTT plus gamma distances. Numbers around each node indicate bootstrap values based on 1,000 replicates. Branch lengths are proportional to expected replacements per site. Consistent with BP phylogeny, the vertebrate *KANK*s forms four groups. The tree was rooted with *Tricolpax* and *Hydra*.

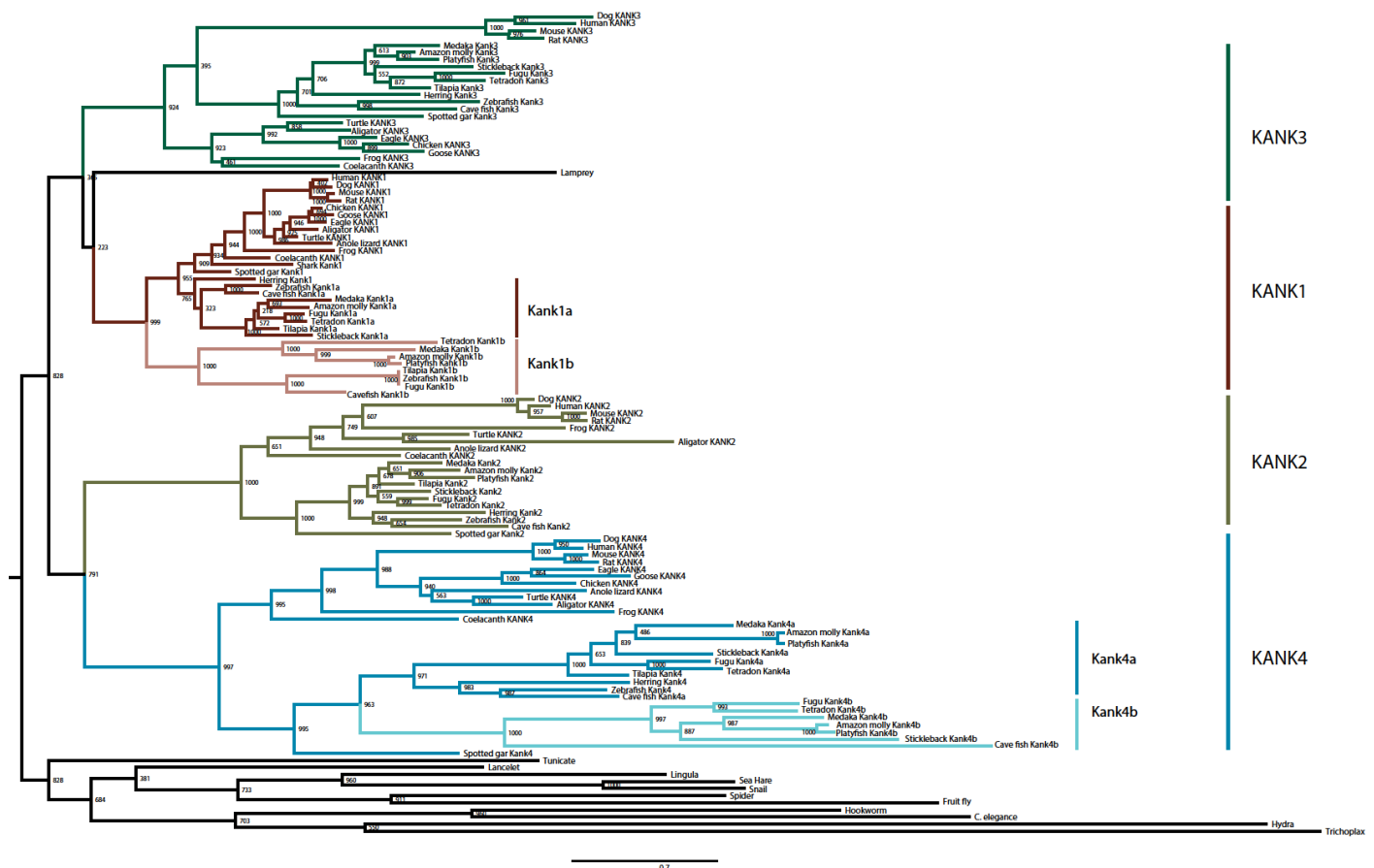


Figure S2. Comparison of the KANK protein domains of human and zebrafish. (a). Human KANK protein domains. (b). Zebrafish Kank protein domains. Purple bars indicate low compositional complexity regions. Green bars represent coiled-coil regions. Vertical colored thin lines show the intron positions. KN motif and ankyrin repeats are shown in square boxes with “KN-motif” and “ANK” respectively. A ruler with amino acid numbers is below each protein diagram.

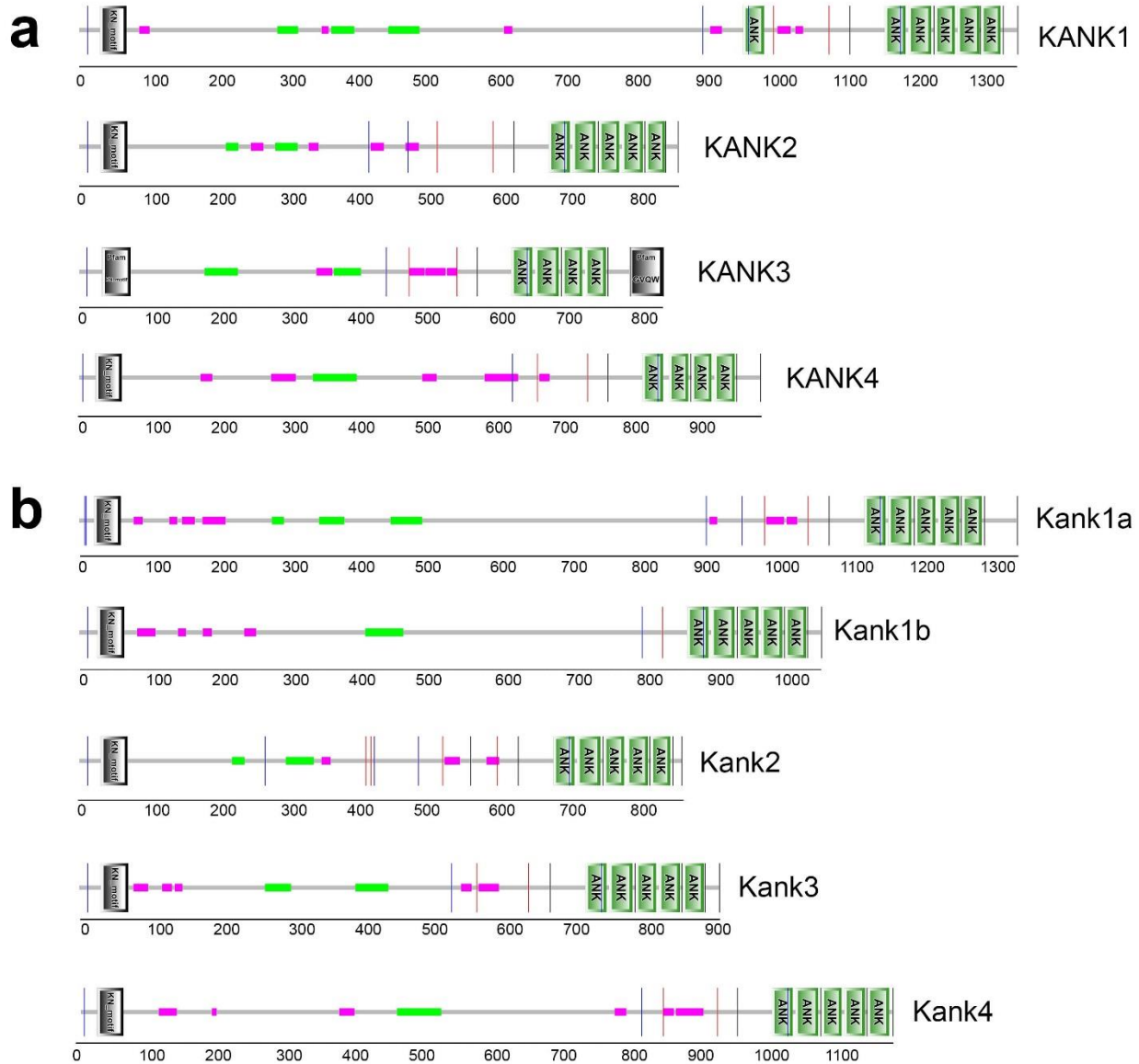
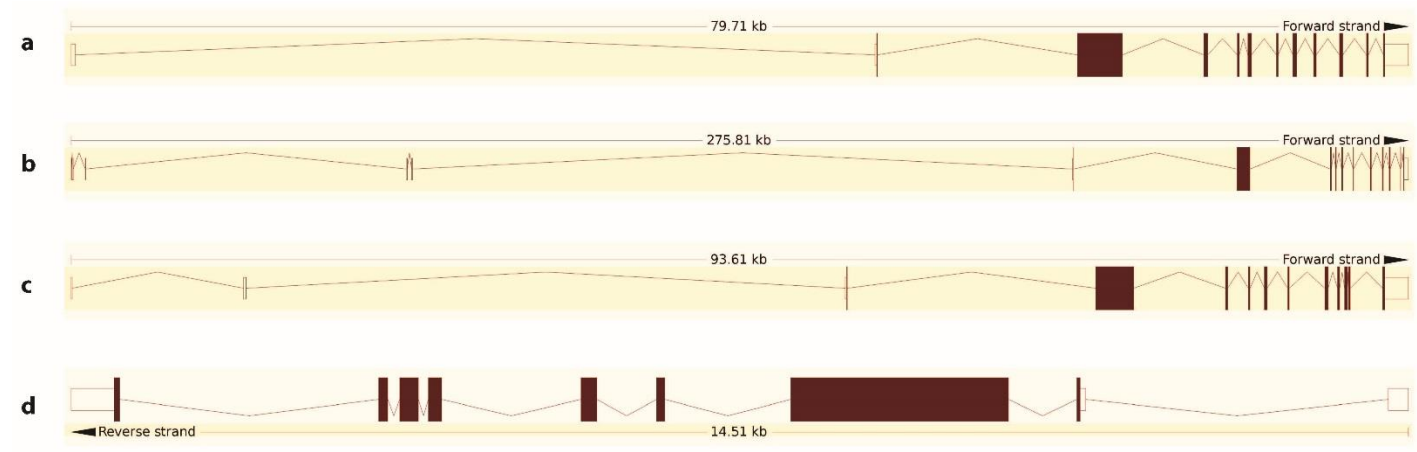


Figure S3. Zebrafish *kank1a* and *kank1b* have different intron-exon structures.

These gene structures were retrieved from Ensembl using the longest transcripts. (a) Spotted gar *kank1*, Transcript: *kank1*-201 ENSLOCT00000014107. (b) Human *KANK1*, Transcript: *KANK1*-001 ENST00000382303. (c) Zebrafish *kank1a*, *kank1*-001 ENSDART00000136521. (d) Zebrafish *kank1b*, Transcript: *KANK1* (2 of 2)-201 ENSDART00000085512. The solid red boxes represent the gene coding regions, and the empty boxes indicate untranscribed regions. Red lines indicate the introns.



Supplementary Table

Table S1. The sources of KANK protein sequences used for the phylogenetic analyses.

Common name	Scientific name	KANK1 or Kank1a	Kank1b	KANK2	KANK3	KANK4 or Kank4a	Kank4b
Alligator	<i>Alligator sinensis</i>	XP_006022667.1		XP_006023540.1	XP_014376372.1	XP_006027522.1	
Amazon molly	<i>Poecilia formosa</i>	kank1-201 ENSPFOT00000001152	si:dkey-226m8.9-201 ENSPFOT00000010906	kank2-201 ENSPFOT00000029317	kank3-201 ENSPFOT00000000137	a: kank4-201 ENSPFOT00000006984	b: KANK4 (2 of 2)-201 ENSPFOT00000023801
Anole lizard	<i>Anolis carolinensis</i>	XP_008101527.1		XP_008101990.1		XP_008107551.1	
Atlantic herring	<i>Clupea harengus</i>	XP_012684054.1		XP_012689245.1	XP_012695057.1	XP_012697624.1	
<i>C. elegans</i>	<i>Caenorhabditis elegans</i>	T22D2.1					
Cave fish	<i>Astyanax mexicanus</i>	kank1-201 ENSAMXT00000012876	XP_007257032.1 OR si:dkey-226m8.9-201 ENSAMXT00000012956	XP_007238267.1	kank3-201 ENSAMXT00000014761	kank4-201 ENSAMXT00000010815	XP_007250784.1
Chick	<i>Gallus gallus</i>	KANK1-201 ENSGALT00000016515			KANK3-201 ENSGALT00000041280	XP_422516	
Coelacanth	<i>Latimeria chalumnae</i>	XP_006001260		XP_005994226.1	XP_005989925.1	XP_014352296.1	
Dog	<i>Canis lupus familiaris</i>	KANK1-201 ENSCAFT00000003130		KANK2-201 ENSCAFT000000027519	KANK3-202 ENSCAFT000000029379	KANK4-201 ENSCAFT000000049528	
Frog	<i>Xenopus tropicalis</i>	ANKRD15-201 ENSXETT00000004865		XP_002942889.2	XP_002938597	XP_002931658	
Fugu	<i>Takifugu rubripes</i>	kank1-203 ENSTRUT00000040327	si:dkey-226m8.9-201 ENSTRUT00000047389	kank2-202 ENSTRUT00000028247	kank3-202 ENSTRUT00000018377	kank4-202 ENSTRUT00000047507	b: XP_011614899.1
Fruit fly	<i>Drosophila melanogaster</i>	CG10249 FBgn0027596					
Elephant shark	<i>Callorhynchus milii</i>	NCBI AFO94041					
Golden eagle	<i>Aquila chrysaetos</i>	XP_011588687.1			XP_011591736.1	XP_011570405.1	
Hookworm	<i>Ancylostoma ceylanicum</i>	EYC07694.1					
Human	<i>Homo sapiens</i>	KANK1-201 ENST00000619269		KANK2-003 ENST00000589359	KANK3-002 ENST00000593649	KANK4-001 ENST00000371153	
Hydra	<i>Hydra vulgaris</i>	XP_012562942.1					
Lamprey	<i>Lethenteron japonicum</i>	JL1710 unnamed protein product 1-727 (http://jlampreygenome.imcb.a-star.edu.sg)					
Lancelet	<i>Branchiostoma belcheri</i>	BbP_088960R (http://mosas.sysu.edu.cn/genome/index.php)					

Lingula	<i>Lingula anatina</i>	XP_013392739.1					
Medaka	<i>Oryzias latipes</i>	XP_011471394.1	XP_011479791.1	KIAA0172-201 ENSORLT000000067 22	XP_011472324.1	a: kank4-201 ENSORLT000000132 00	XP_011484789.1
Mouse	<i>Mus musculus</i>	Kank1-001 ENSMUST00000049400		Kank2-201 ENSMUST000000347 17	Kank3-001 ENSMUST000000485 60	Kank4-001 ENSMUST000001027 90	
Painted turtle	<i>Chrysemys picta</i>	XP_005296814.1		XP_008173664.1	XP_005283841.1	XP_008166090.1	
Platyfish	<i>Xiphophorus maculatus</i>		XP_014327830.1	kank2-201 ENSXMAT000000001 94	kank3-201 ENSXMAT000000024 86	a: XP_014326532.1	b: XP_014328965.1
Rat	<i>Rattus norvegicus</i>	Kank1-201 ENSRNOT00000021496		Kank2-201 ENSRNOT000000141 35	Kank3-201 ENSRNOT000000095 32	Kank4-201 ENSRNOT000000661 39	
Sea hare	<i>Aplysia californica</i>	XP_005108295.2					
Spider	<i>Stegodyphus mimosarum</i>	KFM78514.1					
Snail	<i>Biomphalaria glabrata</i>	XP_013078178.1					
Spotted gar	<i>Lepisosteus oculatus</i>	kank1-201 ENSLOCT00000014107		XP_006631656.1	kank3-201 ENSLOCT000000031 17	kank4-201 ENSLOCT000000078 96	
Stickleback	<i>Gasterosteus aculeatus</i>	kank1-201 ENSGACT00000019197		kank2-201 ENSGACT000000183 46	kank3-201 ENSGACT000000108 86	a: kank4-201 ENSGACT000000090 94	b: KANK4 (2 of 2)-201 ENSGACT000000214 28
Swan goose	<i>Anser cygnoides</i>	XP_013047600.1			XP_013051691.1	XP_013031592.1	
Tetradon	<i>Tetraodon nigroviridis</i>	kank1-202 ENSTNIT00000001422	KANK1 (1 of 2)-201 ENSTNIT0000001047 9	kank2-201 ENSTNIT0000002198 4	kank3-201 ENSTNIT0000001329 0	a: KANK4 (1 of 2)-201 ENSTNIT0000001085 2	kank4-201 ENSTNIT0000002149 6
Tilapia	<i>Oreochromis niloticus</i>	kank1-201 ENSONIT00000017876	si:dkey-226m8.9-201 ENSONIT000000140 23	kank2-201 ENSONIT000000019 05	kank3-201 ENSONIT000000159 98	kank4-201 ENSONIT000000111 21	
Trichoplax	<i>Trichoplax adhaerens</i>	XP_002114910.1 OR TriadT58901					
Tunicate	<i>Ciona intestinalis</i>	ENSCINT00000023213					
Zebrafish	<i>Danio rerio</i>	kank1-001 ENSDART00000136521	si:dkey-226m8.9-201 ENSDART000000855 12	kank2-001 ENSDART000001540 31	kank3-201 ENSDART000001150 50	kank4-001 ENSDART000001557 90	

Supplementary File

Supplementary File 1: KANK protein alignment



Fugu Kank2	-----MAQVLHMDPGF-----PGKLNPSAPPSLHGKEQEA-----PYSVETPYGYRLDLDLFLK---
Medaka Kank2	-----MAQVLHMDPTF-----PGKLNPPAPPSLHAKQEA-----PYSVETPYGYRLDLDLFLK---
Sticklebacc Kank2	-----MAQVLHMDPGF-----PGKLNPPAPPSLHGKEQEA-----PYSVETPYGYRLDLDLFLK---
Tilapia Kank2	-----MAQVLHMDPGF-----PGKLNPPAPPSLHAKQEA-----PYSVETPYGYRLDLDLFLK---
Amazon molly Kank2	-----MAQVLHMDPGF-----PGKLNPPAPPSLHGKEQEA-----PYSVETPYGYRLDLDLFLK---
Platyfish Kank2	-----MAQVLHMDPGF-----PGKLNPPAPPSLHGKEQEA-----PYSVETPYGYRLDLDLFLK---
Coelacanth KANK2	-----MAQVLHMETNF-----PGKSNPTSPATFRGKQDL-----PYSVETPYGYRLDLDLFLK---
Anole lizard KANK2	-----MAQVLHMETAF-----PGKPNPTSATSFHAKQDM-----PYSVETPYGYRLDLDLFLK---
Turtle KANK2	-----MAQVLHMESSF-----PGKPTPTSPATFGAQEPPL-----PYSVETPYGYRLDLDLFLK---
Tetradon Kank1b	-----KTIP-----ETPKQTDLE-----
Medaka Kank1b	-----MAQGSYTLRLV-----SGPNAAEAI-----PTHLGVDYNYQLD-----
Amazon molly Kank1b	-----
Platyfish Kank1b	-----MAQNNYILRNV-----PGQKSKDCI-----PEYQGTESHYPLDLGGIQ-----
Frog Kank4	-----MERT-----NGEDILSKTEKKEKRM-----SYSVETPYGFHLDDLFLK-----
Zebrafish Kank1b	-----MTQETHFHPNQ-----QDWEITSDAFQKS-----PFSVNTPYGYQLDLDFVK-----
Tilapia Kank1b	-----MTQETHFHPNQ-----QDWEITSDAFQKS-----PFSVNTPYGYQLDLDFVK-----
Fugu Kank1b	-----MTQETHFHPNQ-----QDWEITSDAFQKS-----PFSVNTPYGYQLDLDFVK-----
Cavefish Kank1b	-----MAQETYIYMNV-----ADTLESSANTYHSS-----SFCSTPYGYQLDLDFVK-----
Spotted gar Kank4	-----MNKS-----NANGLSSKPCSEGGQRKQL-----PYSVETPYGFHLDDLFLK-----
Coelacanth KANK4	-----MAVPERQPAQAEKHREHVI FVPGNGDSSKTSSENGNQKQL-----PYSLETGYGFHLDDLFLK-----
Frog Kank1	-----MEQAEENLNGNIYKGYCGDNTGDEENIQIGENDKGGNA-----AYFVETPYGYQLDLDFLK-----
Shark Kank1	-----MAHTVINEVS-----PEKGEASLNGEDEKDPQS-----PYSVETPYGYQIDLDFLK-----
Coelacanth KANK1	-----MAHTTQTNGSI-----SEKGNVNVGEDDKDTQA-----PYFVETPYGYQLDLDFLK-----
Mouse KANK1	-----MAYTTKVGCA-----AEKADGVLNGDHNKEKKD-----PYFVETPYGFQLDLDFVK-----
Rat KANK1	-----MAYTTKVG-----CENADGVLNGDRNKEKKD-----PYFVETPYGFQLDLDFVK-----
Dog KANK1	-----MAHTTKVGCA-----SGKADVLNGDHDKEQKD-----PYFVETPYGYQLDLDFLK-----
Human KANK1	-----MAHTTKVNGSA-----SGKAGDILSGDQDKEQKD-----PYFVETPYGYQLDLDFLK-----
Anole lizard KANK1	-----MAHPVNINGGS-----TEKDENALNGEDERDQKD-----PYFVETPYGYQLDLDFLK-----
Eagle KANK1	-----MKLRQPYVAGKFAVWGQRHVANSEKEEVTINGDDEKERKD-----PYFVETPYGYQLDLDFLK-----
Chicken KANK1	-----MAYPANTNGSA-----AEKEEVIINGKDENERKY-----PYFVETPYGYQLDLDFLK-----
Goose KANK1	-----MAYPANTNGSA-----AEKEEVAVNGEDEKERKD-----PYFVETPYGYQLDLDFLK-----
Turtle KANK1	-----MAYPATISGST-----SEKEEGVLSGEDDKEQKD-----PYFVETPYGYQLDLDFLK-----
Aligator KANK1	-----MAYTANINGNN-----SEKEESHNLGKDDKEQKD-----LYFVETPYGYQLDLDFLK-----
Spotted gar Kank1	-----MAQTAQINGSI-----AEKGGGLNADDDKDSL-----PYYLETGYGYQLDLDFLK-----
Herring Kank1	-----MAQTLHINGNV-----SEKDEGEKDPVA-----PYYLETGYGFQLDLDFLK-----
Zebrafish Kank1a	-----MAQTMHINGNA-----SEKDEDEKD-----PYCLETGYGYQLDLDFLK-----
Cave fish Kank1a	-----MAQTMQLNGNT-----TEKDEEDKESVA-----PYYLETGYGYQLDLDFLK-----
Stickleback Kank1a	-----MAQTMHLVNGG-----SERGQRCPKSADEKDAAA-----PYSVETPYGYQLDLDFLK-----
Medaka Kank1a	-----MAQAAQVKGSS-----PGTVGGGEEKD-----SYYVETPYGYQLDLDFLK-----
Fugu Kank1a	-----
Tetradon Kank1a	-----
Tilapia Kank1a	-----
Amazon molly Kank1a	-----MAQTVNVNGG-----PERAQTCPGAGDEKD-----SYYVETPYGYQLDLDFLK-----
Mouse KANK3	-----MAKFA-LNQNL-----PDLGGPPLYPGPTGSARSPSS-----PYSVETPYGFHLDDLFLK-----
Rat KANK3	-----MAKFA-LNQNL-----PDLGGPPLYPGPTGSARSPSS-----PYSVETPYGFHLDDLFLK-----
Dog KANK3	-----MAKFA-LNQNL-----PDLGGPRLCPGPTAGARSPSS-----PYSVETPYGFHLDDLFLK-----
Human KANK3	-----MAKFA-LNQNL-----PDLGGPRLCPVPAAGGARSPSS-----PYSVETPYGFHLDDLFLK-----
Lamprey	-----MTDAVGK-----ADAVTMAASPSTESRGAGNEHPERSDRCVGTAPCLAEASTSTAV-----
Coelacanth KANK3	-----MAQFVQLNQKL-----PDLGGPFQYREEENDKS-----LYSVETPYGFQLDLDFLK-----
Frog Kank3	-----MTQSIHLNQNL-----PDLGGPFLLYRDQDENKTI-----AYSVETPYGFQLDLDFLK-----
Turtle KANK3	-----MAQPIHLNQNL-----PDLGGPFLLYRDQDDGEKS-----SYSVETPYGFLLDDLFLK-----
Aligator KANK3	-----MAQPAHLNQNL-----PDLGGPFLLYRDQDDGEKS-----SYSVETAYGFTLDDLFLK-----
Eagle KANK3	-----MAQPAHLNQNL-----PDLGGPFLLYRDQDDGEKS-----SYSVETPYGFLLDDLFLK-----
Chicken KANK3	-----MAQPAHLNQNL-----PDLGGPFLLYRDQDDSEKS-----SYSVETPYGFLLDDLFLK-----
Goose KANK3	-----MAQPAHLNQNL-----PDLGGPFLLYRDQDDGEKS-----SYSVETPYGFLLDDLFLK-----
Spotted gar Kank3	-----MTQSVQLNQKL-----PDVGTFFLYSTQEEGDQGG-----SYSVQTPYGFQLDLDFLK-----
Zebrafish Kank3	-----MTQSVHITSKV-----PNLSAFPHCSEEEESDQSG-----AYSVQTPYGFELDDLFLK-----

```

Cavefish Kank3      -----MTQSVQINPKL-----PNLGAPFQCATQEEEDQSA-----SYSVQTPYGFQLDLDFLK---
Herring Kank3      -----MTQSVQVNSKL-----PDLGAPFLYGSQEEEDQAG-----SYSVQTPYGFQLDLDFLK---
Stickleback Kank3  -----MTQSVQVNPVKL-----PDLGSPFFIYSAQEDADQSG-----SYSVQTPYGFQLDLDFLK---
Fugu Kank3         -----MTQSVQVMNPKL-----PDLGSPFFMYPSQGEEDQPA-----SYSVQTPYGFQLDLDFLK---
Tetradon Kank3     -----MAQSVQMNPNL-----PDLASPFICSGRGEEDQPG-----SYSVQTPYGFQLDLDFLK---
Medaka Kank3       -----MSQSVQVNPVKM-----PDLGSKFLYSSQEEADQSS-----SYSVQTPYGFQLDLDFLK---
Tilapia Kank3      -----MTQSVQVNPVKL-----PDLGSPFFHYPSQEEADQQA-----SYSVQTPYGFQLDLDFLK---
Amazon molly Kank3-----MTQSVQVNPVKV-----PDIGSAFIYSSQEEADQSG-----SYSVQTPYGFQLDLDFLK---
Platyfish Kank3    -----MTQSVQVNPVKV-----PDLGSAFIYSGQEEADQSG-----SYSVQTPYGFQLDLDFLK---

```

110 120 130 140 150 160 170 180 190 200

```

Hydra               -FTDTS CDSAK--VFKDVG VQ--KSLNYPV-----MKDIGINV-----
Trichoplax         AIID-----LMNQLTVN-----
Aplasia            -FCR-DVEGGSTLRNLKRIQRA--KRKLRKS--MEIMLDEQEGIAADPNSAPPDV--
Snail              -FCR-DIEEGS--TLRNLKRI--RRNKKLRKSMELMLDEQEGRTFDPSAPPDI--
Fruitfly          -YCE-AL--ALEKPS EEEQRRRDRRRS--RK-----SMEFMLGF-----
Hookworm          EYAVSDTE NAH--RVRYYSAS--PKMPR--K-----LQAVPPLP-----
C.elegance        -YAQ-NVSNQ--FVSRQGTP-----TNMTLRGN-----
Tunicate          -YCE-ELMSGQ--SFKRTSSF--RRPR-----SRTASQAS-----
Spider            -YCD-SLYNTA--QLDKLRQH--KRERRKE-----KKTVE SYL-----
Lingula           -YCE-DSQSGTMLKQLKRIKD--KKRLRKS-----MEVQLQGG-----
Lancelet          -YCD-DISKGS--NIPKIVRP--RKPKSPG--GPAPMDFR--ANTLPRGFYLSNQSNLPKHASVVPSSPISPLSVNTSLSSANN SIPETTTT
Medaka Kank4b     -YVE-DIEKGN--TIKRVP IQ--RRSKGPR-----ASTLPRNL-----
Amazon molly Kank4b -YVD-DIEKGN--TIKRVP IQ--RRSKGSR-----ASTLPRHL-----
Platyfish Kank4b  -YVD-DIEKGN--TIKRVP IQ--RRSKGPR-----ASTLPRHL-----
Stickleback Kank4b -YVD-DIEKGN--QVDGVPGE--RRM-----
Fugu Kank4b       -YVD-DIEKGN--TIRRIPIH--RRSKGPR-----ASTLPRHF-----
Tetraon Kank4b   -QVD-----
Cave fish Kank4b  -YVD-DIEKGN--TIRRVPIQ--RRQRGRT-----TGSLSRNL-----
Medaka Kank4a     -YVD-DIEKGN--TIKRVIH--RRIKGPAK-----FSTLPRNF-----
Fugu Kank4a       -YVD-DIEKGN--TIKRVIH--RRIKGPS-K-----FSTLPRNF-----
Tetradon Kank4a   -YVD-DIEKGN--TIKRVIH--RRIKGPP-K-----FSTLPRNF-----
Stickleback Kank4a -YVD-DIEKGN--TIKRVIH--RRVKSPA-K-----FSTLPRNF-----
Tilapia Kank4a    -YVD-DIEKGN--TIKRVIH--RRVKGPPK-----FSTLPRNF-----
Platyfish Kank4a  -YVD-DIEKGN--TIKRVIH--RRVKGPA-K-----FSTLPRNF-----
Amazon Molly Kank4a -YVD-DIEKGN--TIKRVIH--RRVKGPA-K-----FSTLPRNF-----
Herring Kank4     -YVD-DIEKGN--TIKRVIH--RKNRGPK-----YSTLPRNF-----
Zebradish Kank4   -YVD-DIEKGN--TIKRVIH--RKNRGPK-----YSTLPRNF-----
Cave fish Kank4a  -YVD-DIEKGN--TIKRVIH--RKNRGPK-----YSTLPRNF-----
Mouse KANK4       -YVD-DIEKGN--TIKRIP IH--RRAKQAK-----FSTLPRNF-----
Rat KANK4         -YVD-DIEKGN--TIKRIP IH--RRAKQAK-----FSTLPRNF-----
Dog KANK4         -YVD-DIEKGN--TIRRIPIH--RRAKQAK-----FSTLPRNF-----
Human KANK4       -YVD-DIEKGN--TIKRIP IH--RRAKQAK-----FSTLPRNF-----
Eagle KANK4       -YVD-DIEKGN--TIRRVHIH--RKAKQPK-----FSTLPRNF-----
Chicken KANK4     -YVD-DIEKGN--TIRRVHIH--RKAKQPK-----FSTLPRNF-----
Goose KANK4       -YVD-DIEKGN--TIRRVHIH--RKAKQPK-----FSTLPRNF-----
Anole lizard KANK4 -YVD-DIEKGN--TIKRIQ IH--RKTYPK-----FSTLPRNF-----
Turtle KANK4      -YVD-DIEKGN--TIKRVIH--RKAKQPK-----FSTLPRNF-----
Aligator KANK4    -YVD-DIEKGN--TIRRVHVH--RKAKQPK-----FSTLPRNF-----
Frog Kank2        -YVD-DIEKGN--TIKRVPVH--RRPR-----YGS LPRGP-----
Mouse KANK2       -YVD-DIEKGN--TLRRVAVQ--RRPR-----LGS LPRGP-----
Rat KANK2         -YVD-DIEKGN--TLRRVPVQ--RRPR-----LGS LPRGP-----
Dog KANK2         -YVD-DIEKGN--TLRRVAVQ--RRPR-----LGS LPRGP-----
Human KANK2       -YVD-DIEKGN--TLRRVAVQ--RRPR-----LSS LPRGP-----
Aligator KANK2    -YVD-DIEKGN--TLRRLPVR--RRPR-----
Spotted gar Kank2 -----RVCQLQMR-----SLSEPRGS-----

```


Cave fish Kank2	-YVN-DIEKGN--TLKKVPVQ--RRPR-----YGSLEPRGY-----
Herring Kank2	-YVN-DIEKGN--TIKRVPVQ--RRPR-----YGSLEPRGY-----
Zebrafish Kank2	-YVN-DIEKGN--TIKKVPVQ--RRPR-----YGSLEPRGY-----
Tetradon Kank2	-YVN-DIEKGN--TIKKVAVQ--RRPR-----YGSLEPRGY-----
Fugu Kank2	-YVN-DIEKGN--TIKKVAVQ--RRPR-----YGSLEPRGY-----
Medaka Kank2	-YVN-DIEKGN--TIKKVSIQ--RRPR-----YGSLEPRGY-----
Stickleback Kank2	-YVN-DIEKGN--TIKKVPIQ--RRPR-----YGSLEPRGY-----
Tilapia Kank2	-YVN-DIEKGN--TIKKVPVQ--RRPR-----YGSLEPRGY-----
Amazon molly Kank2	-YVN-DIEKGN--TIKKVPIQ--RRPR-----YGSLEPRGY-----
Platyfish Kank2	-YVN-DIEKGN--TIKKVPIQ--RRPR-----YGSLEPRGY-----
Coelacanth KANK2	-YVD-DIEKGN--TIKKVPIH--RRPR-----YSSLEPRGY-----
Anole lizard KANK2	-YVD-DIEKGN--TIKKRIPVH--RRPR-----YSSLEPRGY-----
Turtle KANK2	-YVD-DIEKGN--TIKRVVPH--RRPR-----YGSLEPRGA-----
Tetradon Kank1b	-----VPNQAAPO--PRPRQRL-----
Medaka Kank1b	-----RFQKGA--TIKRLSLK--RRPRVV-----LSDAEKTV-----
Amazon molly Kank1b	-----MKRLSLK--RRPRGV-----LNDVEKSO-----
Platyfish Kank1b	-NII-----TMKRLSLK--RRPRGV-----LNDVEKTO-----
Frog Kank4	-YVH-DIEKGN--TIKRVHIH--RRAKQSK-----FSTLERNF-----
Zebrafish Kank1b	-YVD-DIERSD--TIKRLRFN--KRPGVAN-----AASEPQHP-----
Tilapia Kank1b	-YVD-DIERSD--TIKRLRFN--KRPGVAN-----AASEPQHP-----
Fugu Kank1b	-YVD-DIERSD--TIKRLRFN--KRPGVAN-----AASEPQHP-----
Cavefish Kank1b	-YVD-DIEQSD--TIKRLGFN--RRPR-----ADPAPEAQ-----
Spotted gar Kank4	-YVD-DIEKGN--TIKRVHIH--RRAKDPK-----FSTLERNF-----
Coelacanth KANK4	-YVD-DIEKGN--TIKRVHIH--RKAKQPK-----YSTLERNF-----
Frog Kank1	-YVE-DIQKGN--TIKRVSLL--KRRKLV-----NLAEGRNP-----
Shark Kank1	-YVD-DIQKGN--TIKRVNIQ--RKPKVPK-----TLATRNA-----
Coelacanth KANK1	-YVD-DIQKGN--TIKRLNIQ--RKSVAK-----PIVTPKSA-----
Mouse KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKPSV-----PCPEVRAI-----
Rat KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKPSG-----PCAEVRAI-----
Dog KANK1	-YVD-DIQKGN--TIKRLNIP--KRRKPSV-----PCPESRAT-----
Human KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKPSV-----PCPEPRTT-----
Anole lizard KANK1	-YVE-DIQKGN--TIKRLNIQK--KRVIPP-----FATVKNTT-----
Eagle KANK1	-YVD-DIQKGN--TIKRLNIR--KRRKAVP-----ASAGTKNS-----
Chicken KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKAVP-----ASTSTKNA-----
Goose KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKAIP-----ASTGTKNS-----
Turtle KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKLV-----TFTGTKNS-----
Aligator KANK1	-YVD-DIQKGN--TIKRLNIQ--KRRKLV-----TFPGTKNS-----
Spotted gar Kank1	-YVD-DIERGN--TLKRLNIQ--RKPKVAK-----PVATPRSG-----
Herring Kank1	-YVD-DIERGN--TIKRLNFQ--RKPKSAR-----PSTSSQHS-----
Zebrafish Kank1a	-YVD-DIERGN--TIKRLNIQ--RKPKVVR-----TVPPRPS-----
Cave fish Kank1a	-YVD-DIERGN--TIKRLNIQ--RKPKVPR-----CVPSSQ-----
Stickleback Kank1a	-YVD-DIERGN--TIKRLSVH--RKPKGAT-----PSTSG-----
Medaka Kank1a	-YVE-DIERGN--TIKRLSIQ--RKPKVAR-----TPPAPRAS-----
Fugu Kank1a	-----
Tetradon Kank1a	-----
Tilapia Kank1a	-----
Amazon molly Kank1a	-YVD-DIERGN--TIKRLSIQ--RKPKAAR-----PLATPRGS-----
Mouse KANK3	-YVE-EIERGP--ASRRTPGPPHARRPRASRTGL-----AGARSPGA-----
Rat KANK3	-YVE-EIERGP--ASRRAPGPPHARRPRASG-----KGL-----AGARSPGA-----
Dog KANK3	-YVE-EIERGP--APRRAPGPPHARRPRAPR-----AGLAGARS-----
Human KANK3	-YIE-EIERGP--AARRAPGPPHARRPRAPR-----PGLAGARS-----
Lamprey	-SCR-DAQSGTVAVEVRTVSVG--NCER-----YEDTRRSV-----
Coelacanth KANK3	-YVD-DIQSGQ--TLKRVNVQ--RKSHPAK-----PTTSLRSP-----
Frog Kank3	-YVD-DIQSGQ--TLKKVPVY--RKPRVPRQ-----STSSLRSP-----
Turtle KANK3	-YVD-DIESGQ--TLKKVPKH--RKAGPK-----Q-----QPSSLRSP-----
Aligator KANK3	-YVD-DIQSGQ--TLKKLH--RKAGPKQ-----QLSCLRSP-----
Eagle KANK3	-YVN-DIESGQ--TLKKVPLP--RRAKGARQ-----PPSALRSP-----

Chicken KANK3	-YVD-DIESGQ--TLKKVPLP--RRAKCTRL-----QPGLRSP-----
Goose KANK3	-YVD-DIESGQ--TLKKVPLP--RRAKGAR-----
Spotted gar Kank3	-YVE-EIESGH--NFRRAPVNPR-RGPRSSK-----SGSLSRRS-----
Zebrafish Kank3	-YVE-EIESGH--SIRRAVNH--PRRG-----SRSDRRNL-----
Cavefish Kank3	-YVE-EIESGQ--SIRRAHMSV--RRPSRS-----DRGSQRSA-----
Herring Kank3	-YVE-EIESGH--TFRRTPVSSR-RGVRAGK-----LSQRS PGV-----
Stickleback Kank3	-YVE-EIESGH--NLRRAPLG--SRRSGRG-----ARLSQGA-----
Fugu Kank3	-YVE-EIESGH--HLRRAPVSSR-RSSRGTK-----LSLRS PSV-----
Tetradon Kank3	-YVE-EIESGH--NLRRAVPSR-RSSRGPR-----LSQRS PSV-----
Medaka Kank3	-YVE-EIESGH--NLRRAVSS--RRPGRGLK-----LSQRSASV-----
Tilapia Kank3	-YVE-EIESGH--NLRRAPISSR-RSGRGLK-----LSQRNPGV-----
Amazon molly Kank3	-YVE-EIESGH--NLRRAPLSS--RRPGRGLK-----LSQRS PSV-----
Platyfish Kank3	-YVE-EIESGH--NLRRAPLSS--RRPGRGL--K-----LSQRS PSV-----

210 220 230 240 250 260 270 280 290 300

Hydra
Trichoplax	-----FLT---FL-DRACQTKTETND-----
Aplasia	-----S-ETSCPNNYESND-----
Snail	-----VHSTEAGRLMHMINYERSATHRILNQ--ID-TTVNTTIAGGGR-----HMSSDSD
Fruitfly	-----VHSTEAGRLMHMINYERSATHHILSQ--ID-SSVNTTIANIDG-----VRGRRYMSS
Hookworm	-----ESLFGGDWQA--E-SRVQKLGKSETSH-----ESEPDSPHPIGGGGSLHMSQSYTT
C.elegance	-----SASQFTYTH--NN-GNTMLAKTQGTS-----
Tunicate	-----GADRHLMSV--LLDNSIFSDSLDNL-----
Spider	-----GQQQVHYNT--RL-AGGPNESLDSL-----
Lingula	-----GLGNICSSQ--YS-EPNLTTVROHNT-----LPNDFYL
Lancelet	-----QIETDYEP--R-QEMVGYDSGTNR-----YLNDIDS
Medaka Kank4b	TATTTKQIVTDPRENASSVYGYNSSTRPSPGDLPIPFTSPNSNSVFTM--P-AALATQSNSSSSSSLSQLSTQSSSQFSPHSEMSGDTKHS--
Amazon molly Kank4b	-----NPSGCGYRP--SPWGSGALGPR-----
Platyfish Kank4b	-----NSSGSGYKP--SPWRSTGALDPR-----
Stickleback Kank4b	-----NSSGSGYKQ--NPWRSTGALDPR-----
Fugu Kank4b	-----TASGWGS--T-GALGSRQLEASC-----
Tetraon Kank4b	-----ANGSR-----
Cave fish Kank4b	-----SLPGYGCSR--P-SQWNSTGILFPR-----
Medaka Kank4a	-----SLPGHGVRPTLKDKSAWPGTSTLGP-----
Fugu Kank4a	-----SLPGHGVRPVPKEKDSVSGTSTLGP-----
Tetradon Kank4a	-----SLPGHGVRPVPKEKDSVSGTSTLGP-----
Stickleback Kank4a	-----SLPGHGARPPPDKDSTVSGTSTLGP-----
Tilapia Kank4a	-----SLPGHGVRPPPKEKDSVSGTSTLGP-----
Platyfish Kank4a	-----SLPGHGVRP--PPKEGAWSGTSTLGP-----
Amazon Molly Kank4a	-----SLPGHGVRP--PSKEGAWSGTSTLGP-----
Herring Kank4	-----SLPGHGARP--PPKDVMASGTSTLGP-----
Zebradish Kank4	-----SLPGHGARP--LAKDTWANTSTLGS-----
Cave fish Kank4a	-----SLPGHGARP--AAKDTWANTSTLGS-----
Mouse KANK4	-----SLPNSGDR-----Y-AVPPQQNWSPVV-----
Rat KANK4	-----SLPNSGDRS-----H-AAPPQQNWSPVV-----
Dog KANK4	-----SLPDSRARP-----H-AALSHQNWSPVV-----
Human KANK4	-----SLPDSGARP-----P-AAPPQQNWSPVV-----
Eagle KANK4	-----SLPENSGR-----C-ASTPGKWAATR-----
Chicken KANK4	-----SLPENSHG-----Y-AASTGPGWPAAT-----
Goose KANK4	-----SLPENSGR-----YA-AALLLASSMPAA-----
Anole lizard KANK4	-----SLPENSGRA--RNKNFIAQRKASLGA-----
Turtle KANK4	-----SLPENSGRA--Y-ASSPNKSWTATC-----
Aligator KANK4	-----SLPENSGRA--Y-AASSNKSWAFA-----
Frog Kank2	-----GYTGSWWT-----T-ESLCSNASNDSR-----
Mouse KANK2	-----GSWWT-----T-ESLCSNASGDSR-----
Rat KANK2	-----GSWWT-----T-ESLCSNASGDSR-----

Dog KANK2	-----G SWWTS -----T- ESLCSNASGDSR -----
Human KANK2	-----G SWWTS -----T- ESLCSNASGDSR -----
Aligator KANK2	-----C ASASWWPS -----T- ESLCSTDSLASA -----
Spotted gar Kank2	-----S LGTGGFNF -----
Cave fish Kank2	-----G YTGSWWTS -----T- ESLCSNASVDSR -----
Herring Kank2	-----G YTGSWWTS -----T- ESLCSNTSVDSR -----
Zebrafish Kank2	-----G YTGSWWTS -----T- ESLCSNASMDSR -----
Tetradon Kank2	-----G YAGSWWTS -----T- ESLCSNASMDSR -----
Fugu Kank2	-----G YTGSWWTS -----T- ESLCSNTSIDSR -----
Medaka Kank2	-----G YTGSWWTS -----T- ESLCSNASMDSR -----
Sticklebacc Kank2	-----G YTGSWWTS -----T- ESLCSNTSMDSR -----
Tilapia Kank2	-----G YTGSWWTS -----T- ESLCSNASMDSR -----
Amazon molly Kank2	-----G YTGSWWTS -----T- ESLCSNASVESR -----
Platyfish Kank2	-----G YTGSWWTS -----T- ESLCSNASVESR -----
Coelacanth KANK2	-----G YTGSWWTS -----T- ESLCSNASMDSR -----
Anole lizard KANK2	-----G YTGSWWTS -----T- ESLCSNVSMDSH -----
Turtle KANK2	-----G SWWTS -----T- ESLCSNASLDSR -----
Tetradon Kank1b	-----A SFGGVSSPGSA -----
Medaka Kank1b	-----S SSQWHS -----A- ESLSSSSDDFR -----LL GMSSSA
Amazon molly Kank1b	-----S GASSGPVH -----SA- ESLSLPCNDGTR -----LL GMSSSAK
Platyfish Kank1b	-----S GSSCGPVH -----SA- ESLSLPCNDGTR -----LL GMSSSAK
Frog Kank4	-----S VPDNGSQS -----Y- ISSSRTWSPTS -----
Zebrafish Kank1b	-----I NPTHRISS -----E- LSVVSSDEAK -----KT SSSSSAVNS
Tilapia Kank1b	-----I NPTHRISS -----E- LSVVSSDEAK -----KT SSSSSAVNS
Fugu Kank1b	-----I NPTHRISS -----E- LSVVSSDEAK -----KT SSSSSAVNS
Cavefish Kank1b	-----S RVDPSQWAS -----S- ESLSSVSSDEAR -----N PSVTTTSSISSINR
Spotted gar Kank4	-----S LPDHGSRS -----A- PKDSWNTPGSY -----
Coelacanth KANK4	-----S IPNNGSRS -----Y- SSFSSGNWTSSY -----
Frog Kank1	-----P SQEAGWPS -----T- DSLSSSNSDDNK -----H SPSL
Shark Kank1	-----G GQVSGWTS -----T- ESLSSSNSDENK -----L SPSLF
Coelacanth KANK1	-----A GQFSGWTS -----T- ESLSSSNSDENK -----L SPSFLTK
Mouse KANK1	-----P GHQGVWTS -----T- ESLSSSNSDDSK -----Q CPSFLLA
Rat KANK1	-----P GPQGVWTS -----T- ESLSSSNSDDSK -----Q CPSFLLA
Dog KANK1	-----T GQQGVWTS -----T- ESLSSSNSDDNK -----Q CPHFLLA
Human KANK1	-----S GQQGIWTS -----T- ESLSSSNSDDNK -----Q CPNFLLA
Anole lizard KANK1	-----P SQYSGWTS -----N- ESLSSSNSDDNK -----H SSSFCAARS
Eagle KANK1	-----G GQCGGWTS -----T- ESLSSSNSDENK -----Q SCLAA
Chicken KANK1	-----G GHCGDWTS -----T- ESLSSSNSDENK -----Q SFLAA
Goose KANK1	-----G GHCSGWTS -----T- ESLSSSNSDENK -----Q SFLAA
Turtle KANK1	-----S GQYSGWTS -----T- ESLSSSNSDENK -----Q SFFAA
Aligator KANK1	-----S VQYSGWTS -----T- ESLSSSNSDENK -----Q SFLAA
Spotted gar Kank1	-----G GQTSGWTS -----T- ESLSSSNSDECK -----Q SPLLP
Herring Kank1	-----N NNNSVSSSSGGGCGLAEWTS -----T- DSLSSSNSDENK -----Q SQSPVFLNPGYLP
Zebrafish Kank1a	-----C SGHTEWTS -----T- DSLSSSNSDECK -----Q SPVYF
Cave fish Kank1a	-----S GQQAEWTS -----T- DSLSSSNSDESK -----Q SPVYF
Stickleback Kank1a	-----G GAPAEWTS -----T- DSLSSSNSDDKQ -----
Medaka Kank1a	-----A QAEWTS -----T- DSLSSSNSDDKQ -----
Fugu Kank1a	-----
Tetradon Kank1a	-----
Tilapia Kank1a	-----
Amazon molly Kank1a	-----T AGGGARPEWTS -----T- DSLSSSNSDGKQ -----S PVFFTS
Mouse KANK3	-----W TS -----S- ESLASDDGGASG -----
Rat KANK3	-----W TS -----S- ESLASDDGGASG -----
Dog KANK3	-----P GA -----W TS -----S- ESLASDDGGASG -----
Human KANK3	-----P GAWTSS -----S- ESLASDDGGAPG -----
Lamprey	-----G VNTAGVGA -----A- IRLSRREAAVGS -----
Coelacanth KANK3	-----N SHTSGWTS -----T- ESLSSTTSEDSK -----N MPIFF

```

Frog Kank3          -----SCQTGGWTS-----T-ESLTFSDDDRSS-----NVFF
Turtle KANK3       -----SGHASGWTS-----T-ESLASTASEDGR-----NVL LLS
Alligator KANK3    -----GSHASGWTS-----T-ESLASTASEDGR-----TTL LLS
Eagle KANK3        -----SSHASAWTS-----T-ESLASTASEEGR-----
Chicken KANK3      -----SSHPSGWTS-----T-ESLASTLEDGR-----SAV
Goose KANK3        -----QPLGTL LVDGGR-----
Spotted gar Kank3  -----PGAGGHTSGWTS-----T-ESLSSSASEEGR-----VPP
Zebrafish Kank3    -----STGGRTSGWTS-----T-ESLSSSTSENGQ-----T
Cavefish Kank3     -----GGRASGWTS-----T-ESLASTTSEDGR-----SAPPVAR
Herring Kank3      -----GGRASGWTS-----T-ESLSSASDDGS-----RVPP
Stickleback Kank3  -----GGRASGWTS-----T-ESLSPASEDGS-----
Fugu Kank3         -----GGRTSGWTS-----T-ESLSSPASEDGR-----
Tetradon Kank3     -----GGRTSGWTS-----T-ESLSSPASEDGR-----
Medaka Kank3       -----GGRTSGWTS-----T-ESLSPASEDGR-----APP
Tilapia Kank3      -----GGRTSGWTS-----T-ESLSSPASEDGR-----
Amazon molly Kank3 -----GGRTSGWTS-----T-ESLSSPASEDGR-----VPP
Platyfish Kank3    -----GGRTSGWTS-----T-ESLSSPASEDGR-----VPP

```

310 320 330 340 350 360 370 380 390 400

```

Hydra
Trichoplax
Aplasia           EPMPYSPVHGG RPPVDETPP-FSASGR
Snail             DSDEPVTFFSSSSYRAAY SNDGAMTPPL
Fruitfly         TPCYRPRSSSVPRFTYGSIPRSESPFG
Hookworm         ---MSPKPEEEKKMF SKQLTTVGWVTG
C.elegance       --MSDFDDV LAPHKEVEKKKTVQDIRSR
Tunicate         -----ASEGTCEG-----
Spider           NSESLKDAVTD FEDT WQRSLKSSSSYA
Lingula          SVD TTLHTIDKVIKQTSYRTYSAGDSDF
Lancelet         --MGVQTPASLLSSGSSSRGSGASTPQPPAVSSAMLOGTREQIAASLKR IKVLEEQVKEIPVLQVKISVLKEEK RLLVMQLKSKNGEQNLKPEDTDNKRE
Medaka Kank4b    --SPPSDTHHHGYS LWASHRPPLPFTD
Amazon molly Kank4b --SRPLDNHHHGCS SSWTFDHRPPLSPTG
Platyfish Kank4b --SRPFANHHHGCS SSWTFDHRSLLYPTG
Stickleback Kank4b -----
Fugu Kank4b     -----SPHGYASWSNGHRSHLSPTG-----
Tetraon Kank4b -----
Cave fish Kank4b ---PRLADLQOSYGN TAFQSSDGGSTAL
Medaka Kank4a    ---PKSRVTEVQQIFDFRGGEGGTSSC
Fugu Kank4a     ---PKSRVAEVQQIFDFRASE-----
Tetradon Kank4a ---PKSRVAEVQQIFDFRASERTTSTQ
Stickleback Kank4a ---PKSRVTEVQQIYDFRASEGGTSSH
Tilapia Kank4a  ---PKSRVTEVQQIFDFRANEGVTSSL
Platyfish Kank4a ---PKSRVTEVQQIFDFRPEGAISSH
Amazon Molly Kank4a ---PKSRVTEVQQIFDFRPEGAISSH
Herring Kank4   ---RPKSRVTEVQQIFDFKPSDGGSPSL
Zebradish Kank4 ---PKSRVTEVQQLFEFRASDATGSSS
Cave fish Kank4a ---PKSRVTEVQQLFEFRASDSSSSG
Mouse KANK4     ---PRKISLGTQEPSQPLPLGDLPOA
Rat KANK4      ---PRKISLGTQEQSQSVPLGDLPOA
Dog KANK4      ---PRKVLGTEERAQSLPPGEYPQA
Human KANK4    ---PREASLGTQEQNQSPPLGNAPQA
Eagle KANK4    SFPQRKASLGAETPRPLPPDEAPLPVA
Chicken KANK4  --YRAQRKASLGAEEISRAPLPSEEPSY
Goose KANK4    ---LLPGQPPAGDGCEL
Anole lizard KANK4 ---DESTHLITPTDSTPFSGISNEP
Turtle KANK4   --SFAQRKASLGAETTCLITSYDSPQS

```

Aligator KANK4	HRKTSLGAEEITIRLVTTNESPPFVTPTD-----
Frog Kank2	-----HSSYSYCGRGFYPAYE-----
Mouse KANK2	-----HSAYSYCGRGFYPOYG-----
Rat KANK2	-----HSAYSYCGRGFYPOYG-----
Dog KANK2	-----HSAYSYCGRGFYPOYG-----
Human KANK2	-----HSAYSYCGRGFYPOYG-----
Aligator KANK2	-----LSYGP-----
Spotted gar Kank2	-----
Cave fish Kank2	-----HSSYSYCAPGYHTAQR-----
Herring Kank2	-----HSSFSYCAPGYHHPHH-----
Zebrafish Kank2	-----HSSYSYCAPGFHTSQR-----
Tetradon Kank2	-----HSSYSYCAPGYHTAQR-----
Fugu Kank2	-----HSSYSYCAPGYHSTQR-----
Medaka Kank2	-----HSSYSYCAPGYHTSQR-----
Sticklebacc Kank2	-----HSSFSYCAPGYHTTHR-----
Tilapia Kank2	-----HSSYSYCAPGYHTSQR-----
Amazon molly Kank2	-----HSSYSYCAPGYHTSQR-----
Platyfish Kank2	-----HSSYSYCAPGYHTLQR-----
Coelacanth KANK2	-----YSSFSYCGRGFYPAYG-----
Anole lizard KANK2	-----HSSYSYCGRSFYPOYP-----
Turtle KANK2	-----HSSYSYCAPGFYPOCG-----
Tetradon Kank1b	-----SPFTGLGAYNQDS-----
Medaka Kank1b	RGRPPLPPSHISSQDSKIFNSEDPSPSR
Amazon molly Kank1b	GRPPLPPPSSLLDDRRSKGEGPGNSQR
Platyfish Kank1b	GRPPLPPPSSLLDDRRSKGGGPGNSQR
Frog Kank4	-----FKSDAQGNIAPAS-----
Zebrafish Kank1b	RRPPLPHSKPKTSSQRADVPODLITCQR
Tilapia Kank1b	RRPPLPHSKPKTSSQRADVPODLITCQR
Fugu Kank1b	RRPPLPHSKPKTSSQRADVPODLITCQR
Cavefish Kank1b	RRPPLPPSHSLPKTTSATLESSQAPPAS
Spotted gar Kank4	-LPKNKSRALDVQQIFDFRAAESMTPE-
Coelacanth KANK4	-LPAPKNKVVKT KDVLDFAAADSTTLAG-
Frog Kank1	LTRRHTFSENTARPSSEASPSFLTPEN
Shark Kank1	IGARSQPAPPPIRGGGIEASQAFITVQEN
Coelacanth KANK1	SQPVPPSAHVKTFASFEASPTFLTPVDS
Mouse KANK1	RSHTVTSTPIPRPPAPLETSPTEFAVSENR
Rat KANK1	RSHTVTSTPIPRPPAPLETSPTEFAISENR
Dog KANK1	RSQVTSTPVPRPPAPLETSPTEFLTIPES
Human KANK1	RSQVTSTPIPKPPPPLETSLPFLTIPEN
Anole lizard KANK1	PAAAATSFSTRPSLSFEASPSFLTIPES
Eagle KANK1	RSQVTSSIAVRPSVTFEASPSYLTVPES
Chicken KANK1	RSQVVSSAAVRPLASLEASPSYLTVPES
Goose KANK1	RSQVTSSVAVRPLVSVFEVSPSYLTVPES
Turtle KANK1	RNQVASSVTARPSVSVFEASPTFLTIPES
Aligator KANK1	RSQVVSSATARPSVSVFEASPAFLTIPES
Spotted gar Kank1	TRNQPNSPQVRTAVLHEASPAFLSVPEG
Herring Kank1	SLPPPPQPLTQSQTIRPREVPIPANVPH
Zebrafish Kank1a	TSQNQVAPPGHATAQVHEVPQPFVNVPET
Cave fish Kank1a	TTRSQLASLSHIGQVHEPPQAFVNVLEA
Stickleback Kank1a	-SPVFFGGGPQVAAPLTPTLCRACEAP-
Medaka Kank1a	-SPIPPFRPQDAAPLTCCEAPVQQLPSG-
Fugu Kank1a	-----
Tetradon Kank1a	-----
Tilapia Kank1a	-----
Amazon molly Kank1a	RHPDAAPLTPTLPRATGDVPLGQSYLAE-----
Mouse KANK3	-----ALSPGAFPGLSLPL-----
Rat KANK3	-----ALSPGAFPGLSLPL-----

```

Dog KANK3          -----ALSPGAPSGLLLSPR-----
Human KANK3       -----ILSQGAPSGLLMQPL-----
Lamprey           -----VDFSENFVGAEV-----
Coelacanth KANK3 PRGRTQSSSLEVRFPFGVQTSNVPSPAP-----
Frog Kank3        PRVRTQSNSSDNKEMLSFPKSNPVSPTP-----
Turtle KANK3     PRIRTSQSGSSEMREPLSKQASNPVSPTP-----
Aligator KANK3   PHARTQSNSSSETREALSKQVSNPVSPTA-----
Eagle KANK3      TLLLLSPRGRAPLEPLSKPSSHVSPPPP-----
Chicken KANK3    LLSPHGRAVPEPPGKQTSLPTSPPPFVR-----
Goose KANK3      -----
Spotted gar Kank3 VPPFRNRRTISAPSESLPLSPVPLTSPPL-----
Zebrafish Kank3  NQPFLLQSPITPPYKSQPLSPLPVISPSL-----
Cavefish Kank3   SHLISPSPKSQPLSPTSVCSPTLPSASK-----
Herring Kank3    PPPFRNRRLGSAPAEVHIRSPVSVLSPPL-----
Stickleback Kank3 -----LGSAPCEGLRLSPVTLTGVP-----
Fugu Kank3       --GPPPPPPRNRRLGSAPCEGLGLSPMA-----
Tetradon Kank3   ----APPPPPRNRRLGSAPCAKVPPPP-----
Medaka Kank3     PPPFRNRRLGSAPCEVLSLSPVTLASFPS-----
Tilapia Kank3    ----ATVLSLSPVTFNLVPPPLSAGAKV-----
Amazon molly Kank3 PPPFRRLRLGSAPCEVLSISPVTLLNVPP-----
Platyfish Kank3  PPPFRRLRLGSAPCEVLSISPVTLLNVPP-----

```

410 420 430 440 450 460 470 480 490 500

```

Hydra             -----FSCQNDLISSKNQELQTDDEVILK-----
Trichoplax
Aplasia          -----TDSLSSLSVSTVSSSEAPMMHQAYLYQQQQAQHF-----
Snail            -----SSMARTDLSLTSLSVSTMSSESHLMQQLYPQEF-----
Fruitfly        -----TASSTCSSLRGGVESDAGIYHQRHRPAISPPETRAFLHEALDEVCSDFERTLERTSVKRR-----
Hookworm        -----PLPPAKPCAECAPLRREVQELLKRLAVAEA-----
C.elegance       -----MQGGYNSDYTTYRRGPPEIPRAHFEOAKPPPL-----
Tunicate        -----NRQGVRAADKTLMETRRRLEAFRSFRS-----
Spider          -----VSDKRNQFKVVKDLATSETSAIMCGSMENKELYAT-----
Lingula         -----SPSPTSPTKFTSTMYTTNRALAGSNSSIS-----
Lancelet        KQDGDKDGTKRLHRRSLSTGSFQMLEQQWKEQQAEQEKQKASKDAPAPSEKTVQPRSANGATNTYKERILAKPRFVNQTPQIEDGPPNIKMEENDRQ
Medaka Kank4b   -----PRSLAELEAKIKEFDEQPLGEH-----
Amazon molly Kank4b -----LTSLTEMEARIKEFDEQPLGEH-----
Platyfish Kank4b -----LTSLTEMEARIKEFDEQPLGE-----
Stickleback Kank4b -----LRTLSEMEARIREFDEQPLGEH-----
Fugu Kank4b     -----
Tetraon Kank4b -----
Cave fish Kank4b -----VRQVEPSYSSTAAEMDATIOAFDEQPLGLH-----
Medaka Kank4a   -----RGQTSQGIQFVPGKPREEIGAGTQGEDNAVSQS-----
Fugu Kank4a     -----SVTSTQSNRAAVSPAKPRDEAREGDG-----
Tetradon Kank4a -----SNRAAVSPGGGFSLAKPRDEAQEGEVKTI-----
Stickleback Kank4a -----IRAGHVSAKPRDELGAGAKDVEERTSGI-----
Tilapia Kank4a  -----SSRVTTSGQTSYVSTKPKDEVGAGARGVEDKTGGIQ-----
Platyfish Kank4a -----SSRATTSQGTANVSTKSRDEPGTVYQGTEDKTAVI-----
Amazon Molly Kank4a -----SSRATTSQGTPNVSNKSRDEPGTVYQGTEDKTAVI-----
Herring Kank4   -----SRIQGTSYSPPPRPAEEVKSRVYEEQPLSLQ-----
Zebradish Kank4 -----SISGSSATSQSKI SSSYLSPKVAEESQVQTS-----
Cave fish Kank4a -----SGISTAGHSKVQNTGYLSSSKPADEPLVQA-----
Mouse KANK4     -----SVQGSSELNYHRKALLAKDARQAEAGSLEDV-----
Rat KANK4       -----TVHGNELSYHRKALLAKDTRQVEAGSLEDA-----
Dog KANK4       -----SASGSEVSYHRKALLAETARHLEAAAPREA-----
Human KANK4     -----STSRSEVSYHRKALLAETARQLEAAEPEDA-----
Eagle KANK4     -----DEPSYRCALSAAETRRPSEPGQEGE-----

```

Chicken KANK4 -----RRKALLAETRRAELVRCED-----
 Goose KANK4 -----CPLRSPSQPGDNESCPES-----
 Anole lizard KANK4 -----NYRRKALLIETTRQDPMKLAEN-----
 Turtle KANK4 -----LTAEEPSYRKALLAETIRQAEVIHHEE-----
 Aligator KANK4 -----EQSYRKALLAETIRQAEVMHPEED-----
 Frog Kank2 -----SRGGAQAPHNFNPRVEKTLLDASKKLEAGQSRPL-----
 Mouse KANK2 -----ALETRIGSNPRVERTLLDARRRLEDQAAAPS-----
 Rat KANK2 -----ALETRSGTNPRVERTLLDARRRLEDQAAAPS-----
 Dog KANK2 -----ALETRAGFNPRVERTLLDARRRLEDQAAAPT-----
 Human KANK2 -----ALETRGGFNPRVERTLLDARRRLEDQAAATPT-----
 Aligator KANK2 -----RDARVESTLLGARRKLEGOA-----
 Spotted gar Kank2 -----NARVERTLLDARKKLEEDQKDR-----
 Cave fish Kank2 -----PGFGAGRVEKTLLDARRKLEEEKDARR-----
 Herring Kank2 -----ASSAAATMQRPSFSAARVERTLLDARRKLEEEKES-----
 Zebrafish Kank2 -----PNFSTARVEKTLMDARRKLEEEKDGR-----
 Tetradon Kank2 -----PSFTTARVEKTLLDARRKLEEEKEGRR-----
 Fugu Kank2 -----PSFSTARVEKTLLDARRKLEEEKEGRR-----
 Medaka Kank2 -----PSFTAARVEKTLLDARRKLEEEKEGRR-----
 Stickleback Kank2 -----PSFSSARVEKTLLDARRKLEEEKESRR-----
 Tilapia Kank2 -----PSFSTARVEKTLLDARRKLEEEKEGRR-----
 Amazon molly Kank2 -----PSFSTARVEKTLLDARRKLEEEKEGRR-----
 Platyfish Kank2 -----PSFSTARVEKTLLDARRKLEEEKEGRR-----
 Coelacanth KANK2 -----VENRPPLLTSGYNARVEKTLLDARRRLEEDQADSA-----
 Anole lizard KANK2 -----NTTPGSEFNARVEKTLLDARKKLEDQADSGD-----
 Turtle KANK2 -----TGAFNARVEKTLLDARKKLEDQAGDRA-----
 Tetradon Kank1b -----KRCSDAGTEKH-----
 Medaka Kank1b -----IPSGSKPQSAPRSSQSGVMEKTEETSKLLNQDVVGQT-----
 Amazon molly Kank1b -----HTEPKPQOTERNAASQRPSLQVQSVLETHKHISQSPQPL-----
 Platyfish Kank1b -----HAEPKPQOTERNAASQIPSPGVEQTVLETHKNISQSPQPL-----
 Frog Kank4 -----DSSLRLRYIHDLNRYRKENVCDTQKHIGDIVSEDI-----
 Zebrafish Kank1b -----NVEGKPTPTTQPTTAKSNPVVEKTLMETCRRLEHEKGSLO-----
 Tilapia Kank1b -----NVEGKPTPTTQPTTAKSNPVVEKTLMETCRRLEHEKGSLO-----
 Fugu Kank1b -----NVEGKPTPTTQPTTAKSNPVVEKTLMETCRRLEHEKGSLO-----
 Cavefish Kank1b -----HRPSDGKPPPVACQPTSPTKPNPLVERTLVETRRRLEQENVLSQ-----
 Spotted gar Kank4 -----PRALGFSFSSVKAFFDEQPLGFR-----
 Coelacanth KANK4 -----SSNTCELNFKVGSYQEIKGEGKEACYGEP-----
 Frog Kank1 -----KPLPPSPQIPQHNHVTKTLMETRRRLEQEKIMQ-----
 Shark Kank1 -----KLLPPSPRPPIHNFHVEKTLMETRRRLEQERLIMQ-----
 Coelacanth KANK1 -----KLLPPSPRLPKHNFHVTKTLMETRRRLEQERLIMQ-----
 Mouse KANK1 -----QLLPPSPQLPRHNLHVTKTLMETRRRLEQERVIMQ-----
 Rat KANK1 -----QLLPPSPQLPRHNLHVTKTLMETRRRLEQERVIMQ-----
 Dog KANK1 -----RQLPPSPQLPKHNLHVTKTLMETRRRLEQERVIMQ-----
 Human KANK1 -----RQLPPSPQLPKHNLHVTKTLMETRRRLEQERATMQ-----
 Anole lizard KANK1 -----KQLFPPSPQLPRHNLHVTKTLMETRRRLEQEKMMQ-----
 Eagle KANK1 -----KQLPPSPQPPRHNHVTKTLMETRRRLEQERMMQV-----
 Chicken KANK1 -----KQLPPSPQLPRHNLHVTKTLMETRRRLEQERMMQV-----
 Goose KANK1 -----KQLPPSPQLPRHNLHVTKTLMETRRRLEQERMMQV-----
 Turtle KANK1 -----RQLPPSPQLPRHNLHVTKTLMETRRRLEQEKVIMQ-----
 Aligator KANK1 -----KQLPPSPQLPRHNFHVTKTLMETRRRLEQERIMMQ-----
 Spotted gar Kank1 -----KLLPPSPRLPRHNLHVEKTLMETRRRLEQERLLMQ-----
 Herring Kank1 -----EAPQVYLSVLEAKQOQHLPSPSRVPRHNPQVEKTLMETRRRLEQERLLAQ-----
 Zebrafish Kank1a -----KQLLPPSPHLLRHNQVEKTLMETRRRLEQERLLMQ-----
 Cave fish Kank1a -----KQQQQQLLPPSPRLPRHNPQVEKTLMETRRRLEQERLLMQ-----
 Stickleback Kank1a -----QRLLLLPPSPRFAPRHNQVEKTLMETRRRLEQERLLTQ-----
 Medaka Kank1a -----ATEQRLLPPSPRFAPRHNQVEKTLMETRRRLEQERLLLQ-----
 Fugu Kank1a -----METRLRLEQERLLMQ-----
 Tetradon Kank1a -----METRLRLEQERLLMQ-----


```
Tilapia Kank1a -----METRRRLEQERALLQ-----
Amazon molly Kank1a -----QKQLLPPPSPRFAPRHNPQVEKTLMETRRRLEQERLLVQ-----
Mouse KANK3 -----SFRSLSRNPVEHTLLETSSRRLEQAQARER-----
Rat KANK3 -----SERSFSRNPRVEHTLLETSSRRLEQAQOER-----
Dog KANK3 -----VPARNPRVEHTLLETSSRRLELAQAHER-----
Human KANK3 -----SERAPVRNPVEHTLLETSSRRLELAQATHER-----
Lamprey -----RSVSCDTEELENE-----
Coelacanth KANK3 -----TVRLPPPSFKSLVRNPVEKTLLETSSRRLEEEQLSLE-----
Frog Kank3 -----VISLLPPPSFKSLLRNHRVEKTLLETSSKRLEQEQLNLQ-----
Turtle KANK3 -----VINLLPPPAKSLMRNPVEKTLQETSRRLELEQLHLL-----
Aligator KANK3 -----VINLLPPPSFKSLLRNPRVEKTLLETSSRRLEQEQLNLL-----
Eagle KANK3 -----PVRLLPPPTRKCLMRNPVEKTLLETSSRRLEQEQGHLO-----
Chicken KANK3 -----LLPPPARKYLARNPQVEKTLLETSSRRLEQEQRSO-----
Goose KANK3 -----
Spotted gar Kank3 -----SAGPRGPPPPPIRNPVERTLLETSSRRLEQEQSHLO-----
Zebrafish Kank3 -----PTFSKVPPPPPRNPVERTLLETSSLRLQQEQSQFS-----
Cavefish Kank3 -----IPPPPPRNPVERTLLETSSRRLQQEQSQFFP-----
Herring Kank3 -----SAGAKVPPPPPARNPVERTLLETSSLRLQQEQSQLQ-----
Stickleback Kank3 -----LSAGAKVPPPPQORNPRVERTLLETSSRRLQHEQTHQH-----
Fugu Kank3 -----LRNPRVERTLLETSSRRLQQEQTHQH-----
Tetradon Kank3 -----PORNPRVERTLLETSSRRLQQEQTHQH-----
Medaka Kank3 -----ISAKVPPPPQORNPRVERTLLETSSRRLQQEQTHQH-----
Tilapia Kank3 -----PPPPQORNPRVERTLLETSSRRLQQEQTHQN-----
Amazon molly Kank3 -----LSAGAKVPPPPQORNPRVERTLLETSSRRLQQEQTHQH-----
Platyfish Kank3 -----LSAGAKVPPPPQORNPRVERTLLETSSRRLQQEQTHQH-----
```

510 520 530 540 550 560 570 580 590 600

```
Hydra -----ESSVGDVAEK-----
Trichoplax -----
Aplasia -----QHSKTTKTSTEVIE-----
Snail -----QYTVNHKVTSKIIE-----
Fruitfly -----KSPYGAGSLSMDRNNKLSLSISNGHGALKELKSHRLGNSTWDRHFDVADSCIGGNQSPGTGTPRPFLLR-----
Hookworm -----KPTVVS-----
C.elegance -----SRPINLG-----
Tunicate -----KRTKAFGE-----
Spider -----TFPAVQSRSSS-----
Lingula -----S-----
Lancelet QANKDNI TRPTNLENTTSSANVVRTVEPQTNVEKPADAESGFGMESDTP EANKVDLSPDGKCTCCPYGYHIDLDFLKYCDDISKGSNIPKIVRPRKPK-----
Medaka Kank4b -----IRPHLLR-----
Amazon molly Kank4b -----IRPHLLR-----
Platyfish Kank4b -----HIRPHLLR-----
Stickleback Kank4b -----
Fugu Kank4b -----IRPNLLR-----
Tetraon Kank4b -----
Cave fish Kank4b -----VRPNLLR-----
Medaka Kank4a -----RPNLLR-----
Fugu Kank4a -----RTIPGQARPNNLLR-----
Tetradon Kank4a -----LGQTRPNLLR-----
Stickleback Kank4a -----QSRPNLLR-----
Tilapia Kank4a -----IQSRPNLLR-----
Platyfish Kank4a -----QSRPNLLR-----
Amazon Molly Kank4a -----QSRPNLLR-----
Herring Kank4 -----LRPNLLR-----
Zebradish Kank4 -----SQNEQSIGLSVRPHLLR-----
Cave fish Kank4a -----SYKEQQLSLNVRPHLFR-----
Mouse KANK4 -----GSGRPQLLR-----
```


Rat KANK4	-----GSGRPQLLR
Dog KANK4	-----ETASGSGRPQLLR
Human KANK4	-----ELTFGSGRPQLLR
Eagle KANK4	-----LRGRPQLLR
Chicken KANK4	-----LRGRPQLLR
Goose KANK4	-----TFRPALRS
Anole lizard KANK4	-----GSCRGPRQLLR
Turtle KANK4	-----PGSCRGPRQLLR
Aligator KANK4	-----LASCGRPRQLLR
Frog Kank2	-----
Mouse KANK2	-----
Rat KANK2	-----
Dog KANK2	-----
Human KANK2	-----
Aligator KANK2	-----
Spotted gar Kank2	-----RFSN
Cave fish Kank2	-----FSN
Herring Kank2	-----RRFSH
Zebrafish Kank2	-----FSN
Tetradon Kank2	-----YSN
Fugu Kank2	-----YSN
Medaka Kank2	-----FSN
Stickleback Kank2	-----FST
Tilapia Kank2	-----FSN
Amazon molly Kank2	-----FSN
Platyfish Kank2	-----FSN
Coelacanth KANK2	-----EDRRSRFAS
Anole lizard KANK2	-----GERSRVSG
Turtle KANK2	-----G
Tetradon Kank1b	-----
Medaka Kank1b	-----PPQPLPFRRLAS
Amazon molly Kank1b	-----PFRRLAS
Platyfish Kank1b	-----PFRRLAS
Frog Kank4	-----NRCADRPQFVR
Zebrafish Kank1b	-----QAPPEPQFRRRLAS
Tilapia Kank1b	-----QAPPEPQFRRRLAS
Fugu Kank1b	-----QAPPEPQFRRRLAS
Cavefish Kank1b	-----AVPQELCFRRRLAS
Spotted gar Kank4	-----VRPQLLR
Coelacanth KANK4	-----SALSRRGPQLLR
Frog Kank1	-----VASSYNDIRRPRLAS
Shark Kank1	-----STSGDARRPRFAS
Coelacanth KANK1	-----SGPGDVRRPRLAS
Mouse KANK1	-----MAPGDFRRPRLAS
Rat KANK1	-----MAPGEFRRPRLAS
Dog KANK1	-----VAPGEFRRPRLAS
Human KANK1	-----MTPGEFRRPRLAS
Anole lizard KANK1	-----ASPGDTRRPRLSS
Eagle KANK1	-----TPGDVRRPRLSS
Chicken KANK1	-----MPGDVRRPRLSS
Goose KANK1	-----TPGDVRRPRLSS
Turtle KANK1	-----VTPGDVRRPRLSS
Aligator KANK1	-----VTPGDVCRPRLSS
Spotted gar Kank1	-----PPSSEARRPRLAS
Herring Kank1	-----PPPCDPPFRRLAS
Zebrafish Kank1a	-----PPVSEPPFRRLAS
Cave fish Kank1a	-----PPASEPPFRRLAS

```

Stickleback Kank1a -----PPSLAS
Medaka Kank1a -----PHTEVLMFRRRLAS
Fugu Kank1a -----PHVDPMPRRRLAS
Tetradon Kank1a -----PHVDPPLFRRRLAS
Tilapia Kank1a -----PLSEPPMPRRRLAS
Amazon molly Kank1a -----AHNEPLIFRRRLAS
Mouse KANK3 -----
Rat KANK3 -----ALS PARAATRS
Dog KANK3 -----
Human KANK3 -----
Lamprey -----
Coelacanth KANK3 -----NIGDVQRPLAS
Frog Kank3 -----GAEGQIRTCSSSTLSK
Turtle KANK3 -----SSGDAQMTG
Aligator KANK3 -----SSGNAQIPK
Eagle KANK3 -----DIGGPSRSG
Chicken KANK3 -----
Goose KANK3 -----
Spotted gar Kank3 -----NGSGFQLAEPFRAGSKQ
Zebrafish Kank3 -----NGLGSNLAD
Cavefish Kank3 -----NGLGLPASDLRS
Herring Kank3 -----NGTGTIQLADPPRGALRE
Stickleback Kank3 -----
Fugu Kank3 -----QNGGRFQLAD
Tetradon Kank3 -----
Medaka Kank3 -----
Tilapia Kank3 -----
Amazon molly Kank3 -----
Platyfish Kank3 -----Q

```

610 620 630 640 650 660 670 680 690 700

```

Hydra FYSNSFTQ-----VLKNYKNQFTQCHLTEYLD-----
Trichoplax -----
Aplasia NPVLEMAT-----AEMKYATNPVEMGTAEMKPLPPPPPVK-----
Snail TPVLEMAT-----AEVKLKETPVIERGTAEVKPKETSVE-----
Fruitfly SNTLPLRQ-----RSPPAEVQYESYVQATVAANAKSPVEQLESAKSPGAPPPPPRRHLLAT-----
Hookworm IGTATEEV-----ORVEAAVGEPTQC-----
C.elegance FSGRSNT-----PTQRFNAPNGTGNGYSTALAKT-----
Tunicate EGPLPPHN-----YAVRNGVSSQTLHNMRRGSGS-----
Spider MSSVSSQS-----TASILGPVPDASRNSCMSD-----
Lingula QTTVNSEM-----SAVNGSPGPERYTTVTAQ-----
Lancelet SPGGPAPMDFRANTLPRGFYLNQQSNLPKHASVVPSSPISPLSVNTSLSSANN SIPETTTTTATTTKQTVTDPRENASSVYGYNSSTRRPSLPGDLPIP-----
Medaka Kank4b ASSLPLTV-----LLRQSESECADDRSSIWSSREY-----
Amazon molly Kank4b ASSLPLTV-----LLRQSESESTDDRSSVRSRD-----
Platyfish Kank4b ASSLPLTV-----LLRQSESESTDDRSSIQSSRD-----
Stickleback Kank4b -----
Fugu Kank4b ASSLPLTV-----LLRQSSESSDDPSSLRGSRDHLEG-----
Tetraon Kank4b -----
Cave fish Kank4b ASSLPLTV-----LLRKRSESIEDPTSPNGSRDYLTQ-----
Medaka Kank4a ASSMPITL-----QQRKGS DSSSPDCTTGTP-----
Fugu Kank4a ASSMPITL-----QQRKGS DSSSPDRTVGTPE-----
Tetradon Kank4a ASSMPITL-----QQRKGS DSSSPDRTVGTPE-----
Stickleback Kank4a ASSMPITL-----QQRKAS DSSSPDRVVGTPE-----
Tilapia Kank4a ASSMPITL-----QQRKSS DSSSPDRTVGTPE-----
Platyfish Kank4a ASSMPITL-----QQRKGS DSSSPDCTTGTP-----
Amazon Molly Kank4a ASSMPITL-----QQRKGS DSSSPDCTTGTP-----

```

Herring Kank4	TSSMPGNV	-----	-----	PRRKGSDSSEDRSPVALGESQ	-----
Zebradish Kank4	ASSMPVNV	-----	-----	PRRKGSDSTDEQSSQ	-----
Cave fish Kank4a	ASSMPVNV	-----	-----	PQRRLSDSTDEQSPQ	-----
Mouse KANK4	ASSMPATL	-----	-----	LQNQVPEEPLTSGPST	-----
Rat KANK4	ASSMPATL	-----	-----	PQNQAPEVNLTSGPSA	-----
Dog KANK4	ASSMPATL	-----	-----	LQNKASEDSSLNSGSPM	-----
Human KANK4	ASSMPATL	-----	-----	LHSRASEEPGLSLGPPA	-----
Eagle KANK4	ASSMPAAL	-----	-----	PPGQPPPPPGDKVPSPLRPPPHCHD	-----
Chicken KANK4	ASSLPAAL	-----	-----	PPGQAPASDGCVPCLRPS	-----
Goose KANK4	PDGITSSL	-----	-----	PQDAF	-----
Anole lizard KANK4	ASSMPATL	-----	-----	PPNQNSEEEETPLTFLQS	-----
Turtle KANK4	ASSMPAKL	-----	-----	LPSKSSSEESQCSKPSQPSALSQPC	-----
Aligator KANK4	ASSMPATL	-----	-----	PPTKNAEEESQCSEPSQLVLLPQPC	-----
Frog Kank2	--SLGCRS	-----	-----	TSSLSTQSLSRFP	-----
Mouse KANK2	SGGLGSLT	-----	-----	PSAAGSTS	-----
Rat KANK2	SGGLGSLT	-----	-----	PSAAGSTS	-----
Dog KANK2	--GLGSLT	-----	-----	PSAAGSTS	-----
Human KANK2	--GLGSLT	-----	-----	PSAAGSTA	-----
Aligator KANK2		-----	-----		-----
Spotted gar Kank2	LGSLHSSI	-----	-----	AGSTSSLASQYSRAQNG	-----
Cave fish Kank2	LGSMHGSM	-----	-----	AGSNTSLSSAHSFN	-----
Herring Kank2	LGSMHSSV	-----	-----	AGSTTSLSSAHSYNRSHGGGGGG	-----
Zebrafish Kank2	LGSMHSSM	-----	-----	AGSNTSLSSAHS	-----
Tetradon Kank2	LGSMNSSV	-----	-----	AGSNTSLSSAHSF	-----
Fugu Kank2	LGSMNSSV	-----	-----	AGSNTSLSSAHSF	-----
Medaka Kank2	LGSMHSSV	-----	-----	AGSNTSISSAHSF	-----
Sticklebake Kank2	LGSMHSSV	-----	-----	AGSNTSLSSAHSF	-----
Tilapia Kank2	LGSMHSSV	-----	-----	AGSNTSISSAHSF	-----
Amazon molly Kank2	LSSMNNSM	-----	-----	AGSNTSLSSAHSF	-----
Platyfish Kank2	LGSMNNSM	-----	-----	AGSNTSLSSAHSF	-----
Coelacanth KANK2	LGSLHGSV	-----	-----	SGSTSSLSGAGLSQSLSKMSSHS	-----
Anole lizard KANK2	LGSLHSSV	-----	-----	SGSTSSLVGSQSLSRQTSYN	-----
Turtle KANK2	PGGLGSLH	-----	-----	SSVSGSTSSLVGGQPP	-----
Tetradon Kank1b	-AGLSSSL	-----	-----		-----
Medaka Kank1b	FGGVSSPG	-----	-----	SVSPFTGLNAYNQSNNNHSSDADVHLG	-----
Amazon molly Kank1b	FGGISPSC	-----	-----	SHSPFTGMGAYNQNNNGNKPDDDMSAH	-----
Platyfish Kank1b	FGGISPSC	-----	-----	SHSPFTGLGAYNQNNNGNKPDDDMSAH	-----
Frog Kank4	ASSMPAAL	-----	-----	PQSTGHYEQNKY	-----
Zebrafish Kank1b	FGGVGSSG	-----	-----	TLSPYTSWSALNQGAKMTVLDQPRER	-----
Tilapia Kank1b	FGGVGSSG	-----	-----	TLSPYTSWSALNQGAKMTVLDQPRER	-----
Fugu Kank1b	FGGVGSSG	-----	-----	TLSPYTSWSALNQGAKMTVLDQPRER	-----
Cavefish Kank1b	FGGVSSG	-----	-----	TLSPYTSWNALNQAQTQALSKRSGDQ	-----
Spotted gar Kank4	TSSLPVTV	-----	-----	LQRKNSPEPEQAPPPIRSSNKPNGT	-----
Coelacanth KANK4	ASSMPVTV	-----	-----	LQRKDSSEEQCTPTDVQHS	-----
Frog Kank1	FGGMGSTG	-----	-----	SLSSVTGTTGHNISAQQLQ	-----NGH
Shark Kank1	FGGMGSTS	-----	-----	SLSSFTGSTGLNQVSPNSQ	-----QVHNGF
Coelacanth KANK1	LGAMGSTS	-----	-----	SLSSFTGSSGHNHISPTSQQLQ	-----NGY
Mouse KANK1	FGGMGSTS	-----	-----	SLPSFVGSANHSSAIHQQLQ	-----NGY
Rat KANK1	FGGMGSTS	-----	-----	SLPSFMGSGNHSSAMHQQLQ	-----NGY
Dog KANK1	FGGMGSTS	-----	-----	SLSSFLGSGNHNPAHQQLQ	-----NGY
Human KANK1	FGGMGTTT	-----	-----	SLPSFVGSNGHNPAKHQQLQ	-----NGY
Anole lizard KANK1	FGAMGSTG	-----	-----	SLPSFVGSSGPNQVSHPFQ	-----NGY
Eagle KANK1	FGGMGSTS	-----	-----	SLPSFVGSSGYGHMSQQLQ	-----NGY
Chicken KANK1	FGGMGSTS	-----	-----	SLPSFVGSSGYGHLPQQLH	-----NGY
Goose KANK1	FGGMGSTS	-----	-----	SLPSFVGSSGYGHMSQQLQ	-----NGY
Turtle KANK1	FGGLGSAS	-----	-----	SLPSFVGSSGHSQMSQQLQ	-----NGY
Aligator KANK1	FGGLGSAS	-----	-----	SLPSFVGSSGHNQVSPQLQ	-----NGC

```

Spotted gar Kank1  FGGMGSTS-----SLSSFTGSSGQNQISFNHSHQLVH-NGH
Herring Kank1     FGGMGSNS-----SLSSSYGGSVGPSQISPGSHLLVH-NGH
Zebrafish Kank1a  FGGMGSSS-----SLSSYGSYGPSQISFSSHSFQH-NGH
Cave fish Kank1a  FGGMGSSS-----SLSSYGGSYGPSQILPSSNSLQH-NGH
Stickleback Kank1a FGAAGSSS-----LSSHSGSAGPSQISFGAPHPLPVNGH
Medaka Kank1a     FGGVGSSS-----SLSSYGSYGPSQVSPSAHHPLPTNGH
Fugu Kank1a       FGGMGSSS-----SLSSHSSSILHSQISFNAHPAFPINGH
Tetradon Kank1a   FGGMGSSS-----SLSSYGSIVQSQISPSAHPAFTINGH
Tilapia Kank1a    FGGMGSSS-----SLSSYTGSIQTSQISFNQTYQLPINGH
Amazon molly Kank1a FGGMGSSS-----SLSSYSSSVATSQISFSTHQPLPING-
Mouse KANK3
Rat KANK3         PRGSGRSS-----
Dog KANK3
Human KANK3
Lamprey
Coelacanth KANK3 AGSRAGNL-----PLGTSSSNLNQLPSPIPQNGNGDSQNLH
Frog Kank3        LGSVSTSS-----PNLSQLPQNLPLNKVGEHSHGIL-
Turtle KANK3      PPSPPSKT-----WISVSTASFHQTRSSSAVPLNGGDSQ
Aligator KANK3    PPSPPSKT-----SNSISSAASVTQSRSCSSVPSNNGDSQ
Eagle KANK3       PPGAPSQP-----SPWVPAG-
Chicken KANK3     -PGAPSQA-----HPWVPAG-
Goose KANK3
Spotted gar Kank3 LGRVAINS-----SQSPPPSAFMGDPHPPHLPSPSP-
Zebrafish Kank3   LSKVSSKT-----NVSNRDFSVGSSQPSSEAPLLEPMSHYMQ
Cavefish Kank3    VGTTRDGGG-----SVGNLSASSPLPTDGHLLQISTTAATT
Herring Kank3     AGWTGSSS-----SQPATTAAVFPASAQSSNGGVKLNFF
Stickleback Kank3
Fugu Kank3        PPKQLLRS-----
Tetradon Kank3
Medaka Kank3      HNGGRLQL-----AEPKQLTPSPST-
Tilapia Kank3     -PM-----
Amazon molly Kank3 QNGGRLQL-----ADPPKQLTPSLSI-
Platyfish Kank3   NGGGRLQL-----ADPPKQLTPSLSI-

```

710 720 730 740 750 760 770 780 790 800

```

Hydra              KSLMAGCSTNDFIDVGSGLD-----SLA-----EIFLISSETQTCKQVK
Trichoplax        -VLIKKIQQEYN-----VTEKDDINDQSGLLIK
Aplasia           DESTROKYSTLLSAQLADNGVDLPDSARPPDRKP-----PAR-----ASPVDVNMQLQSVREAMAVSLQ
Snail             RGTAEVKHYSTTSSAQLAGPSEVFEVFPVFSKVF-----PGN-----TKIPPNTLPPASPLTFAVKETLALNAQ
Fruitfly         TPTGKPTFKEDRPQENGVSVSSSLQSPVISETCQ-----TTAD-----AQLFQIREQMALSLR
Hookworm          YSIATEETQRYETVDCGADA-----LQIEVASVCQTSPTTMA
C.elegance        ISEIRARNAESPFPDSRVG-----TPIDL-GLHQQNGHVT
Tunicate          PANSSGSLTPNTIASGNGQ-----IT-----SHHLQVVREQMATALS
Spider            QMTAAIATLSKPISSSTNT-----VGIH-----RSVLTNIRAQMASSLY
Lingula           LAAVLAALHLPDPDSGEAV-----PIY-----HQSLIELRQQLAISLQ
Lancelet          FTSPNSNSVFTMPAALATQSNSSSSSLSSQLSTQSSSGQFSPHSEMSGDTKHSMGVQTPASLLSPGSSSRGSGASTPQPPAVSSAMLQGIREQIAASLK
Medaka Kank4b     LLAGNTSCEDVFNPPDSPQ-----PQDCSGLLRRLSEALE
Amazon molly Kank4b HLGGRNTSCEDVFLSDSPR-----PQDCSGLLRRLTEALE
Platyfish Kank4b  HLGGRNTSCEDVFLSDSPR-----PQDCSGLLRRLTKALE
Stickleback Kank4b ISGGAEPGRTDGSAVSPEA-----
Fugu Kank4b       RNVSCEDVFHSPDSRQSHE-----GSVLLRRLRE---ALE
Tetraon Kank4b
Cave fish Kank4b  ENGSSEDFVHSPERKTAGA-----NGTLQRLTAAALQ
Medaka Kank4a     NGSTENMFRSPDITERRC-----IPQDRAGLHQQITVALK
Fugu Kank4a       TGSTENVFRASPDITERRS-----IPQDRTGLHQQITVALK
Tetradon Kank4a   SGSTENMFRASPDITERRC-----IPQDRTGLHQQITVALK

```

Stickleback Kank4a -----SGSTENVFRASPDITERRC-----IPQDRTGLHQITVALK
Tilapia Kank4a -----NGSTENMFRASPDVTERRC-----VPQDRAGLHQITVALK
Platyfish Kank4a -----NGSTENMFRASPDILERRC-----LPQDRAGLHQITVALK
Amazon Molly Kank4a -----NGSTENMFRASPDILERRC-----LPQDRAGLHQITVALK
Herring Kank4 -----KENGSEYERLFRADGGDRR-----GSV-----PQDRASLHVQITNALK
Zebrafish Kank4 -----SQNGSTERLFRPADGGDRR-----GSI-----PQDRASLHQITAAALK
Cave fish Kank4a -----SQNGSTERLFRPVESDRR-----GSV-----PQDRASLHQITAAALK
Mouse KANK4 -----LLALPLLQDEGSVCDGAFD-----PAE-----GLMGFQASAAQS
Rat KANK4 -----LLVLPPLQDEGSVRDGTFD-----PAE-----GLMGFQAAAQS
Dog KANK4 -----PPALPLLQSEGSVCDGTFG-----PAD-----GFAGFQNSTFRATTQP
Human KANK4 -----PPALPPLQGEGSVCDGTFE-----PAE-----GLAGFHSSSPRAST
Eagle KANK4 -----RSGSESAFRPAPRSPGSDG-----PAE-----AALSLAREASSEPGV
Chicken KANK4 -----DNGSCPESTFRMPRSPDG-----IAS-----LPSLMLSPGAEIASQQQ
Goose KANK4 -----LQQQEQQPKGSPVREGWHG-----EVP-----
Anole lizard KANK4 -----CDAKSLENSFSPANESPES-----ESS-----KGVSLTAPDGLMTVKQ
Turtle KANK4 -----DGKSFTTEIPFSPAKELLD-----HYS-----DSVTLHFPEPRNVQEQIKVVFQ
Aligator KANK4 -----DGKSFTTEIPFSPAKESLDS-----NCP-----DSLNLNPKDTRIAQQQMEEAMP
Frog Kank2 -----STSSQQISSFTPLSSGMST-----PVS-----PSPAQLQHVREQMAVALK
Mouse KANK2 -----SLAGVGLLPPPTPRSSGLST-----PVA-----PS-----AGHLAHVREQMAVALR
Rat KANK2 -----SLAGVGLLPPPTPRSSGLST-----PVA-----PS-----AGHLAHVREQMAVALR
Dog KANK2 -----SLVGVGLPPPTPRSSGLST-----PVP-----PSAGHLAHVREQMAVALR
Human KANK2 -----SLVGVGLPPPTPRSSGLST-----PVP-----PSAGHLAHVREQMAVALR
Aligator KANK2 -----GPSGLRNSRLSLAGSGLST-----PAT-----PTPGHLQHVREQMAVALR
Spotted gar Kank2 -----AQGAGGGGQFTPMSSGLST-----PVS-----PT-----PAHLQHVREQMAVALR
Cave fish Kank2 -----RAQGGAGSSYTPASSGLST-----PVS-----PT-----PAHLQHVREQMAVALR
Herring Kank2 -----GGGGGGGGSYTPMSSGLST-----PVS-----PT-----PAHLQHVREQMAVALR
Zebrafish Kank2 -----FNRAQGGGGSYTPMSSGLST-----PVS-----PTPAHLQHVREQMAVALR
Tetradon Kank2 -----NRAHGGGSFTPIINSGLST-----PVT-----PTPAHLQHVREQMAVALR
Fugu Kank2 -----NRAHGGGSFTPIINSGLST-----PVT-----PTPAHLQHVREQMAVALR
Medaka Kank2 -----NRAQGGGGSVTTLNLSGLST-----PVT-----PTPAHLQHVREQMAVALR
SticklebacK Kank2 -----NRAHGGGGSYTPMSSGLST-----PVT-----PTPAHLQHVREQMAVALR
Tilapia Kank2 -----NRSQGGGGFTPMSSGLST-----PVT-----PTPAHLQHVREQMAVALR
Amazon molly Kank2 -----NRAHGGGGFTPMSSGLST-----PVT-----PT-----PAHLQHVREQMAVALR
Platyfish Kank2 -----NRAHGGGGFTPMSSGLST-----PVT-----PTPAHLQHVREQMAVALR
Coelacanth KANK2 -----NSQSGVSGQYTPMSSGLST-----PVS-----PT-----PAHLQHVREQMAVALR
Anole lizard KANK2 -----GSQLGASGQFTPIGSGGLST-----PVS-----PT-----PGHLQHVREQMAVALR
Turtle KANK2 -----GRLNGSQAGFTPLSSGLST-----PVS-----PSPGHLQHVREQMAVALR
Tetradon Kank1b -----GSRGSTGCLRLSPSSGRIT-----PVP-----NLG-----PTQLQHVREQMAVALQ
Medaka Kank1b -----SSLG-----SRGSTGCLQLSPQSSGRST-----PVS-----GPMHLQHVREQMAVALQ
Amazon molly Kank1b -----LTSSLG-----SRGSTGCLKLSPOSSGRST-----PVT-----SLG-----SMHLQHVREQMAVALQ
Platyfish Kank1b -----LTSSLG-----SRGSTGCLTLSPQSSGRNT-----PVT-----SLG-----SMHLQHVREQMAVALQ
Frog Kank4 -----LKFPQSVNSYSESTTQCLE-----GSHHKGSEDTQAVALK
Zebrafish Kank1b -----TLILGSALKISPSSGRAS-----PAS-----GVSPLHLQMVREQMAVALQ
Tilapia Kank1b -----TLILGSALKISPSSGRAS-----PAS-----GVSPLHLQMVREQMAVALQ
Fugu Kank1b -----TLILGSALKISPSSGRAS-----PAS-----GVSPLHLQMVREQMAVALQ
Cavefish Kank1b -----SSQGQGA-----STMSSTMRISPLSSGRAT-----PVT-----SVS-----PLHLQLVREQMAVALE
Spotted gar Kank4 -----SENSFWSLNASPSPDNKHQ-----LTA-----QKEMSSLHQFTNALQ
Coelacanth KANK4 -----NRTSCVDNIFNPANESISQ-----NSS-----KNFVLTKSEEGTNIKE-FQIALQ
Frog Kank1 -----QANGDYSALE-----ASSLGSSIRHSPSSGVST-----PVT-----NVS-----PMHLQHIREQMAVALK
Shark Kank1 -----QTNGDYNPYF-----TSSMGSSIRHSPSSGLTT-----PVT-----NVT-----PTHLQHIREQMAVALK
Coelacanth KANK1 -----QANGDYSALE-----TSSIGSSIRHSPSSGMTT-----PVS-----NVS-----PMHLQHIREQMAVALK
Mouse KANK1 -----QNGDYNSYVPAAPTSSMGSSVRHSPSSGIST-----PVT-----NVS-----PMHLQHIREQMAVALK
Rat KANK1 -----QNGDYSSYVPAVPTSSMGSSVRHSPSSGIST-----PVT-----NVS-----PMHLQHIREQMAVALK
Dog KANK1 -----QNGDYGGYVPAATATSSMGSSIRHSPSSGIST-----PVT-----NVS-----PMHLQHIREQMAVALK
Human KANK1 -----QNGDYGSYAPAAAPTSSMGSSIRHSPSSGIST-----PVT-----NVS-----PMHLQHIREQMAVALK
Anole lizard KANK1 -----QNGDYSLHL-----ASSLGSSIRHSPSSGIST-----PVT-----NVS-----PVHLQHIREQMAVALK
Eagle KANK1 -----QNGDYGACF-----STSLGSSIRHSPSSGIST-----PVT-----NVS-----PVHLQHIREQMAVALK

Chicken KANK1 QGNGDFGACF----GSSLGSSIRHSPMSSGIST-----PVT-----NVS---PVHLQQIREQMAIALK
 Goose KANK1 QSSGDYGACF----SSSLGSSIRHSPMSSGIST-----PVT-----NVS---PVHLQHIREQMAVALK
 Turtle KANK1 QGNGDYNVYL----ASSLGSSIRHSPMSSGIST-----PVT-----NVS---PVHLQHIREQMAVALK
 Aligator KANK1 QGNGDYNVCL----GFLNSSIRHSPMSSGIST-----PVT-----NVS---PVHLQHIREQMAVALK
 Spotted gar Kank1 QANGEYNPYF----TSSMGSSIRHSPMSSGMTT-----PVT-----NIS---PMHLQQIREQMVALK
 Herring Kank1 LPNGDYNPYF----TPSMVSSMRHSPMSSGMTT-----PVT-----NVS---PAHLQHIREQMVALK
 Zebrafish Kank1a LGNGEYNPYF----TSSMGSSIRHSPMSSGMTT-----PVT-----NVS---PLHLQHIREQMVALK
 Cave fish Kank1a LANGEYNLYL----TSSMGSSIRHSPMSSGMTT-----PVT-----NIS---PLHLQNIIRDQMVALK
 Stickleback Kank1a PPGNDYSLYY----PSSMVSSIRHSPMSSGVAT-----PVT-----NVS---PLHLQQIREQMVALR
 Medaka Kank1a LPNGDYGYF----PPSVGSSIRHSPMSSGVAT-----PIT-----NVS---PLHLQQIREQMVALR
 Fugu Kank1a PHNGEYNPYF----PASMSSIRHSPMSSGMTT-----PVT-----NVS---PLHLHQIREQMVALR
 Tetradon Kank1a PHNGEYNPYF----PASMSSIRHSPMSSGMTT-----PVT-----NVS---PLHLQQIREQMVALR
 Tilapia Kank1a LPNGEYNPYF----PPSRGSSIRHSPMSSGVAT-----PVT-----NVS---PLHLQQIREQMVALK
 Amazon molly Kank1a LSNGEYNPYH----SQSRGSSIRHSPMSSGVAT-----PVT-----NVS---PLHLQQIREQMVALK
 Mouse KANK3 -----ALSPARAVTRSPRGSGRSS-----PAP-----NPALASPGPAQLQLVREQMAAALR
 Rat KANK3 -----PAPNPALASPSVPLASPG-----PAP-----PAQLQLVREQMAVALR
 Dog KANK3 -----APSPGRAVPRSPRGSGRSS-----PAP-----NPAPASPGPAQLQLVREQMAAALR
 Human KANK3 -----APSPGRGVPRSPRGSGRSS-----PAP-----NLAPASPGPAQLQLVREQMAAALR
 Lamprey -----AEGNEGARAGSEVARGAEL-----SRYTERVQRLLHEQQA
 Coelacanth KANK3 -----SPSFTSSIRISPMNSGRST-----PVT-----SIT---PAQLQHVREQMVTALK
 Frog Kank3 -----SPSFGSGVKISPVNSGRST-----PAM-----ISSSHLHYVREQMAAALK
 Turtle KANK3 ATP-----GPSLTGSMRSPMNSGRST-----PAT-----NIS---PAHLQHVREQMAAALK
 Aligator KANK3 ATL-----SPSLTGSMRSPMNSGRST-----PAT-----NLS---ATHLQHVREQMAAALK
 Eagle KANK3 -----TEGQAGWGRASPSSGRST-----PAA-----GLG---AAPLQHVREQMATALR
 Chicken KANK3 -----SEGQPGSVRMSPGSSGRST-----PAA-----GLGTAPLQHVREQMAAALR
 Goose KANK3 -----DPSPARDCRAA-----
 Spotted gar Kank3 -----SPSQVIWPRASPQNSGRST-----PASGGTSTGLTQIP---PNQLQTVREQMAAALR
 Zebrafish Kank3 -----NPLSGAWTRASPQNSGRST-----PAS-----NSGTMPPGQLQTVREQMAAALR
 Cavefish Kank3 VQ-----NPPSTGNRLSPQNSGRST-----PAS-----NCGTSASSSIPPGQLQTVREQMAAALR
 Herring Kank3 SSASP-----SPCPSGLARASPHTSGRST-----PAA-----ASAQMPPAQLQTVREQMASALR
 Stickleback Kank3 -----QNPVQSGWTKPSPQTSGRST-----PAV-----GSTMTPIPPSQQLQTVREQMATALK
 Fugu Kank3 -----QSQPQLQAKPSPQTSGLST-----PAA-----GTTMTPIP---PSQLQTVREQMATALR
 Tetradon Kank3 -----QNAQPLQAKPSPQTSGLST-----PAA-----AMTPIP---PSQLQTVREQMATALK
 Medaka Kank3 -----LVVQSSWIKPSPQTSGRST-----PAA-----GATVTPVP---PSQLQTVREQMAIALK
 Tilapia Kank3 -----QPLQSSWTKPSPQTSGRST-----PAA-----GTTVTPIP---PSQLQTVREQMATALK
 Amazon molly Kank3 -----PPLQNSWTKPSPQTSGRST-----PAA-----GTTVTPIPPSQLQTVREQMATALK
 Platyfish Kank3 -----PPLQNSWIKPSPQTSGRST-----PAA-----GTTVTPIP---PSQLQTVREQMATALK

810 820 830 840 850 860 870 880 890 900

Hydra NDQAT-QCSINTLEKSLAVGCSYANL---KTASSQCLVDMKD-----FQCGDNFVKYKDASSNVH-----
 Trichoplax LITDI-NHSVHY-----QNGHANINPSFQA-----NQTEYKDSQHLNH-----
 Aplasia RMREL-EEQVKAIP---ILQVRISVL---KEEKRLNLQQLKA---HKANSKPMTRTVGLNTRDVRDWSDRTEFSSY-----SQFERNFSSQ
 Snail RIKEL-EDQVKVIP---ILQVRISVL---KEEKRLNLQQLKA---SKSNSHPPMISIGVGNRIEVDKVEKLVYSPKQFELPKSFTDSTQSLRSP
 Fruitfly RLKDL-EEQVKVIP---DMELELNSL---RSEKQKLLRRNEE-----LMRSQRQTPSPSPGL-----
 Hookworm EVGVAVEPNVADV---LQ-----TDEQAKAHFGVNT-----DEVEKMPDVEKADQST-----
 C.elegance PSRFA-NNRYDDL---PTPTTFRR---APSQGDLPRGFST---APSTGPGDFASLRRREFALPPEQEH-----HSRRF
 Tunicate RLRDL-EEQVKVIP---VLQVKISVL---QEKKHLDELKE-----AENKVERLKSPLDDLHDN-----
 Spider RMREL-EEQVKSIP---ILEIKLSAL---KEEKNSLLNQLKL---KESKLQNKSVNSDGDLDQ-----KQLKRENE
 Lingula KMRDL-EEQVKSIP---LLQTRMSVL---KEEKRLLELQLLA---KQSKPTSTYSIGVGYRVDVEEPAPRR---PDMRSIGVG
 Lancelet RIKVL-EEQVKEIP---VLQVKISVL---KEEKRLLVMLKLS---KNGE---QNLKPEDTDNKRKQDGDKDGTT---KRLHRRSLS
 Medaka Kank4b RVGEL-EMEVVVIP---ELRAQICIL---QEERERLRGLVH---HLLSSTENGTTKRF-----
 Amazon molly Kank4b RVGEL-EMEVVVIP---ELRAHICIL---QEERERLRGLVH---HIPSTVNGTTDLH-----
 Platyfish Kank4b RVGEL-EMEVVVIP---ELRAQICIL---QEERERLRGLVH---HIPSSVNGTTDLH-----
 Stickleback Kank4b -----EKTAKTKP-----
 Fugu Kank4b RVREL-EMEIRVIP---ELKAQICIL---QEERORLQPGLLS---QSVNGTTSLYDRNHNISQGDST-----
 Tetraon Kank4b -----

Cave fish Kank4b RTAEL-EEEIRVIP---ELKAQICIL---QEEREMILLYKFQT-----QISPSTKEPVDFFSSGSPQSS-----
 Medaka Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREQLLNQLKV-----QTQTLVSTSSSSAAKSPD-----AASA
 Fugu Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREKLLLLQLQA-----HVC TSPSTVVPSSNTE TL-----
 Tetradon Kank4a RVREL-EEQVKTIP---ELKAQIFSL---KEEREQLLLQLQA-----HVSTSPSAVDPG SYT-----
 Stickleback Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREKLLLLQLHA-----HAQAQSKAQVSSLPST-----
 Tilapia Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREKLLLLQLQA-----QAKAQASKLSTTVPTGY-----
 Platyfish Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREKLLCQIQTFQVQASTSSSAMATTYETGGISQRQRPRPSEGLNLSLAIQTVQGVASEHVPVNVVEE
 Amazon Molly Kank4a RVREL-EEQVKTIP---ELKAQICSL---REEREKLLRQIQTSQVQASTSSSAMATTYETGGNSQRQRPRPSEGLNLSLAIQPVRGVASEHVPVNVVEE
 Herring Kank4 RVREL-EEQPPTPEEETKTRVEESEA---EEPEEEAAETQK-----PQTS EIQTEALERGP E EIT-----E
 Zebrafish Kank4 RVREL-EEQVRTIP---ELKAQICSL---RTEREGLLQKILQ-----HQSEQKREPLQKKEIEVL-----QADLQVSALPPST
 Cave fish Kank4a RVREL-EEQVRTIP---ELKSQICSL---REEKEKLLQRIQE---QAERKAEPSEKSPEDSTEHPVATQQQEK A-----SAFSEDITVV
 Mouse KANK4 VDREL-GELEPAIP---EQVWEG AEP---EEGDLKASSHLSQ-----PGPSSAVQSVEMDLEEV EIE-----
 Rat KANK4 TDRAV-EELEPAIP---EPVWEG AEP---EEGDIKAASHLSQ-----PAPSSSVQNVSVLDLEEV DIQ-----
 Dog KANK4 KVREF-GDLVPGIP---ELVQEGTELP EGEDEEAPNHL SLP S-----PPFFSQDALVVLVEDEEDEPKTR-----
 Human KANK4 RIPELVQEGAE--P-----PEGVVKVPNHLPL-----PGPPFSFQNVLVVLEDK EDE-----
 Eagle KANK4 SLGQK-EHPGGGGPGPRQTQPPRQSQ---HPAAPQLQAVMES-----GGEEGD AADAGGRSAS-----AG
 Chicken KANK4 EWPGK-GGLVRDVP---KERAQPLWQG-QHSAVQLQVVMES-----RGEEGDASDATNGSTL-----
 Goose KANK4 -----KERAPAQP---PRQGGHAAV-----QQLQVVVES-----GAEEGDAADM-----
 Anole lizard KANK4 KINKL-----VP-----ETERENTQLGLNQ-----KHIVKERM RPSASWEGQPF-----
 Turtle KANK4 KNEQPEGQVKAIP---ELDPQPLEF---PRERMLIQSPHQS-----QHFI AQE LLLVTE SGGEECY-----
 Aligator KANK4 KNKQL-GEQAKTTP---ELDHQPEEH---POEGKEIQSPQPS-----QPSTVQEP L MVIESGEE ECE-----
 Frog Kank2 KLRQL-EEQVKMIP---VLQVKISVL---QEEKRQLSVQLKS-----QKYLGHPRGNIRGKDR-----
 Mouse KANK2 KLRQL-EEQVKLIP---VLQVKLSVL---QEEKRQLTVQLKS-----QKFLGHPSGTRSRSEL-----
 Rat KANK2 KLRQL-EEQVKLIP---VLQVKLSVL---QEEKRQLTVQLKS-----QKFLGHPSGTRSRSEL-----
 Dog KANK2 KLRQL-EEQVKLIP---VLQVKLSVL---QEEKRQLTVQLKS-----QKFLGHPTGARSSEL-----
 Human KANK2 KLRQL-EEQVKLIP---VLQVKLSVL---QEEKRQLTVQLKS-----QKFLGHPTAGRGRSEL-----
 Aligator KANK2 QLRQL-EEQVKLIP---VLQKVAVL---QEEKRQLSTRLOS-----RRGLGQPVGGPG-----
 Spotted gar Kank2 KIREL-EEQVKMIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTMGEFGKGRSR-----
 Cave fish Kank2 KIRD L-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGVRGRSRPR-----
 Herring Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGFGGSSG-----GR
 Zebrafish Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGFNRSRPR-----
 Tetradon Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGF SRGRSR-----
 Fugu Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGF SRGRSR-----
 Medaka Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGF SRSRPR-----
 Stickleback Kank2 KIRD L-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHSLSFNVRPR-----
 Tilapia Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGFNRSRPR-----
 Amazon molly Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGF SRGRNR-----
 Platyfish Kank2 KIREL-EEQVKTIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTLGF SRGRNR-----
 Coelacanth KANK2 KLRQL-EEQVKMIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHTTGFGKPKPR-----
 Anole lizard KANK2 KLRLL-EEQVKMIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHPGGFCGKGR-----
 Turtle KANK2 KLRQL-EEQVKIIP---VLQVKISVL---QEEKRQLSVQLKS-----QKFLGHPGGFCGKGR-----
 Tetradon Kank1b KLKEL-EEQVKIIP---VLQVKISVL---QEEKRLLACQLKT-----QSDSEEFNGGLRDAPQSPPEKGD-----
 Medaka Kank1b KLKEM-EEQVKMIP---VLQVKISVL---QEEKRQLSVQLKN-----QNDNENINNL IWNRS CDVEM-----
 Amazon molly Kank1b KLKEL-EEQVKIIP---ILQVKISVL---QEEKRQLVSQ L S D-----SKSINDMTWRTCLGEDGID-----
 Platyfish Kank1b KLKEL-EEQVKIIP---ILQVKISVL---QEEKRQLVSQ L S D-----SKSINDMTWRTCLGEDGID-----
 Frog Kank4 RIKDL-EEQLQTVT---EHKKTISEL---EGENSKLNAQLKS-----ISELLTSNRMENENVD-----
 Zebrafish Kank1b RLKDL-EEQVKAIP---LLQVKISVL---QEEKRQLAALVKS-----QDEDQKSGSSIDQ EY-----
 Tilapia Kank1b RLKDL-EEQVKAIP---LLQVKISVL---QEEKRQLAALVKS-----QDEDQKSGSSIDQ EY-----
 Fugu Kank1b RLKDL-EEQVKAIP---LLQVKISVL---QEEKRQLAALVKS-----QDEDQKSGSSIDQ EY-----
 Cavefish Kank1b RLKEL-EEQVKTIP---MLQIKISTL---QEEKRQLVALVKQ---QEGQSLSSSTLSDSLQGLFRKRAHSTG STLQ Q-----LQQH
 Spotted gar Kank4 RVKEL-EEQARMIP---ELEEKQLI---LKLPPQSVA TEE---KTLHSEHERRNGQSQCL-----
 Coelacanth KANK4 RIKEL-EEKVKSIP---NLKKQILLL---KEEKNV LITQLQN---QSFA-----TEFKDAQSLTLHKGSR-----
 Frog Kank1 RLKEL-EEQVKTIP---ILQVKISVL---QEEKRQLMSEIKS-----QKLSNQKDTAGFRKRSYSAGNAAGF-----E
 Shark Kank1 RLKEL-EEQVKAIP---ILQVKISVL---QEEKRQLASQLS-----HKLSSQNVAPGFRKRSYSAGNADQL-----
 Coelacanth KANK1 RLKEL-EEQVKTIP---ILQVKISVL---QEEKRQLVSQ L S-----EKISNQNC SFNFRKRSYSAGNVDF-----EQLAQ
 Mouse KANK1 RLKEL-EEQVRTIP---VLQVKISVL---QEEKRQLASQLS-----QRASSQNEACGVVRKRSYSAGNASQL-----ELLARA
 Rat KANK1 RLKEL-EEQVRTIP---VLQVKISVL---QEEKRQLASQLKN-----QRAASQNEACGVVRKRSYSAGNASQL-----ELLSRA

Dog KANK1 RLKEL-EEQVRTIP---VLQVKISVL---QEEKRQLASQLKN-----QRATAQNDACGVVRKRSYSAGNASQL-----EQLSRA
Human KANK1 RLKEL-EEQVRTIP---VLQVKISVL---QEEKRQLVSQLKN-----QRAASQINVCGVVRKRSYSAGNASQL-----EQLSRA
Anole lizard KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRQIMAKLKN-----QRIVNQNDTGHFRKRSYSAGNAEHW-----KNLSP
Eagle KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRHMMAELKN-----QRKATQNDTYGFRKRSYSAGNAEQW-----EHMSQ
Chicken KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRHMMAELKS-----QRKSSQNDVYGFVRKRSYSAGNAEQW-----EHLSD
Goose KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRHMMAELKS-----QRKPSQNDYGFVRKRSYSAGNAEQW-----EHLSD
Turtle KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRQMMALQKS-----QRIPNQNDTYGFRKRSYSAGNAEQW-----GHLSQ
Alligator KANK1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRQMVAEELKS-----QRKPSQNETYGFVRKRSYSAGNAEQW-----EHLSD
Spotted gar Kank1 RLKEL-EEQVKTIP---VLQVKISVL---QEEKRQLAAQINN-----QKSTSQSIGHGFRKRSYSAGNAQQF-----D
Herring Kank1 RLKEL-EEQVKTIP---ILQVKIAVL---QEDKRQIQKNQKL-----AGQQGAGAGGFRKRSYSVGSADQF-----EP
Zebrafish Kank1a RLKEL-EEQVKTIP---ILQVKISVL---QEEKRQLVSQLKN-----SKVVGQSGGCFRKRFSVGSADQY-----
Cave fish Kank1a RLKEL-EEQVKTIP---ILQVKISVL---QEEKRQLVSQLKN-----PKLAGQGPLGGFRKRSYSVGSADQY-----
Stickleback Kank1a KLKEL-EEQVKTIP---ILQVKIAVL---QEEKRQLAAQSKS-----QAAGSFRKRFSVGSAAQM-----E
Medaka Kank1a RLKEL-EEQVKTIP---ILQVKIAVL---QEEKRQLAAQSKS-----PGPAGFRKRFSVGSAAQM-----
Fugu Kank1a RLKEL-EEQVKTIP---ILQVKIAVL---QEEKRQMAAQSKN-----QPGGFRKRFSVGSADQM-----
Tetradon Kank1a RLKEL-EEQVKTIP---ILQVKIAVL---QEEKRQMAAQSKN-----QPGGFRKRFSVGSADQM-----
Tilapia Kank1a RLKEL-EEQVKTIP---ILQVKIAVL---QEEKRQLAAQSKG-----QGLGGFRKRFSVGCADQM-----
Amazon molly Kank1a RLKEL-EEQVKSIP---ILQVKIAVL---QEEKRQLAAQKNK-----QGLGGFRKRFSVGSADQM-----
Mouse KANK3 RLREL-EDQARALP---ELQEQVRAL---RAEKARLLAGRVQ-----PEQVEIEARPDKLAQLRRL-----
Rat KANK3 RLREL-EDQARALP---ELQEQVRAL---RAEKARLLAGRVQ-----PEQVVEIEVREDKLSQLRRL-----
Dog KANK3 RLREL-EEQARALP---ELQEQVRTL---RAEKARLLAGRGL-----PEPD---AEAEARPDKLAQLRRL-----TERLATYERG
Human KANK3 RLREL-EDQARTLP---ELQEQVRAL---RAEKARLLAGRAQ-----PEPDGEAETREDKLAQLRRL-----
Lamprey LLTDNYAELADAFDAFA---EPATELGSL---SSRLLTVTVA-----LSSLQRPAPTPARAGS-----
Coelacanth KANK3 QLKDL-EEQVKTIP---ALERKISML---QEEKELSSSELRK-----RKALDTSEAFSFRQRSYSAGHTGVV-----
Frog Kank3 QLKDL-EEQVKAIP---ILEMKISTL---ESEKQLLADLEK-----KQEIPLERSFSAVNCNLN-----
Turtle KANK3 QLKEL-EEQVKTIP---VLEMKICKL---KREKELMAGLQE---QPLP---ETSEASVFSFPPRSLGAEVARAS-----
Alligator KANK3 QLKEL-EEQVKTIP---VLEMKISKL---KQEKELLAGLQE---KASPETCETSFTFPQSPASEEQ-----
Eagle KANK3 QLKEL-EEQVKTIP---LLEMQICEL---KREKAKLMEKLSA-----EPGEAFGHPSGSAVAGC-----
Chicken KANK3 QLREL-EEQVKTIP---LLEMRICEL---QREKAKLMEKLSA-----EPSKVSLDHPDGSSEEQP-----
Goose KANK3 -----
Spotted gar Kank3 QLKEM-EERVKGVP---ALEREVAKL---RAEKEELQALRE---KVGQSKIAELRKLTERLGGREDR-----
Zebrafish Kank3 QLREM-EERVKGVP---VLEREVAML---RAEKERLSEVELQN-----KTKEL-----
Cavefish Kank3 QLKEM-EKVKGVP---ALEREVTL---RAEKDRLELALQQ-----KTEELAAALAEAAASS-----
Herring Kank3 QLKEM-EERVKGVP---VLEREVAKL---RAEKDQLLQVLKK---KNEAPATMAAAVQATALAEPGTGGDQ-----
Stickleback Kank3 QLKEM-EERVKGVP---ALENEVAKL---RAEKDALLLALQE---KKEAREVTQLKQKSTESF-----
Fugu Kank3 QLKEM-EERVKGVP---ALEKELASV---RAEKDVLALLALQE---RLTEKFEGRDGKASSK-----
Tetradon Kank3 QLKEM-EERVKGVP---ALEKELAGL---RAEKDALLLALQE---AQRQPTSDSFTQTT-----
Medaka Kank3 QLKEM-EERVKGVP---ALEKEVANL---RAEKDMLLALQE---KKAAPGFVQERRPSAESSTQ-----
Tilapia Kank3 QLKEM-EERVKGVP---ALEKEVAKL---RAEKDMLLALQE---KKAAMDLAQQKQFTETSTQTV-----
Amazon molly Kank3 QLKEM-EERVKGVP---ALEKELAKL---RAEKDMLLALQE---KKAAMEASHQKQSKESSTQTT-----
Platyfish Kank3 QLKEM-EERVKGVP---ALEKELAKL---RAEKDMLLALQE---KKAAMEVSHQKQSKES-----

910 920 930 940 950 960 970 980 990 1000

Hydra -----LFMKDAWTSRRI-----
Trichoplax -----NGSIPSPMA-----
Aplasia NQRTPPATLPPKPVRTVSVGVGDHSVVEPYLLQPSLPTGYVLWNETVTELR-----STSMMEQESYRNRIPLNSLFSQQ
Snail LAKTPPATLPPKPVKTSTTGVGDHSVIEPYLLQPELPTGYTIEDNVTHTEIH-----TTTVIDERDLLKSFQPPSLNVSFH
Fruitfly -KTASPVQFTPQRISPVSLLESLGARMRSSTSSASPSVVRDVTQAVVR-----
Hookworm ---ATEFLEKSASVDQETMTTRTYRNIPIPSQTDSPVEEAREVVVPDSCA-----
C.elegance FSASPKLPRRGLQAGPSIDVESHFTYAQTQNGQKVLARTQSTSTSPPPQAP-----
Tunicate ----KLSPRKSLSTSSGFSSSSSSQSSISSPRSPPTSPGLPRSLVVEVK-----
Spider GIMSPTTLTKKCLSRNMDNLSSEVIASCIDAAAMAKSFLEKEIISHIKMC-----
Lingula NKSVTELYTLQPHLLESQTEKEMHTQRLIREKETKVVVVVGOEQRPTSPYS-----
Lancelet TGSFQMLEQQWKEQQAEQEKQKASKDAPAPSEKNSTAKKPKVPPPPVPRFRSVVGDTTSLSDIVCYNSALRTTDDVGTNTTVPSRDIGVGYSPMRHV
Medaka Kank4b -----ALTHRSIVDMKRPKVRNSTS-----
Amazon molly Kank4b -----TSSQYKGDVLSQRESHVMFPRNHNV-----

Platyfish Kank4b -----TSSPYGKGDVLKSQRESHVMFPRNHV-----
Stickleback Kank4b -----
Fugu Kank4b -----
Tetraon Kank4b -----
Cave fish Kank4b ----SHFTSSAVVSKTAEIQNKANDDWMNREYDQLEENVKASSEQVDAIVI-----
Medaka Kank4a IHFKGPSAEQDFSLITQVSGGSEAAETALEEKVTVKETATAVAVRQTQPPKKL-----
Fugu Kank4a -PSGSTQATGVSECLPTKEITGKEKISVLVKEVDINSERVEICSTHKETGQ-----
Tetradon Kank4a ----ESQEHKPPERLSPSVSTQPTGVSECLPTKELPSLVEV-----
Stickleback Kank4a -----IASKHDSGTHTQPQGORPSAGLNTSAHLQTSRLSEQELQETEL-----
Tilapia Kank4a -----DPRTNNSQSQQRPSQEMKLEKTESPLGQTVQKLPDIS-----
Platyfish Kank4a SHRETKRTELPIQKDPSTNQKQSVSPSEKADKQKETSLSLQDNAEERLSQDTEVVAKSESEIIRESNASKEDQNGMLKLEEKLMLEAKLTQASQELERTN
Amazon Molly Kank4a SHRETKRTELPIQRDPSTNQKQSVSPSETADKQRETSKSLQDNAEERLSQDTEVVAKSESEIIRESNASKEDQNGMLKLEEKLMVLEAKLTQASQELERTN
Herring Kank4 ALVSVPETETETRDSETSEITQADAEPAHQEETQKISAQEFKPVESRQ-----
Zebrafish Kank4 SGKEDALFLSKNKVADHEIVHEVPSDRSTEQLPEKPHFEVQLNVQPDSSKIN-----
Cave fish Kank4a DHKSKPPASAEPTVEPQTTEGQDLVAQDLAEKETSLSAVSVQVPTVMSP-----
Mouse KANK4 -HHMREAEVLVTPGSATPSPPLPSPILENDLSLDEIELSISEIPPPPI-----
Rat KANK4 -HHTRTADLALSPGSSTPSPPLPSPPIENELSLLEEIELNISEIPPPPI-----
Dog KANK4 -EAEVVVSPGSPTPSPPLPSPPIENEFLEEIELNISEIPPPPV-----
Human KANK4 -HNAREAEVLFTPGSPTPSPPLPSPPIENELLEEIELNISEIPPPPV-----
Eagle KANK4 VEPASPAALQLAESTNPGEGELSVSEMALDVVK-----
Chicken KANK4 -VSASPGALQLADESTNHGKAGGSVSEIALNLKEGEDRCAH-----
Goose KANK4 -----VPASPGAPQLAEGSVSPGRVEKSEIAPSVLKEDEYGGARTQ-----
Anole lizard KANK4 ----ISQELLVVAESGEECDTVEMNIRPPVQSGSSCSMTLEYKFENQIP-----
Turtle KANK4 ----APEYNKCPLELVKDESISSHAPKFMENENREEIKLNISEIMPCAPE-----
Aligator KANK4 ----TPAMETFTQLVKDVSSSKPLFDENENHEEIELNINEVMPSE-----
Frog Kank2 GELYEIEPEEESKVEKEEGEDKVAGKEGPEKENKKPEGEIKNPKEVC-----
Mouse KANK2 -----CLDLPEAPDDPA-----
Rat KANK2 -----CLDLPEAPDDPA-----
Dog KANK2 -----CLDLPEPLEDPV-----
Human KANK2 -----CLDLDPPEDPV-----
Aligator KANK2 -----ELYIDLPEEEMAARGT-----
Spotted gar Kank2 ----GELYIDIPEEDSTGFVAAAARGGGLSPTTPEGSRQDSGCEIEDTVIV-----
Cave fish Kank2 ----ELYIDIPEEEVGGATTKAATTTGLSPTTPEGSRQDSGCEIEDTVIV-----
Herring Kank2 GRPRGELYIDIPEEDTTAAGTKATATGVTAGADRASRGLSPTTQADGSRQ-----
Zebrafish Kank2 ----GELYIDIPEEEAGNGAGAANKATGSLSPPTPGSLQDSGCEIEETVI-----
Tetradon Kank2 ----GELYIDIPEEEDTTG-----
Fugu Kank2 ----GELYIDIPEEEVGPAA-----
Medaka Kank2 ----GELYIDIPEEEASTGAP-----
Stickleback Kank2 ----GELYIDIPEEPEP-----
Tilapia Kank2 ----GELYIDIPEEDMS-----
Amazon molly Kank2 ----GELYIDIPEEEVGTAAKSTKTE---SLSPTEVSKQDSGCEIEDTVI-----
Platyfish Kank2 ----GELYIDIPEEEGPEG-----
Coelacanth KANK2 ----GELYIDIPEEDSDQSGSVFSPPLPGSSRSHSGTEIEGSMQORSLIKS-----
Anole lizard KANK2 ----GELYIDIPEEGTSGNTEEGKVRPDTGARLD-----
Turtle KANK2 ----GELYEIEPEEEGGGGAG-----
Tetradon Kank1b ----RVEVPPRKPSKENTFVYTD-----
Medaka Kank1b ----TDSNDKGADEELADPGNFKEVRQLSEMDALEKAIKEGPL-----
Amazon molly Kank1b ----FENKRHTEAESKGTNENVYTDREFRELTEEMQALERTIKGGHM-----
Platyfish Kank1b ----FENKRHTEETSEGTNEKVYTDREFRELTEEMQALERTIKGGHM-----
Frog Kank4 ----LNISESEAQPEAITGN-----
Zebrafish Kank1b ----INKPSVEGWEHKTMTSLKDFQLLSVEMQLLERKIQDARI-----
Tilapia Kank1b ----INKPSVEGWEHKTMTSLKDFQLLSVEMQLLERKIQDARI-----
Fugu Kank1b ----INKPSVEGWEHKTMTSLKDFQLLSVEMQLLERKIQDARI-----
Cavefish Kank1b DVKMOKTKESKRESSGEVEGWEHGALSGLQEFKQLSAEMHLEKIKIQDARL-----
Spotted gar Kank4 ----NNTPASQLSAQCMSASADKLRDQDTQKTVKALA-----
Coelacanth KANK4 ----ELDNSVNEGVIATNGYKVAKNQNIPLDVTIPESTSMHTKQNTNVMS-----
Frog Kank1 PPSRVRSAGELHIDSDEMETPEQNSQTLKEFRQLTAEMLQALEKKIHDSL-----

Shark Kank1 ---EPLRGE^LHDSEDE^MESLE^QSSLR^MEEFR^QLTA^EVQAL^ERKI^QDN^GD-----
Coelacanth KANK1 IRRSGE^QVGEL^HIDSEDE^IESME^QSSQR^VKEFR^QLTA^EMQAL^ERKI^QES^NE-----
Mouse KANK1 RRGGGELY^IDYEEEE^MESVE^QSTQ^RIQ---E^FRQLTAD^MQAL^ERKI^QDSS^C-----
Rat KANK1 RRGGGELY^IDYEEEE^MESVE^QSTQ^RIR---E^FRQLTAD^MQAL^EQKI^QDSS^C-----
Dog KANK1 RRSGGELY^IDYEEEE^MESVE^QSAQ^SIR---E^FRQLAAD^MQAL^ERKI^QDSS^C-----
Human KANK1 RRSGGELY^IDYEEEE^METVE^QSTQ^RIK---E^FRQLTAD^MQAL^EQKI^QDSS^C-----
Anole lizard KANK1 ARGGGELY^IDCEDDA^GSTIE^QSS---E^RIEEFR^QLTA^EMQAL^EKKI^QDSS^Y-----
Eagle KANK1 VRRGGELY^IDCEEVE^SVE^QSS---Q^GIEEFR^QLTA^EMQAL^EKKI^QDSS^Y-----
Chicken KANK1 VRRGGELY^IDCEDE^MESA^EQSS---R^RVEEFR^QLTA^EMQAL^EKKI^QDSS^Y-----
Goose KANK1 GRRGGELY^IDCEDE^MSME^QSS---Q^RIEEFR^QLTA^EMQAL^EKKI^QDSS^Y-----
Turtle KANK1 VRRGGELY^IDCEEVE^QNSQ^RTE---E^FRQLTF^EMQAL^ERKI^QDSS^Y-----
Aligator KANK1 VRRGGELY^IDCEEDV^EHVE^QSS---Q^RIEEFR^QLTA^EMQAL^EKKI^QDSS^Y-----
Spotted gar Kank1 QLSQLKKGSEL^HINSEDE^LENME^HSSQ^RIEEFR^QLTA^EMQAL^ERKI^QDSS^Y-----
Herring Kank1 LAQLKQGSSEL^HIDSEDE^LEGME^QSSLR^LQEFR^QLTA^EMQAL^EKKI^QEPGA-----EK
Zebrafish Kank1a --EPLSQIKTGSSEL^HIEEID^NTEQSTQ^RLQEFR^QLTA^EVEAL^ERNI^QDNG^E-----
Cave fish Kank1a --EPVAQLKSGSEL^HIDPEN^VEQSSQ^RLQEFR^QLTA^EVQAL^EKKI^QDSS^NE-----
Stickleback Kank1a APGAERQETEL^HIMEPEA^QRQDA^QRLDCA^EFR^RLAA^EVQAL^DGNAA^DARE-----
Medaka Kank1a ---ENPAA^YKEA^ELHIMEPEA^QEQSA^QQLLE^LRRLTA^EVQAL^EKTK^NNRW-----
Fugu Kank1a --ENPGPVQKEPEL^HIREPEA^QEQSSQ^CLEEF^RRLAA^EVQAL^EKTT^RENKI-----
Tetradon Kank1a --ENPGPFKEPEL^HIREPEA^QEHSSQ^CLEEF^RRLAA^QVQAL^EKTSQ^ESNM-----
Tilapia Kank1a --ENPGPIQKETEL^HITEPEA^QEQSA^QRLEEF^RRLAA^EVQAL^EKTSED^NAN-----
Amazon molly Kank1a ---ENSGSIQKETEL^RIIEPEA^QEQSA^QRLEEF^RRLAA^EVQAL^EKTK^ENNI-----
Mouse KANK3 ---TERLATS^DRGVRS^RASPR^AEDPD^GLAARR^SEGAL^QVLD^PGSRT^PDG-----
Rat KANK3 ---TERLATS^DRGVRS^RASPR^AEDPD^GLAARR^SEGAL^QVLD^PASRT^PDG-----
Dog KANK3 VRRARAGPWADG^PDPAS^RREG^EAL^EVPDA^AGI^PDAAP^QTRD^AGTQ^AVP^ETQ-----
Human KANK3 ---TERLATS^ERGC^RARAS^PRAD^SPD^GLAAR^SEGAL^QVLD^GEVG^SLDG-----
Lamprey -----
Coelacanth KANK3 -DAKAKARQD^HHGE^FDSE^EAVK^IRTSK^IVEL^RRLTE^KLTN^LERN^PKCE^KT-----
Frog Kank3 -ESCSEQNI^ELPSE^TENE^LETSK^LRTNK^IAEL^KRRLTE^KLAV^PERN^VKMS^RT-----
Turtle KANK3 ---QEAPAE^LERLE^SVKAR^ASKITEL^RRLTE^KLSAS^DRNV^RASKA-----
Aligator KANK3 ---PPVSQEAQGE^LEGESE^MGKAR^ASKITEL^RRLTE^KLS^ERNV^RAG^RT-----
Eagle KANK3 ---EPPRAG^PES^ETEPA^KGR^ASKVA^ELRLTE^KLAV^PERS^GRAW^PG-----
Chicken KANK3 ---QAELEGE^AEPGK^RASKIA^ELRLTE^KLAV^PERS^SVP^G-----
Goose KANK3 -----
Spotted gar Kank3 --NSEQV^ERTM^VVER^KSVG^VGG^DRPLE^EGV^FYR^KG^TKE^VAV^GTEA^VE^ACE-----
Zebrafish Kank3 ---EAAIKL^QVPTEA^VEE^QDK^EQIK^KIPT^FVLE^TKSIA^VGN^DVPLE^NVI-----
Cavefish Kank3 ---EPELKS^SSEV^VKEPP^PMR^VERN^SIA^VGDD^VPLEA^VV^CNR^QNV^KD^VSIE-----
Herring Kank3 -GLPPLS^PTHGR^STRV^SEL^RKAIE^KASKE^EGSQ^QQ^QQ^QQ^QTE^KAV^PAP^VQ-----
Stickleback Kank3 -TQTAE^VLQTD^PTRG^QPT^PVS^PGL^KGL^GKS^GEL^KRLTE^RQ^VKD^ASE^GT-----
Fugu Kank3 ---VLVKA^PEK^VRE^KKS^VSV^GED^VPM^ESIV^FY^SQ^LKD^ACE-----
Tetradon Kank3 ---ETT^KMH^QGTQ^SRLT^SPP^SAV^RGP^KAEL^GRLTE^KFE^GSR^GRK^DACE^G-----
Medaka Kank3 ---TTE^TQMD^QS^LTSP^TTGH^KR^FSK^PGEL^KWLTE^KFE^VKE^QKSP^QIIS-----
Tilapia Kank3 ---EILQTE^HSRLT^SPT^TGH^KGV^KS^GEL^KRLTE^KDGV^KDACE^GTR^VN-----
Amazon molly Kank3 ---EILQSD^YSRV^TSP^NSTGH^KGL^VKS^GEL^KRLA^EKE^FE^GKEL^KSPP^PPL-----
Platyfish Kank3 ---STQTTE^LLQ^FLPH^LA^EKE^KKS^VAV^GDD^VPM^TSV^VF^YHR^NGV^KD^ASV^C-----

1010 1020 1030 1040 1050 1060 1070 1080 1090 1100

Hydra -----
Trichoplax -----
Aplasia PSSLEERES^RFS^SSMV^SESS^QPH^FTI^KQ^IQR^NAP^KAL^TRS^VGI^DGN^VFE^GSG^LHV^HEKE^FRT^VFI^GQ^NDK^VAK^RNV^GIE^CRV^PTR^DV^GS^FMC^DEE--
Snail RTTSQES^IDRE^TRLP^SSSQ^LES^PRFT^INQ^IQR^STP^KAL^RTL^GV^GEG^NV^FED^SGL^HV^HEKEL^RTV^IIG^QSGA^VAK^RNV^GID^CRV^PTR^DV^GS^FMC^DEE--
Fruitfly -----
Hookworm -----
C.elegance ---ASAFE^PV^KPL^SNG^SPS^PTH^QV^QK-----
Tunicate ---L^DL^RG^PPL^PPK^RK^YRS^IAV^GDS^MPY^QD^IVC^YSK^NLI^THE^VES^DC^QIL^RQ^TS-----
Spider ---D^INS^GVE^KCK^NM^KSV^GT^SCS^VLR^DIG^IGV-----

```

Lingula -----PMIKTMERKPITRSVGVGDGNVFEKDMQIQEKELRTIIIDKEAKKQTRNVGISVVRVPMRDVGVHYHCEAE--
Lancelet GVGISNDLLQQEELGIVENQKCN TAVVETSEVGVGVSV EQRAVAVGNHTELRDVGMTTDEEVVKKQKTKHATRSIGVIVDIPE TKDVRTVGVGNGSVSEHQ
Medaka Kank4b -----
Amazon molly Kank4b -----
Platyfish Kank4b -----
Stickleback Kank4b -----
Fugu Kank4b -----
Tetraon Kank4b -----
Cave fish Kank4b -----
Medaka Kank4a -----PFTTGTGRNLQGTKT-----
Fugu Kank4a -----ESSLPVGARKDASRI-----
Tetradon Kank4a -----
Stickleback Kank4a -----
Tilapia Kank4a -----
Platyfish Kank4a ALLKEQMEENKAKEDRILQLSEGM RVEICTTQVPVRSRRESIDAGTVTEKIDLSHQETETESPSKIDQGTDTDKILVEVIVP--
Amazon Molly Kank4a ALLKEQMEENKVKEDRILQLSEGM RVEICTTQVPERPRRESIDAGTVTERIDLSHQETETESPAKIDQGTDTDKILVEVIVP--
Herring Kank4 -----GVEQQDKKAESPTHEHFEEKI EPSEGVSKAAMP RVPLECTVSVVITEA-----
Zebrafish Kank4 -----KPVTDTESEKEQVPAPVSVPVILIDKAETPTDPEEEELQEP TLQEEASKSPSEQVKEQERSEILLEDKQPTLLEGIPASESE-----
Cave fish Kank4a -----VILIEKVESPTDSESEKQLEEFKHEA EIPELSEQLEKQEGTQDT-----
Mouse KANK4 -----
Rat KANK4 -----
Dog KANK4 -----
Human KANK4 -----
Eagle KANK4 -----
Chicken KANK4 -----
Goose KANK4 -----
Anole lizard KANK4 -----EDIELSICETEVL E-----
Turtle KANK4 -----
Aligator KANK4 -----
Frog Kank2 -----KKE TVENNSLP-----
Mouse KANK2 -----
Rat KANK2 -----
Dog KANK2 -----
Human KANK2 -----
Aligator KANK2 -----RELRSVAVGTEGG-----
Spotted gar Kank2 -----GGARQPAGGRKEVRSIGTEPEAGA-----
Cave fish Kank2 -----GGGRPGNRKEVRTICVGS DVAE-----
Herring Kank2 -----DSGCEIEDTVIVGGARPGARKEVRTICVGP EEKEGER-----
Zebrafish Kank2 -----VAGARPGAKREVRTICVGP EAE-----
Tetradon Kank2 -----
Fugu Kank2 -----
Medaka Kank2 -----
Stickleback Kank2 -----
Tilapia Kank2 -----
Amazon molly Kank2 -----VGGARPD AKREVRTICVGP EG-----
Platyfish Kank2 -----
Coelacanth KANK2 -----PKKEMRSISVGTGEEMMVRESRPS-----ASVGLGQ-----
Anole lizard KANK2 -----RKEVRSVGVGRSAEDREGNE-----
Turtle KANK2 -----
Tetradon Kank1b -----
Medaka Kank1b -----QVWHGKGPISVQ GKATKSVAVGTD TDMVPPKPSKVDKSVHTE-----
Amazon molly Kank1b -----LSWQDKGHGLLHENTTKTIGIKTDIDMKMTLSKN SKENKSVHTD-----
Platyfish Kank1b -----LSWQEKGHSLLHKNTTNSIGIKTDIDMKMASSKTSKENKSVHTD-----
Frog Kank4 -----
Zebrafish Kank1b -----ESSAFKMRDRESVDRGIDEAFCKDGTIGA-----
Tilapia Kank1b -----ESSAFKMRDRESVDRGIDEAFCKDGTIGA-----
Fugu Kank1b -----ESSAFKMRDRESVDRGIDEAFCKDGTIGA-----

```

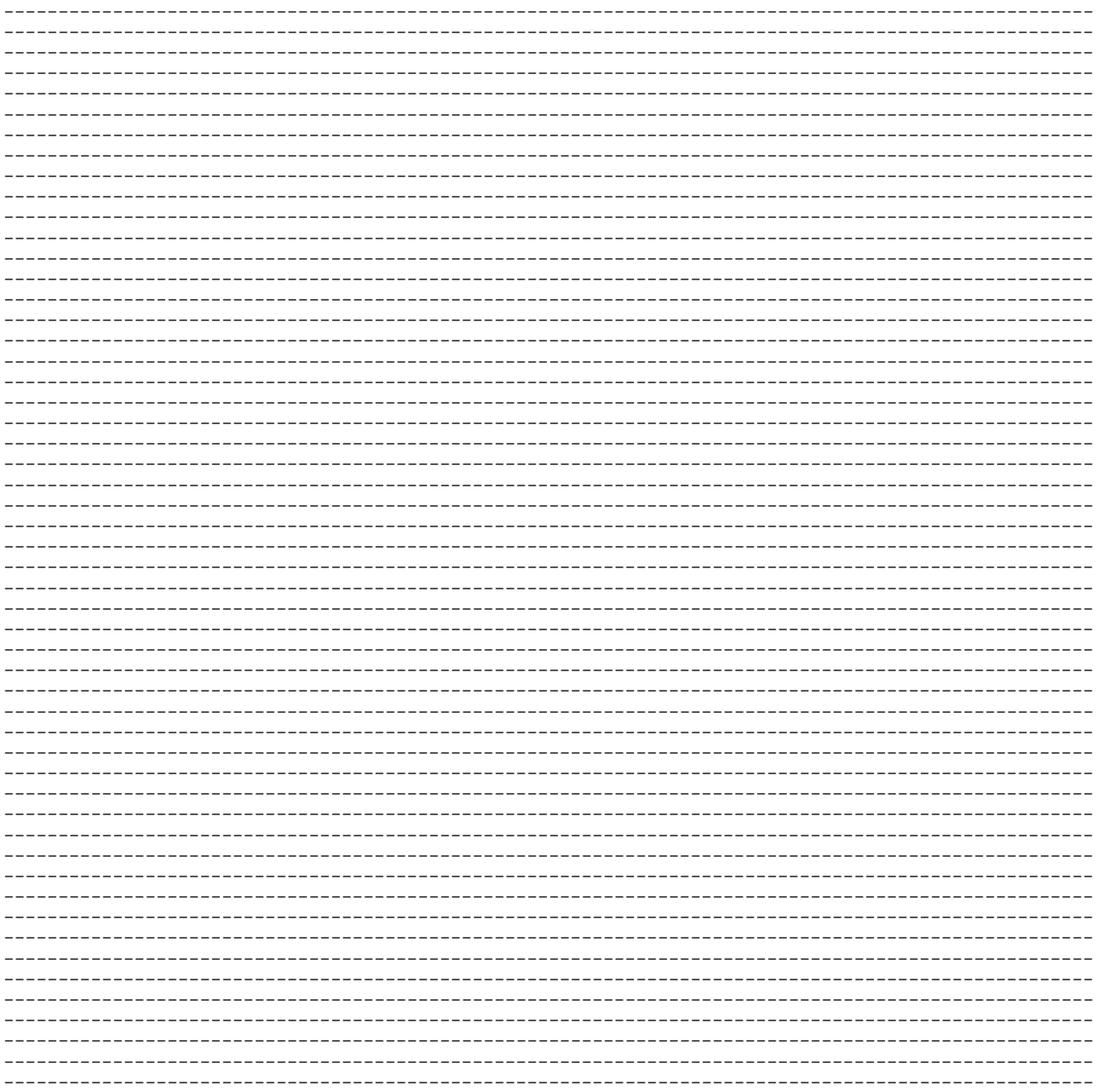
Cavefish Kank1b	-----AAHPVAKARALIRRSVTVGENKNCEDCRCTKSSFRDV-----	
Spotted gar Kank4	-----SKHLELNISENEMESSV-----	
Coelacanth KANK4		
Frog Kank1	ESRCPDTPREIKTKEKCSRVAVGADENMNDIIYHKSVKSS	ODASVGT
Shark Kank1	EKPGGVEPCVKHLAKAREFRSVAVSTDVNMDFVIYHRSARF	KDVAVGT
Coelacanth KANK1	VPVTSGGFTQRTENPQKAKEYRSIAVGADENMNDIVYHRSRRC	KAIAVGT
Mouse KANK1	EVASELRENGQCPSRECKSVAVGSDENMNDVVYHRLRPC	KDTAVGT
Rat KANK1	EATPELRENGQCASREKRSVAVGSDENMNDIVYHRDFRSR	KDTAVGT
Dog KANK1	QPAPEGRSVAVGADTDMSVYVYRRAAGSR	RDAVGT
Human KANK1	EASSELRENGEGRSVAVGAENMNDIVYHRGSRSC	KDAVGT
Anole lizard KANK1	DNPASMRVNRASVMKENRSVAVGTDESMDNIVVYRNLRAF	RDI VGT
Eagle KANK1	ESPANLRVNRESLTKEARSVAVGADENMNDVVIYNRSARQH	KEVAVGT
Chicken KANK1	EVPSNLRRESLTKESSRSVAVGADENMNDVVIYNRSSRQH	REVAVGT
Goose KANK1	ETPSNLRANRESLTKESSRSVAVGADENMNDVVIYNRSRQR	REVAVGT
Turtle KANK1	EIPSNLRTNRENITKESKSVAVGADENMNDVVIYNRSSRPC	MEVAVGT
Aligator KANK1	EIPSNLRMNRDSLARESSRSVAVGADENMNDVVIYNRSSRQC	REVAVGT
Spotted gar Kank1	DTQFNLTQKAEQKQNAKEQKSI VAVGADENMNDVVIYRKSQKQY	RDVAVGT
Herring Kank1	KIQEPGAEKNRRQHSHQMNAAAPAPAATLQRQSSREQKSI VAVGADENMNDVVICRSPERS	KDASVGT
Zebrafish Kank1a	EIKHSLHQTELRSNQNVQLWSRESRSIGVAVGADENMNDVVYRRSPGKN	KDVAVGT
Cave fish Kank1a	EPERGLNQMHNTNQNSLQSQWNRESKSI VAVGADENMNDVVIYRRLPGRN	KDVCI GT
Stickleback Kank1a	SQKSVGMVTDENMASLRADQRARGRS	RDAVSTE
Medaka Kank1a	TDGTPPRSQCGAVGVATDKSAKDLDPQSTFRDVGVSTE	
Fugu Kank1a	NEVHSHKVLQNQAHQKSI GIVTDENMNNLPVPHGKLTNG	HCLR DAGVSTE
Tetradon Kank1a	DEVHSQKLLQNQTHQKSV GIVTDENMNSLPVLHGKLTSG	LCFQ DAGVSTE
Tilapia Kank1a	ENQPQNLTQNQAHQKSI GIVTDQNMNNLPATQRKPEKE	RCFQ DAGVSTE
Amazon molly Kank1a	AEVQPQNLPKQVLQKSI GIVTDENMNDLLGSLSKPKQD	SCLQDVG VSTE
Mouse KANK3	EPRTRETGTEVVPETREVDQA VPETGEAGVEV	
Rat KANK3	EPQTREAGTEVVPETREVDQA VPETREAGVEV	
Dog KANK3	DARAQAEPETQ EAGVEA	
Human KANK3	TPQTR EVA AEAVPETREAGQA VPETREAGVEA	
Lamprey		
Coelacanth KANK3	DIAYIAENQIKASERKTYMSVAVGEDINMNEAVFFYRSQRPC	KEVAVGS
Frog Kank3	GASKITSPPKVMERRSKSI VAVGEEMDMNDVVFFYRSQNTN	REVAVGC
Turtle KANK3	AARPAKAMEKACKSV GEGVNMNEAVFFYRSQKPC	HEI VAGQ
Aligator KANK3	GTRPARPSDQACKSV GEGEMDMNDVVFFYRSQKLC	REVAVGQ
Eagle KANK3	RSPRAAERLCRSVAVGEDRAMTDAVFFYRSQREGGDMPDGR	
Chicken KANK3	KGMAARPRAAERQCRSVAVGGEERAMSDAVFFYRSQEGGEAPE	
Goose KANK3		
Spotted gar Kank3	KGVGTDARETRDAGAEA	
Zebrafish Kank3	VSNRQTLKDAAVGSIIDVCHAAVETEANAMCEGIQT	
Cavefish Kank3	ATVSVSHVGIETE VATMHD EEVQVG	
Herring Kank3	MASLAVGEDLPMSAGFFYYRQDMKDAAVDVRCEVTDKGVGTAPAGSACDKGVQV	
Stickleback Kank3	QVKVCDKSGMDAPLVQEEGVQV	
Fugu Kank3	GTAVKVCEKGT RTEVPLLRDEGAQT	
Tetradon Kank3	PAVKLWEKGTGTEVPVVRDQGAQT	
Medaka Kank3	KLNPAAEKAVVQKKTVAVGDDVPMSSIVFYYSHNVIDATVGT E VTVSEKCTGT DAPLVQEQEIQA	
Tilapia Kank3	VCEKCTETE PPLVQEEGIQT	
Amazon molly Kank3	SKVLPHSAEKESKSVAVGDDVPMTSVVFYHRNGVRDASVCTEVKVC DKTGT EAAAVVREQAIQV	
Platyfish Kank3	MEVKVCDKTETE AAVVHEQAIQV	

1110 1120 1130 1140 1150 1160 1170 1180 1190 1200

Hydra
 Trichoplax
 Aplasia
 Snail
 Fruitfly

Hookworm -----
C.elegance -----
Tunicate -----
Spider -----
Lingula -----
Lancelet KPPVETVSVYTTNTFPVINTIDKVTNTVAVNLKTVAVGNFSVKDVLCDRCADVKTKTVAVGVCSIKDTICDRCNNMESKTVGVGRCTVNDTVCDKCSNLKTR
Medaka Kank4b -----
Amazon molly Kank4b -----
Platyfish Kank4b -----
Stickleback Kank4b -----
Fugu Kank4b -----
Tetraon Kank4b -----
Cave fish Kank4b -----
Medaka Kank4a -----
Fugu Kank4a -----
Tetradon Kank4a -----
Stickleback Kank4a -----
Tilapia Kank4a -----
Platyfish Kank4a -----
Amazon Molly Kank4a -----
Herring Kank4 -----
Zebrafish Kank4 -----
Cave fish Kank4a -----
Mouse KANK4 -----
Rat KANK4 -----
Dog KANK4 -----
Human KANK4 -----
Eagle KANK4 -----
Chicken KANK4 -----
Goose KANK4 -----
Anole lizard KANK4 -----
Turtle KANK4 -----
Aligator KANK4 -----
Frog Kank2 -----
Mouse KANK2 -----
Rat KANK2 -----
Dog KANK2 -----
Human KANK2 -----
Aligator KANK2 -----
Spotted gar Kank2 -----
Cave fish Kank2 -----
Herring Kank2 -----
Zebrafish Kank2 -----
Tetradon Kank2 -----
Fugu Kank2 -----
Medaka Kank2 -----
Stickleback Kank2 -----
Tilapia Kank2 -----
Amazon molly Kank2 -----
Platyfish Kank2 -----
Coelacanth KANK2 -----
Anole lizard KANK2 -----
Turtle KANK2 -----
Tetradon Kank1b -----
Medaka Kank1b -----
Amazon molly Kank1b -----
Platyfish Kank1b -----

Frog Kank4
 Zebrafish Kank1b
 Tilapia Kank1b
 Fugu Kank1b
 Cavefish Kank1b
 Spotted gar Kank4
 Coelacanth KANK4
 Frog Kank1
 Shark Kank1
 Coelacanth KANK1
 Mouse KANK1
 Rat KANK1
 Dog KANK1
 Human KANK1
 Anole lizard KANK1
 Eagle KANK1
 Chicken KANK1
 Goose KANK1
 Turtle KANK1
 Aligator KANK1
 Spotted gar Kank1
 Herring Kank1
 Zebrafish Kank1a
 Cave fish Kank1a
 Stickleback Kank1a
 Medaka Kank1a
 Fugu Kank1a
 Tetradon Kank1a
 Tilapia Kank1a
 Amazon molly Kank1a
 Mouse KANK3
 Rat KANK3
 Dog KANK3
 Human KANK3
 Lamprey
 Coelacanth KANK3
 Frog Kank3
 Turtle KANK3
 Aligator KANK3
 Eagle KANK3
 Chicken KANK3
 Goose KANK3
 Spotted gar Kank3
 Zebrafish Kank3
 Cavefish Kank3
 Herring Kank3
 Stickleback Kank3
 Fugu Kank3
 Tetradon Kank3
 Medaka Kank3
 Tilapia Kank3
 Amazon molly Kank3
 Platyfish Kank3



1210 1220 1230 1240 1250 1260 1270 1280 1290 1300



Hydra

Trichoplax	-----TNGRRDSNGN-----
Aplasia	-----KPETRTIGVN-----
Snail	-----KPATRTIGVN-----
Fruitfly	-----PPATRDVSVGHQ-----
Hookworm	-----TAASSDVEC-----
C.elegance	-----PIVTRSIAVS-----
Tunicate	-----PPETVDFSGLVEPC-----
Spider	-----PNKSKSIGVGN-----
Lingula	-----KPSQRDVGVSVG-----
Lancelet	SIGCTTLANWNQKSVSVLAKVEQTDAGTGDDSVLEETVDSGKQETETKDIGVGEDSIFPLEEAKPPVLIQEEKTVNVVVFATAARPPLEIVESSSSDEVE
Medaka Kank4b	-----DDNTQPMHEW-----
Amazon molly Kank4b	-----TSKINPANDW-----
Platyfish Kank4b	-----TSKINPVNDW-----
Stickleback Kank4b	-----
Fugu Kank4b	-----ATHEW-----
Tetraon Kank4b	-----EEAGRQIGSG-----
Cave fish Kank4b	-----SRDNKDLSDH-----
Medaka Kank4a	-----DKQKETFETHA-----
Fugu Kank4a	-----
Tetradon Kank4a	-----RQDASRIHHA-----
Stickleback Kank4a	-----ESTQDDAVQK-----
Tilapia Kank4a	-----GELLSITVA-----
Platyfish Kank4a	-----KPRARSIDRG-----
Amazon Molly Kank4a	-----KPRARLIDRG-----
Herring Kank4	-----EEESEADLY-----
Zebrafish Kank4	-----CTSTQEVMTT-----
Cave fish Kank4a	-----SMEDKQLELS-----
Mouse KANK4	-----EVDVRSIGIR-----
Rat KANK4	-----EVDVRSVGVV-----
Dog KANK4	-----EIDVRSIGIR-----
Human KANK4	-----EVDMRSIGIR-----
Eagle KANK4	-----KAEGGSVRAG-----
Chicken KANK4	-----AQEKKEQGGD-----
Goose KANK4	-----EDEERGGEAGE-----
Anole lizard KANK4	-----EGKVSSSGIR-----
Turtle KANK4	-----KTEVRSVWAR-----
Aligator KANK4	-----ENEDRNVWAR-----
Frog Kank2	-----KRMCSVGVW-----
Mouse KANK2	-----ALETRSVGTW-----
Rat KANK2	-----VLETRSVGTW-----
Dog KANK2	-----TLETRSVGTW-----
Human KANK2	-----ALETRSVGTW-----
Aligator KANK2	-----TSGQRSVGVG-----
Spotted gar Kank2	-----KREVRHIGVE-----
Cave fish Kank2	-----NKRTRQVGVG-----
Herring Kank2	-----ERCYRQVGVG-----
Zebrafish Kank2	-----ERGYRQVGVG-----
Tetradon Kank2	-----PSRTRGVGVG-----
Fugu Kank2	-----VRGSRQVGVG-----
Medaka Kank2	-----TQNNCDVGVW-----
Stickleback Kank2	-----PRGSRHVGVG-----
Tilapia Kank2	-----TGKSRHVGVG-----
Amazon molly Kank2	-----SRGSRDVGVG-----
Platyfish Kank2	-----SRGSRDVGVG-----
Coelacanth KANK2	-----TREVKEVGIS-----
Anole lizard KANK2	-----ETERCDVGVA-----
Turtle KANK2	-----VTSPRSVGVG-----

Tetradon Kank1b	-----KAEVRSVATE-----
Medaka Kank1b	-----QVETRSIATE-----
Amazon molly Kank1b	-----RVETRSIATE-----
Platyfish Kank1b	-----QVETRSIATE-----
Frog Kank4	-----GGNDGDLGCTS-----
Zebrafish Kank1b	-----KLETQSVAVG-----
Tilapia Kank1b	-----KLETQSVAVG-----
Fugu Kank1b	-----KLETQSVAVG-----
Cavefish Kank1b	-----AVEKRSTAVG-----
Spotted gar Kank4	-----SPSVQNVGVG-----
Coelacanth KANK4	-----RAEVGSTAVT-----
Frog Kank1	-----EIQVRNKGVC-----
Shark Kank1	-----VSEQRDVSVG-----
Coelacanth KANK1	-----AVEVRNAAVG-----
Mouse KANK1	-----VTETRNVGIS-----
Rat KANK1	-----VTETRNFGIS-----
Dog KANK1	-----ATEMRSCAIS-----
Human KANK1	-----LVEMRNCGVS-----
Anole lizard KANK1	-----ELVTKDFVAG-----
Eagle KANK1	-----EKEMRESGVC-----
Chicken KANK1	-----EKEMRESGVC-----
Goose KANK1	-----EKEMRESGVC-----
Turtle KANK1	-----ETETRD SGVG-----
Aligator KANK1	-----EKQMRD SGVG-----
Spotted gar Kank1	-----EVETRSTGVG-----
Herring Kank1	-----QRETRSAAVG-----
Zebrafish Kank1a	-----EQEVRSTGVG-----
Cave fish Kank1a	-----ENKTRSTGVG-----
Stickleback Kank1a	-----RRETRSAAVG-----
Medaka Kank1a	-----RLQTQSLSVG-----
Fugu Kank1a	-----RPDTRSVALA-----
Tetradon Kank1a	-----RPSSSVAVG-----
Tilapia Kank1a	-----QLEIRSTAVG-----
Amazon molly Kank1a	-----RLETRSAGVV-----
Mouse KANK3	-----VPETVEVDTW-----
Rat KANK3	-----VPETVEVDTW-----
Dog KANK3	-----APETLESDAW-----
Human KANK3	-----APETVEADAW-----
Lamprey	-----EVARG-----
Coelacanth KANK3	-----EIETKNVGIW-----
Frog Kank3	-----ERETKDAEVW-----
Turtle KANK3	-----ETETKDAAVW-----
Aligator KANK3	-----ETETRDAAVW-----
Eagle KANK3	-----VRERRDAAVW-----
Chicken KANK3	-----GRERRDVAVW-----
Goose KANK3	-----
Spotted gar Kank3	-----RAVEDASVW-----
Zebrafish Kank3	-----TVDTEDVSVW-----
Cavefish Kank3	-----PVQTEEVAVW-----
Herring Kank3	-----EPSTEEASVW-----
Stickleback Kank3	-----SAETAEAEVW-----
Fugu Kank3	-----SVDTADAEVW-----
Tetradon Kank3	-----RVDTTEAEVW-----
Medaka Kank3	-----QVKTEEVAVW-----
Tilapia Kank3	-----RVETEEAEVW-----
Amazon molly Kank3	-----RAGTKEAEVW-----
Platyfish Kank3	-----RAGTKEAEVW-----

Platyfish Kank2	-----VREKDLGLRP-----
Coelacanth KANK2	-----VKEHDLGLSSV---ATQAEVEHQ-----
Anole lizard KANK2	-----VKEEELGLPS-----PEEERQ-----
Turtle KANK2	-----VSEELAPEGQ-----
Tetradon Kank1b	-----VSEIHLGIYT---EREAEIDAQ-----
Medaka Kank1b	-----VSEVNLGIYA---EQEAELIAQ-----
Amazon molly Kank1b	-----VTEVSLGIHT---KHEAELEAQ-----
Platyfish Kank1b	-----VTEVSLGIHT---KHEAELEAQ-----
Frog Kank4	-----VSHSIFLAIKQQITFEFIEHFDDS-----
Zebrafish Kank1b	-----VTETMLGVLS-----DKDEMQ-----
Tilapia Kank1b	-----VTETMLGVLS-----DKDEMQ-----
Fugu Kank1b	-----VTETMLGVLS-----DKDEMQ-----
Cavefish Kank1b	-----VTEAMLGIVP---DSELELEMQ-----
Spotted gar Kank4	-----VTEKDLGLTS---EQVSSDTG-----
Coelacanth KANK4	-----NTENELCLESSTLTE-----
Frog Kank1	-----VTEEMLGVTS---EAEREIELQ-----
Shark Kank1	-----VTEALLGVST---EADQEIELQ-----
Coelacanth KANK1	-----VTEILLGVTT---EADREIELQ-----
Mouse KANK1	-----VTEAMLGVIT---EADKEIELQ-----
Rat KANK1	-----VTEAMLGVIT---EADKEIELQ-----
Dog KANK1	-----VTEAMLGVTT---EADKEIELQ-----
Human KANK1	-----VTEAMLGMT---EADKEIELQ-----
Anole lizard KANK1	-----VTEGMLGLST---EAEREIDLQ-----
Eagle KANK1	-----VTEAMLGLST---EVEKEIELQ-----
Chicken KANK1	-----VTEAMLGLST---EVEKEIELQ-----
Goose KANK1	-----VTEAMLGLST---EVEKEIELQ-----
Turtle KANK1	-----VTEVMLGITT---EAEKEIELQ-----
Aligator KANK1	-----VTEGMLGVTT---EAEKEIELQ-----
Spotted gar Kank1	-----VTEALLGVST---EAETEIEMQ-----
Herring Kank1	-----VTEAMLGMT---EAEAEIELQ-----
Zebrafish Kank1a	-----VTEAMLGLSS---EAETEIEMQ-----
Cave fish Kank1a	-----VTEAMLGMT---EAEAEIELQ-----
Stickleback Kank1a	-----VTEAMLGTSS---EAEREMELQ-----
Medaka Kank1a	-----VTEAMLGVTS---EAEKEIELQ-----
Fugu Kank1a	-----VTEAMLGVTS---EAEKEVELQ-----
Tetradon Kank1a	-----VTEAMLGVTS---EAEKEIELQ-----
Tilapia Kank1a	-----VTEAMLGMSS---EAEKEIELQ-----
Amazon molly Kank1a	-----VTEAMLGVTS---EADKEIELQ-----
Mouse KANK3	-----VTEELLGLPE---AAERELELL-----
Rat KANK3	-----VTEALLGLPE---AAERELELL-----
Dog KANK3	-----VTEALLGLPE---AAERELELL-----
Human KANK3	-----VTEALLGLPA---AAERELELL-----
Lamprey	-----
Coelacanth KANK3	-----VMESLLGVTS---DAEKEMELL-----
Frog Kank3	-----VIESLLGMTC---EAEKEIELL-----
Turtle KANK3	-----VVESLLGLPT---EAEKEMELL-----
Aligator KANK3	-----VMESLLGLST---ESEKEIELL-----
Eagle KANK3	-----VLESSLGLTS---EAERELELL-----
Chicken KANK3	-----VLESSLGLAS---ETETELELL-----
Goose KANK3	-----
Spotted gar Kank3	-----VMESLLGLRT---EAEREIETL-----
Zebrafish Kank3	-----VIESFLGLQS---EAEREIDNL-----
Cavefish Kank3	-----VMESLLGLSS---ETEQEISNL-----
Herring Kank3	-----VMESLLGLTS---ETEREIDTL-----
Stickleback Kank3	-----VIESLLGLTG---EAQREIDTL-----
Fugu Kank3	-----VMESLLG-----
Tetradon Kank3	-----VMESLLGVTS---EAQREMDAL-----

Medaka Kank3
Tilapia Kank3
Amazon molly Kank3
Platyfish Kank3

-----VVESLLGLST--DAQREIGAL-----
-----VMESLLGLTT--EAQREIDTL-----
-----VMESLLGLTT--EAQREIDTL-----
-----VMESLLGLTT--EAQREIDTL-----

1410 1420 1430 1440 1450 1460 1470 1480 1490 1500

Hydra
Trichoplax
Aplasia
Snail
Fruitfly
Hookworm
C.elegance
Tunicate
Spider
Lingula
Lancelet
Medaka Kank4b
Amazon molly Kank4b
Platyfish Kank4b
Stickleback Kank4b
Fugu Kank4b
Tetraon Kank4b
Cave fish Kank4b
Medaka Kank4a
Fugu Kank4a
Tetradon Kank4a
Stickleback Kank4a
Tilapia Kank4a
Platyfish Kank4a
Amazon Molly Kank4a
Herring Kank4
Zebrafish Kank4
Cave fish Kank4a
Mouse KANK4
Rat KANK4
Dog KANK4
Human KANK4
Eagle KANK4
Chicken KANK4
Goose KANK4
Anole lizard KANK4
Turtle KANK4
Aligator KANK4
Frog Kank2
Mouse KANK2
Rat KANK2
Dog KANK2
Human KANK2
Aligator KANK2
Spotted gar Kank2
Cave fish Kank2
Herring Kank2
Zebrafish Kank2
Tetradon Kank2
Fugu Kank2

-----CSIFDVFCDRCS-----
-----QSNNSNKINQDE-----
-----LRGVLQRNVRVSV-----
-----LRGVLQRSVHVS-----
-----SETVYSKEELDK-----
-----NVESTIASDDV-----
-----CGECAGLRKELF-----
-----GSETNSIETINS-----
-----SISSESLSDSE-----
-----QLQHISAPEIRN-----
LKCKHSTKKVNIKKEIQFVGVNGHDESSDDSSSEESSEDETDDEDSSSESESSDEGGYNCELGKVIKCKEDQCKDVKTISSSEIICEDIKETDR
-----LLTVTSLQAKVA-----
-----LLTVTSLQAKVA-----
-----LLTVTSLQAKVA-----
-----LLTVTSLQAKVA-----
-----LLTVTSLQAKVA-----
-----KSLTETLQRKVV-----
-----TCNTKKLQEKLM-----
-----EDSKQKLEKLS-----
-----EDSKQKLEKLS-----
-----TSKIQLQEKLM-----
-----PDDMQKLEKLT-----
-----VIVAIQPRPRAN-----
-----VIEAIQPRPRAN-----
-----SLVVQTLQAKLQ-----
-----LVSNLELEAKLK-----
-----SLAIQELQVKIK-----
-----TSSISSLKNQVL-----
-----TSSISSLKSQVL-----
-----PGSISSLKQQLS-----
-----PGSISSLKQQVS-----
-----PGGVAALKQOVA-----
-----PGGIAALKQHIA-----
-----PGGIAALKQOIA-----
-----PSNIIALKQHIA-----
-----PSRITALKQQIT-----
-----PSTVTALKLQIA-----
-----KMLVQALSAKIA-----
-----PDGEAALVAKVA-----
-----PDGEAALVAKVA-----
-----PDGEAALVAKVA-----
-----PDGEAALAAKVA-----
-----GDTVRALSARVA-----
-----QSESEAWKTKAS-----
-----ETAALKTKVE-----
-----ETESLKTQVS-----
-----ETEALKTKVG-----
-----ETEVLKSQVG-----
-----ETEVLKSQVG-----

Medaka Kank2	-----E T E A L R D Q V G
Stickleback Kank2	-----E T K A L R N Q V G
Tilapia Kank2	-----E T E V L K N Q V G
Amazon molly Kank2	-----E A E V L K D Q V G
Platyfish Kank2	-----E A E V L K D Q V G
Coelacanth KANK2	-----R Q T I E A L A A K I S
Anole lizard KANK2	-----R Q A V Q V L S T K I A
Turtle KANK2	-----R Q A A L A L S A K V A
Tetradon Kank1b	-----Q L I I G A L K D R I S
Medaka Kank1b	-----Q L L N G A L K E R I C
Amazon molly Kank1b	-----Q L L N A A L K E R I S
Platyfish Kank1b	-----Q L L N A A L K E R I S
Frog Kank4	-----T R D C H N L R E I L E
Zebrafish Kank1b	-----Q Q T I Q N L T Y Q V Q
Tilapia Kank1b	-----Q Q T I Q N L T Y Q V Q
Fugu Kank1b	-----Q Q T I Q N L T Y Q V Q
Cavefish Kank1b	-----Q Q T I H V L S D R V Q
Spotted gar Kank4	-----P L T I I A L R T K L T
Coelacanth KANK4	-----P F T V I T L K A K I T
Frog Kank1	-----Q Q T I E A L K D K I Y
Shark Kank1	-----Q Q T I D A L K D K V Y
Coelacanth KANK1	-----Q Q T I D S L K E K I Y
Mouse KANK1	-----Q Q T I E A L K E K I Y
Rat KANK1	-----Q Q T I E A L K E K I Y
Dog KANK1	-----Q Q T I E A L K E K I Y
Human KANK1	-----Q Q T I E S L K E K I Y
Anole lizard KANK1	-----H Q T I E A L K D K I Y
Eagle KANK1	-----Q Q T I E A L K E K I Y
Chicken KANK1	-----Q Q T I E A L K E K I Y
Goose KANK1	-----Q Q T I E A L K E K I Y
Turtle KANK1	-----Q Q T I E A L K G K I Y
Aligator KANK1	-----Q Q T I E A L K E K I Y
Spotted gar Kank1	-----H Q A I D A L K D K I Y
Herring Kank1	-----H Q T I E T L K E K I Y
Zebrafish Kank1a	-----H Q T I E A L K E K I Y
Cave fish Kank1a	-----H Q T I E S L K E K I Y
Stickleback Kank1a	-----Q Q T I E S L K E K I Y
Medaka Kank1a	-----Q Q T I D A L K D K I Y
Fugu Kank1a	-----H Q A I E A L K E K I Y
Tetradon Kank1a	-----H Q A I E A L K D K I Y
Tilapia Kank1a	-----Q Q T I D S L K E K I Y
Amazon molly Kank1a	-----Q Q T I E A L K E K I Y
Mouse KANK3	-----R T S L E H Q R G V S E
Rat KANK3	-----R T S L E H Q R G V S E
Dog KANK3	-----R A S L E H Q R G V S E
Human KANK3	-----R A S L E H Q R G V S E
Lamprey	-----A E L S R Y I E
Coelacanth KANK3	-----Q H T I N H Q K E A I C
Frog Kank3	-----Q H T V D H Q R G V I G
Turtle KANK3	-----Q H T I G H Q R E V I A
Aligator KANK3	-----Q H T V S H Q K E V I N
Eagle KANK3	-----Q Q T V G H Q K E V I A
Chicken KANK3	-----Q Q T V G H Q K D V I A
Goose KANK3	-----
Spotted gar Kank3	-----Q D T I K F Q Q E T I Q
Zebrafish Kank3	-----Q H T I T F Q Q E S I Q
Cavefish Kank3	-----Q Q T I T L Q Q E S I Q

Herring Kank3 -----QDTVKLQQESIR
 Stickleback Kank3 -----QDTIKFQQESIV
 Fugu Kank3 -----QESIA
 Tetradon Kank3 -----QDTRVFQQESIV
 Medaka Kank3 -----QDTVKLQQESIA
 Tilapia Kank3 -----QDTIKFQQESIV
 Amazon molly Kank3 -----QDTIKFQQESIV
 Platyfish Kank3 -----QDTIKFQQESIV

1510 1520 1530 1540 1550 1560 1570 1580 1590 1600

Hydra NLNLQNV--GVGEYVNNL-----LCCVDDKICG-----
 Trichoplax VLNERTH--RHSLSKEPSIDIPNADEHIM-----
 Aplasia ATNCNFKVPTVDCGYMDL-----KTGISVCGCGDEEHRDVEIR-----
 Snail GTNCNFKVTTIDAATLTET-----GSGVSVGCGDEEMRIDVEVR-----
 Fruitfly KVEQALT--NAQKQQLRRL-----ISVGTQMYVQPRDQKDSGVQ-----
 Hookworm IGDTPVP--ECARCQRE-----ETFTRNVGVGACAVSDKVCI-----
 C.elegance LAVEKIPPPPEPESCHVSTS-----TVLLEFADQSVGSEPIKHCH-----
 Tunicate YSQTKNELNTSATQTISPL-----TRTIGTGEHAFNAMVDKSCG-----
 Spider SLNGSFD--HSRLFLQQ-----RNLKSLTTSPIKTDSPNVVL-----
 Lingula IISTMLHRDVASKSTMTDVSFKSGVDKEVLTDKVHTVDEASSDITI-----
 Lancelet LVSRLEKETHELSEELQEA-----CGVLEKHVTTPKSVPPREIMMAMNTIQHEWMKAGAQKTSDVQVVRDYLAAFEQMATGVLGKIVNLADGNGNTAL
 Medaka Kank4b ALEQKLH--ETSLELQKV-----TGLLREQQAESGTKDKKIEN-----
 Amazon molly Kank4b ALEQKLH--DTEQDLQRT-----AGLLKEQQQESRRKDEKIEY-----
 Platyfish Kank4b ALEQKLH--DTEQDLQRT-----VGLLKEQQQESRRKDEKIEY-----
 Stickleback Kank4b -----
 Fugu Kank4b ALEQKLH--ETDLELQRA-----LAQLREQKESREPGVKIEDL-----
 Tetraon Kank4b -----
 Cave fish Kank4b TLEQKLH--ELESDDLKT-----RDQLKQQVLESRIKDERIKE-----
 Medaka Kank4a TLEAKLT--QASQELERT-----NNLLKQIQENKTKEERILQ-----
 Fugu Kank4a TLEAKLA--QASQELDRT-----TGLLKEQLQENKLKEEKILQ-----
 Tetradon Kank4a TLEAKLA--RATQELDRT-----SVLLKEQLQENKLKEEKILQ-----
 Stickleback Kank4a ILEAKLT--QASQDLERT-----NTLLKEQMDENKVKEERILQ-----
 Tilapia Kank4a ILEAKLI--KASQELERT-----NSLLKQQVEENKLKEERILQ-----
 Platyfish Kank4a SMERGTITENIVTQDQTETPAAERVNQVTEETEGETVTDHPQRPRFA
 Amazon Molly Kank4a SMERGTITESIVTQDQTETPAAERVNQVTEETEGETVTDHPQRPRFA
 Herring Kank4 ALEEKLN--LSSLELKT-----NALLREQVEENRVKDERIQE-----
 Zebrafish Kank4 TLEESLS--KASCELEKT-----NVLLREEMDKNRQKDERIQE-----
 Cave fish Kank4a TLEESLS--QASCELEKT-----NSLLREQIEENKDKDLTIQE-----
 Mouse KANK4 ALEDKLS--GRTEELARV-----RAALEQQEETKAREQRIQE-----
 Rat KANK4 DLEDKLS--GRTEELAQV-----RAALEQQEETKAREQRIQE-----
 Dog KANK4 ALEGELS--GRTEELAQV-----RAALQQQEESKARGQRIQE-----
 Human KANK4 ALEGELS--GRTEELAQV-----RTALQQQEETKAREQRIQE-----
 Eagle KANK4 ALEEQLG--KKKEELERI-----KAVLEQQDHEIKEKEKSIKL-----
 Chicken KANK4 ALEEQLD--RKKEELEQI-----RAVLKQQDHEIKEKEKSIQL-----
 Goose KANK4 TLEEQLS--KKKEELEQI-----RAVLEQQDHEIKEKEKSIKL-----
 Anole lizard KANK4 ILEEQLN--NKTEELAQI-----RVVLKEQDKEIKAKEKSIEM-----
 Turtle KANK4 VLEEQLN--SKTEELEQI-----KVVLLKQQDSEIKAKERSIKI-----
 Alligator KANK4 VLEEQLS--TKTQELEHV-----RLVLLKQQDDEIKEKERNIKT-----
 Frog Kank2 VLEKQLG--RALIEVQNA-----NRKLEEAERAGRAEAAKRE-----
 Mouse KANK2 VLETQLK--KALQELRAA-----QTQQVDLQPQAWPPPDQVVR-----
 Rat KANK2 VLETQLK--KALQELRAA-----QTQQVDLQPQAWPPPDQVVR-----
 Dog KANK2 VLETQLK--KALQELQAA-----QARQADPQPQPQPQPQPRPP-----
 Human KANK2 VLETQLK--KALQELQAA-----QARQADPQPQAWPPPDSPVR-----
 Alligator KANK2 LLEERLQ--KALGELQDA-----RQRLGGGAG-----
 Spotted gar Kank2 LLETQLR--KTLQELHTA-----HRKLEALGKETAEKGQDAKP-----
 Cave fish Kank2 ELEEVQLK--RTVQELQSA-----QKQVETVQKERTSGAGPP-----

Herring Kank2	RLEAQLK	--RAMQEIQSS	-----	QEQVETAQRERERQAQLQRQ	-----
Zebrafish Kank2	LLEVQLR	--KTMQELQSA	-----	QQQVEAAQKERQTVCP	-----
Tetradon Kank2	QLEGQLR	--RTMQELQAA	-----	QQQVTAVQKGPRAE	-----
Fugu Kank2	QLEGELK	--RTMQELQAV	-----	QQQVTAVQNP	-----
Medaka Kank2	QLEGKLK	-----	-----	RTLEELQTAQQQSATVQETL	-----
Stickleback Kank2	QLEGQLK	-----	-----	RTVQELRDAQKAPQADRFVM	-----
Tilapia Kank2	QLEGQLK	--RTMQELQAA	-----	QQQVATVQKAP	-----
Amazon molly Kank2	QLEGKLK	--RTLQELQAA	-----	QLQKAP	-----
Platyfish Kank2	QLEGKLT	--RTLQELQAA	-----	QLQKAPQAEHPPOQREQRTVG	-----
Coelacanth KANK2	VLEKQLK	--KALQELQVA	-----	HQKLEQQAKEITEREKATKP	-----
Anole lizard KANK2	VLETQLK	-----	RALQEL	--QAAHQKLEHQSRQEDKEMS	-----
Turtle KANK2	VLEKQLQ	--KALRELQGA	-----	QQKLAGRPGWQQQEVVKAD	-----
Tetradon Kank1b	HLEAELK	-ESALQAEMSRL	-----	KSELKAAG--VRTRADKSSH	-----
Medaka Kank1b	HLEAELK	-ESAFQIELTRL	-----	KLELHVAG--ARNRADKACL	-----
Amazon molly Kank1b	QLETELK	-ESALQTELTR	-----	KLELQAAG--ARNRVDKSCF	-----
Platyfish Kank1b	QLETELR	-ESALQTELTR	-----	KLELQAAG--ARNRVDKSCF	-----
Frog Kank4	RQKEEMN	--AKDLHIIEI	-----	KNTIDTLEEMIRTRQKDDV	-----
Zebrafish Kank1b	ILEAELK	-EAMLKSEMGRM	-----	RSELREAEARNRTYKSSTAQ	-----
Tilapia Kank1b	ILEAELK	-EAMLKSEMGRM	-----	RSELREAEARNRTYKSSTAQ	-----
Fugu Kank1b	ILEAELK	-EAMLKSEMGRM	-----	RSELREAEARNRTYKSSTAQ	-----
Cavefish Kank1b	TLEAELK	-EALLNAEMCR	-----	KDELREAGSHNRADKSSSAQ	-----
Spotted gar Kank4	VVEKQLN	--DTKELDKV	-----	NSLLKQMKENVRKEERIKI	-----
Coelacanth KANK4	VLENQLN	--DARKELEKN	-----	SDTHKQNEEHKAKNINPHQ	-----
Frog Kank1	RLETDLR	-ETTYAMEMTKL	-----	KLEIKAAG--SRKNADKAIM	-----
Shark Kank1	RLEAQVK	-ETMHQAEMSKL	-----	KFELQAAG--SWKKADKCVT	-----
Coelacanth KANK1	RLEVQLK	-ETTHDREMTKL	-----	KLELQAAG--SRKKDKGLM	-----
Mouse KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKATM	-----
Rat KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKAIM	-----
Dog KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKAVM	-----
Human KANK1	RLEVQLR	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKATM	-----
Anole lizard KANK1	RLEVQLR	-ETTHDREMTKL	-----	KHELQAAG--SRKKLDKALM	-----
Eagle KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKLDKAVM	-----
Chicken KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKAMM	-----
Goose KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKATM	-----
Turtle KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKVDKALM	-----
Aligator KANK1	RLEVQLK	-ETTHDREMTKL	-----	KQELQAAG--SRKKLDKAVM	-----
Spotted gar Kank1	RLEVQLK	-ETTHEMEMGKL	-----	KLELQAAG--SRKKADKGS	-----
Herring Kank1	RLEVQLK	-ETTHQMEMCKL	-----	KLELQAAG--NRKSKDKACM	-----
Zebrafish Kank1a	RLEVQLK	-ETTHQMEMGKL	-----	KLQLQVAG--SRKKADKGLM	-----
Cave fish Kank1a	RLEVQLK	-ETTHEMEMGKL	-----	KLELQVAG--SRKKVDKGS	-----
Stickleback Kank1a	RMEVQLK	-ETTHQLEMCKL	-----	KLELQAAGGSGRKRVDKGS	-----
Medaka Kank1a	RLEVQLK	-ETTHQTEMAKL	-----	KLELQAAGGSTRKRADKGLM	-----
Fugu Kank1a	RLEVQLK	-ETTHEMEMGKL	-----	KLELQAAGGSNKKKADKGF	-----
Tetradon Kank1a	RLEVQLK	-ETTHEMEMGKL	-----	KLELQAAGGSNKKKADKGF	-----
Tilapia Kank1a	RLEVQLK	-ETTHQMEMGKL	-----	KLELQAAGGSNKKKADKGLM	-----
Amazon molly Kank1a	RLEVQLK	-ETTHEMEMGKL	-----	KLELQAAGGSNKKKADKGLM	-----
Mouse KANK3	LLRGRLLR	-----	ELEEA	-----	HEAAVTRPQSRDVAAQTTL
Rat KANK3	LLRGRLLR	-----	ELEEA	-----	HEAIVTRS
Dog KANK3	LLRCRLR	-----	ELEEA	-----	REAAEEAEEAQAQRQPP
Human KANK3	LLRGRLLR	-----	ELEEA	-----	REAAEEAAGARAQLREATT
Lamprey	RVQRLH	--EQQALLTDN	-----	YALADAFAPATELGSLS	-----
Coelacanth KANK3	MLEGHLK	--EATEELEKL	-----	RVEVCSRR--PRKMVNKEVM	-----
Frog Kank3	LLEGHLK	--EAANELEEL	-----	RVAVYSRR--QKDMADKEVM	-----
Turtle KANK3	MMEGHLK	--DATKELEEL	-----	RVEVCSRR--PRTLIDKEIM	-----
Aligator KANK3	MMEGHLK	--EATKELEEL	-----	RVEVCSRR--PKLIDKEIM	-----
Eagle KANK3	LMEGHLR	--EATRELEEL	-----	RLEVCARR--PRGRVDKEVT	-----
Chicken KANK3	LMEGHLR	--EATRELEEL	-----	RMEVCARQ--PRSRADKEVT	-----

Human KANK2	-----VDTVRVVEGPREVEVV-----
Aligator KANK2	-----
Spotted gar Kank2	-----SMADAVMMTSLGWQEL-----
Cave fish Kank2	-----QADHAVRATSLGWQEQ-----
Herring Kank2	-----P--QAEHPVKATSLGWQEQ-----
Zebrafish Kank2	-----QVDHAVRATSLGWQDQ-----
Tetradon Kank2	-------HPVMATSTGWQEP-----
Fugu Kank2	-----QAEHPVMATNTGWQEP-----
Medaka Kank2	-----QVDHPVMATSLGWQEP-----
Stickleback Kank2	-------ATSVGWREP-----
Tilapia Kank2	-----QAEHPVIATSLGWQEP-----
Amazon molly Kank2	-----QAEHPVMATSLGWQEP-----
Platyfish Kank2	-----IQVYTLEKPTVVEVGTLLRAE-----
Coelacanth KANK2	-----STADAIIMTCVQWQEL-----
Anole lizard KANK2	-----TGDVGHPTEREVREE-----
Turtle KANK2	-----TVKVVQVQREPEIAAS-----
Tetradon Kank1b	-----ARP--STAGASSEARPTTASQ-----
Medaka Kank1b	-----ARP--STASIGTEIKPFTKSQ-----
Amazon molly Kank1b	-----AKP--HTASIGTTTTLSTQSQ-----
Platyfish Kank1b	-----AKP--HTASVGTTARFPTQSQ-----
Frog Kank4	-----EYKDIAVNTEQPPKDE-----
Zebrafish Kank1b	-----PLVKCTATQTGSQNH-----
Tilapia Kank1b	-----PLVKCTATQTGSQNH-----
Fugu Kank1b	-----PLVKCTATQTGSQNH-----
Cavefish Kank1b	-----PKMQSSAFQTTTQTRSV-----
Spotted gar Kank4	-----LTEEAEARANLKEAKVLQRAA-----
Coelacanth KANK4	-----LPGQKIRMDSKPAVQEEKCILVDK-----
Frog Kank1	-----AQP--LMFSRTTEASVEMKDQ-----
Shark Kank1	-----ARP--AVCSVSVQAAVQTKSQ-----
Coelacanth KANK1	-----VQP--LVSSRAVEAVVQTRDQ-----
Mouse KANK1	-----AQP--LVFSKLVEALVPTRDQ-----
Rat KANK1	-----AQP--LVFSKLVEALVPTREQ-----
Dog KANK1	-----AQP--LVGDKMVEAVVPTRDQ-----
Human KANK1	-----AQP--LVFSKVVEAVVQTRDQ-----
Anole lizard KANK1	-----AQP--LLFSRAVEAVVQTRDQ-----
Eagle KANK1	-----AQP--RVISRMVEAVIQTRDQ-----
Chicken KANK1	-----AQP--LVVSRMVEAVVQMRDQ-----
Goose KANK1	-----AQP--LVVSRVVEAVVPMRDQ-----
Turtle KANK1	-----AQP--LVFSRMVEAVVQTRDQ-----
Aligator KANK1	-----TQP--LVFSRMVEAVVQTRDQ-----
Spotted gar Kank1	-----ARP--AVYSTSVEAKVQMOSQ-----
Herring Kank1	-----ARP--EMYSTSVEARVSTHSL-----
Zebrafish Kank1a	-----ARP--EMYSTSVEARVSTHTQ-----
Cave fish Kank1a	-----ARP--EMYSTSVEAKVSTQSQ-----
Stickleback Kank1a	-----ARP--ETYDACVEARVQTRSV-----
Medaka Kank1a	-----VRP--EVYSVSVEAKVQLHSR-----
Fugu Kank1a	-----VRP--ETYNVYVEAKVQMRDQ-----
Tetradon Kank1a	-----VRP--EMYSVFVEAKVQMRDQ-----
Tilapia Kank1a	-----VRP--EMYSVCVEAKVQTRSQ-----
Amazon molly Kank1a	-----VRP--EMYNASVEAKVQMRSQ-----
Mouse KANK3	-----GCTEKTQTQTELPVENQ-----
Rat KANK3	-----QSREVATQTTLGYTEK-----
Dog KANK3	-----QPQPQPREAATQTQWG-----
Human KANK3	-----QTPWSCAEKAAQTESP-----
Lamprey	-----
Coelacanth KANK3	-----IQP--HTANAFVEAIIISVANQ-----
Frog Kank3	-----AHP--QTLETASEAVVSMNLNQ-----

Turtle KANK3 -----AKP--QMVEAQAEAAVPMQSQ-
 Alligator KANK3 -----AKP--QLAEAYVEAVVPMQSQ-
 Eagle KANK3 -----AKP--QVAEALVEAAVVTQNR-
 Chicken KANK3 -----ARP--QVAEALVETQPGVCD-
 Goose KANK3 -----
 Spotted gar Kank3 -----ARP--EMASVLVEAVVSLTST-
 Zebrafish Kank3 -----AKP--ETVSIRLETCEPVCVSV-
 Cavefish Kank3 -----
 Herring Kank3 -----VRT--QTAHVGTDALPAAPPK-
 Stickleback Kank3 -----LKKRQMTIAEY-
 Fugu Kank3 -----AKA--DTADAQVETATPHFKH-
 Tetradon Kank3 -----
 Medaka Kank3 -----VTP--DVKNVQLETLTTSALKH-
 Tilapia Kank3 -----
 Amazon molly Kank3 -----AKP--DTRNAQVETLAPVVKH-
 Platyfish Kank3 -----AKP--DMRNAQVETLGPVVKH-

1710 1720 1730 1740 1750 1760 1770 1780 1790 1800

Hydra -----ND-----VFCDHCKNLKTS--TCVGD DKIDDF-
 Trichoplax -----
 Aplasia -----VG-----TNTAPVDKYHKASMTDKQRC SFAATNTEVTHTR--QANNQTEVKMF--LAMDQLRHAASNTQ
 Snail -----ASTNTFMIDQYHKACMTDKQK CIMAATNTEPLPYR--HSSIQTDLNVE-
 Fruitfly -----FT-----SCKPDVRHV GSSDDRLLDDVLCEKCAVSKRSV--ACGPE TPAEKV-
 Hookworm -----GF-----KPEKDELRTKEFDLARA AAVKLLTSEQKQPFVVRGT--AVSR SARLERN-
 C.elegance -----PVTVRS LHI DTQTDPAASTVDAACSPVLEF TQEEAVKVTVAASS-
 Tunicate -----LT-----STVGLLLTND FASGNHVESSTVGTSTPRVTRS-DIATSCEGLLKTV--DIGVSAGAKLT-
 Spider -----IL-----NNSTFNKSTLLSPSVRTKAVQAVEKKA VRNI--GLQISGSVNV E-
 Lingula TGINFISKMDFGTNTVTVQKKNSATSTTPKLSFPAETQ TISVPIYIMGTETDMKIFLATEQIRNQSTNT--DVHSTV TQAVGTRDDSDFYLRNFGTNT
 Lancelet -----DE-----DGSTALM CASEHGHLEIVKLLLAQP GCDATITDN--DDSTALSIAMEAGHRDIGVLLYAQVNMG
 Medaka Kank4b -----ER-----VMVEQDGETVVR--SMEPDY SKGCS-
 Amazon molly Kank4b -----ERVVVDQEGDETVVR--SIEPERIPASS-
 Platyfish Kank4b -----ER--VVVDQEGDETVVR--SIEPERIPASS-
 Stickleback Kank4b -----
 Fugu Kank4b -----ERVVIE--QVGDQAVVRSV-
 Tetraon Kank4b -----AAGPERT-
 Cave fish Kank4b -----LNK--NVERNSAENVW-
 Medaka Kank4a -----AEPGKV DDEKNQSPMTSSGPPPKDQVRSVSQVE--APSPTVKLTEE-
 Fugu Kank4a -----RI-----CIEVHPPKERTGSIDHGTETIKTDTCEQPQPQS--KNQPQAQIKGP-
 Tetradon Kank4a -----IS-----QIVDTQPLT IETEDKGPKE DGETLRETIKEA--VIGEKTVVPVR-
 Stickleback Kank4a -----RP-----RRRESIDTGTETERVDFTHQETETEIKGVFVHLLQ--NPGPKPRVEDS-
 Tilapia Kank4a -----QGTDTDKICIERPRASSVDRGTETERVGTVD R--VTETEVAQRAD-
 Platyfish Kank4a -----QQTETEIERQDNNLSRDAQAEGRVGESETTVRGDI GHVPVKSTA ESEKTKKVQIESE--NVAVEVAANIF-
 Amazon Molly Kank4a -----QQTETEIERQDNNLSGDAQAEGRVGESETTESEKTKKVQIESENVAVEVA AKIYVT--DVEGIVVQTL D-
 Herring Kank4 -----PQPVLTS DASVCTDSERIPVSEKAVCTDEEAQP--SNGPKETDLTC-
 Zebradish Kank4 -----PEFVVKCDASVSTD SKSVLEKGISTEPQPIEDF--KVTESQCSSTQ-
 Cave fish Kank4a -----PRPLPQLIVTCDVSVSTD SKSVSEKAVLTD A--ELQPDGPKET-
 Mouse KANK4 -----SEAPDRTDATVNTDPLQELTPRES HDK--NIGVNLNTPD-
 Rat KANK4 -----SDALDRTDAMVNTDPLRE--LIPRESQDKNIGV--NLLSTPVPECW-
 Dog KANK4 -----RDSQGQTDAMVNTDPLNGLLTRES CDKSI EVN--LLGSTGESWR-
 Human KANK4 -----KDTQGQTDVMVNTDPVHG LLTRES CDKGI EVN--LLGSMESESWG-
 Eagle KANK4 -----PS-----TRSSGALQCYDAAVNTD--LSQVAGAKQAHDK--GVNVNIPVSTK-
 Chicken KANK4 -----SSMQRGSM LQCNDAVNTELSYVNGSKQV HDK--GINVNIPLSTK-
 Goose KANK4 -----PS-----GRRSSTLQYDAAVNTE--PSHVNGSKEA HDK--GVNVNIPVSTK-
 Anole lizard KANK4 -----YTTARNVLQYHDAAVNTELVH EKI AKEAYDK--GVNVRLTVPME-
 Turtle KANK4 -----SKQDGNVLQYHDAAVNTE--LMQANTFKEAYDK--GVNVNIPVATE-
 Alligator KANK4 -----CE-----QDGNALPYHDAAVNTE--LIGTDRLKESQDK--GVNVNISVSTK-

```

Frog Kank2 -----RGSEVVSSTKVGH--GVQPQRARDLE-----
Mouse KANK2 -----ASTAAGALAQRAQSLEPYGTGLKALTT--SGGPENTLVFR-----
Rat KANK2 -----ASTAAGAPAQRAQSLEPYGAGLKALAT--SAENTLVFRSH-----
Dog KANK2 -----REVEVASTAAGAPAQRAQSLEPYGTGLRSLAT--PGGVESPA VFR-----
Human KANK2 -----ASTAAGAPAQRAQSLEPYGTGLRALAM--PGRPE SPPVFR-----
Alligator KANK2 -----ARGQAVGPEGQVP--CVGGQV EETRR-----
Spotted gar Kank2 -----QQWGRPGEPSPLQTVVTFSSHPPCREQRTVGIQVY TLEQPT--VVGVR SFQETT-----
Cave fish Kank2 -----DQQQQGRVGTGLHTVVSFSQDDQQRQRTVGIQVY TLEQPT--VVGVTLLRAQ-----
Herring Kank2 -----QQ-----QGGGRLTGSSLQT VVSFTQPPQREQRTVGIQVY TLEQPM--LVRAQGGPSIA-----
Zebrafish Kank2 -----QQQAGAGLHTVVSFTKPHQQR--TVGIQVY TLEQPT--VVGVTLLRAQ-----
Tetradon Kank2 -----HGCSLHTLVSFTQVPQREQRTVGIQVY TLEQPT--VVGVTPLRAE-----
Fugu Kank2 -----QGCSLHTLVSFTQMPQQRQRTVGIQVY TLEQPT--VVGVTPFRAE-----
Medaka Kank2 -----QGRSLHSLV SFTQPPQQRQRSVGIQVY TLEKST--VVEVGTLLRAE-----
SticklebacK Kank2 -----QGCSLHTLVSFTRPPQREQRTVGIQVY TLEQPT--VVEVGTLLRAE-----
Tilapia Kank2 -----QGCSLHTLVFTTQQRHQRDQRTVGIQVY TLEQPT--VVEVGTLLRAE-----
Amazon molly Kank2 -----QGSSLHTLVSFTQPPQREQRTVGIQVY TLEKPT--VVEVGTLLRAE-----
Platyfish Kank2 -----TCSSPSLQ PGGVTEGHHKQTEGLSSFR TYLTM--CVSVPLHFSIV-----
Coelacanth KANK2 -----QA-----GQPRKLA EVSVEG-----LQTSNQL ELVDQR--TMGVQVYISEQ-----
Anole lizard KANK2 -----GPGLAHSPLDNPIRVDTIKVVQIEREPEVVASK--ATGMEHKPORA-----
Turtle KANK2 -----TATGVAHRPQRAQSLESKEPYASLRAL--TLGEP PQAVVV-----
Tetradon Kank1b -----GVGSPTE LCHASAAVQIDVKT VVICCRPELQDV--CAGPDVPM SRW-----
Medaka Kank1b -----GA-----GNHTEFDASTGEATGVK--NVGVSCEPKRKT V--CVGPD FEMSHW-----
Amazon molly Kank1b -----GV-----GNHKEFQDASTGEAAETK--TVGVSCPKTTDS--CTGLD VPM SHW-----
Platyfish Kank1b -----GV-----GNHKEFQDASTGEATEK--TVGVSCPKMTDI--CTGLD VPM SHW-----
Frog Kank4 -----QK-----GNSFSDNISFVTQSVESDNMTNLKQTS DERNELCLLIDSDHPAVIA-----
Zebrafish Kank1b -----TNLLTPAVGGELGRI--SVGISCKPEVKIV--SSGPDTPMVDW-----
Tilapia Kank1b -----TNLLTPAVGGELGRI--SVGISCKPEVKIV--SSGPDTPMVDW-----
Fugu Kank1b -----TNLLTPAVGGELGRI--SVGISCKPEVKIV--SSGPDTPMVDW-----
Cavefish Kank1b -----GV-----GNHSQLVHA AVGGGAVQALHTVGVTKCPETRDM--TS GPDVPIDLW-----
Spotted gar Kank4 -----DT-----VETKLDSDCVCLDAAVGMATKE--EGNIFCDKGVM TD--GIFQQGACENL-----
Coelacanth KANK4 -----KA-----SDNHKCSDAAVNTEIVQEGMOKETCDK--GITVDIHLSTQ-----
Frog Kank1 -----SAGDHVDIIDACVGN SLKTV--SVGVLCSPIVQNA--AAGSS LPMNSW-----
Shark Kank1 -----MV-----GDHVEYADACVGIQOETR--SVGVTCKPDLCDV--AVGPAIPMDCW-----
Coelacanth KANK1 -----IVGNHVNFADVGVGNSIQTN--SVGICTPTLCDI--AVGPEVPLDCW-----
Mouse KANK1 -----MV-----GSHVDTRESCVGT SVQTS--SVGTSCHPDCKNQ--VVGSE LPMNWW-----
Rat KANK1 -----MV-----GSHVDTMDCVGT SVQTS--SVGTSCHPDRKNQ--VVGPE LPMNWW-----
Dog KANK1 -----MA-----GHHLDVVDACVGT SVQTH--SVGVSQPSRESR--LAGPE LPMNCW-----
Human KANK1 -----MV-----GSHMDLVDTCVGT SVETN--SVGISCP ECKNK--VVGPE LPMNWW-----
Anole lizard KANK1 -----MV-----GDRVDIVDSSVGS SLQMS--NVGVLCRPM LTN--AVGPDMPMNWW-----
Eagle KANK1 -----MV-----GDHVDIADSSVGS HLQTS--SIGTSCRPAVRSV--AAGPE LLM SRW-----
Chicken KANK1 -----MV-----GDHVHVADSSVGS HLQMS--SVGTSCRPAVRS T--AAGPE LLM SRW-----
Goose KANK1 -----MV-----GDHVSVADSSVGNHLQMS--SIGTSCQPVVRS T--AVGPE LLM TRW-----
Turtle KANK1 -----MV-----GDHVDVADSCVGNHLQMR--DIGISCRPNLQST--AVGPE LLM NRW-----
Alligator KANK1 -----MV-----GNHVDVTDSSMGT YLQVS--SVGTSCR PVVRS T--AVGPE LPMNRW-----
Spotted gar Kank1 -----AVGNHVVDVADACTGQDSQAS--ATGVSCSP ELRHV--AVGPE LPMNRW-----
Herring Kank1 -----GV-----GNHTESCDVQVQ--AVGVSCQPD TKPA--AVGPDVPM DRW-----
Zebrafish Kank1a -----GV-----GNHVESDASTNHVHQM N--SVGITCRPDARHV--LVGPE LPM DRW-----
Cave fish Kank1a -----GV-----GNHAEFSDNSTGHVSQTQ--TVGVSCR PDLRNV--AVGPE LPM ERW-----
Stickleback Kank1a -----GV-----GAGEHLGPSTQSV--AAGPE TPM ERW-----
Medaka Kank1a -----GV-----GGDLEFARDPDPRAVGGACLP SMQTV--SAGPE TPDQW-----
Fugu Kank1a -----GV-----GNHLEFNHANA AKSSQTC--SVGVSCV--ASGPE IPM DRW-----
Tetradon Kank1a -----GV-----GNHLESSHANA AKSSQAC--TVGVSCQPSLESV--ASGPE IPM DRW-----
Tilapia Kank1a -----GV-----GEHLEFHVSTAKSPQTL--SRGVSCQPSVHSV--ATGPD IPM DWW-----
Amazon molly Kank1a -----GV-----GEHLEFSLQTQ--TVGVSCQPSARSV--ATGPD LPM DQW-----
Mouse KANK3 -----TTQTELPVESQ-----
Rat KANK3 -----CAAKATQTEPAE--ASGPSHENPSG-----
Dog KANK3 -----

```


Goose KANK4	-----	-----
Anole lizard KANK4	-----	-----
Turtle KANK4	-----	-----
Aligator KANK4	-----	-----
Frog Kank2	-----	-----
Mouse KANK2	-----	-----
Rat KANK2	-----	-----
Dog KANK2	-----	-----
Human KANK2	-----	-----
Aligator KANK2	-----	-----
Spotted gar Kank2	-----	-----
Cave fish Kank2	-----	-----
Herring Kank2	-----	-----
Zebrafish Kank2	-----	-----
Tetradon Kank2	-----	-----
Fugu Kank2	-----	-----
Medaka Kank2	-----	-----
Stickleback Kank2	-----	-----
Tilapia Kank2	-----	-----
Amazon molly Kank2	-----	-----
Platyfish Kank2	-----	-----
Coelacanth KANK2	-----	-----
Anole lizard KANK2	-----	-----
Turtle KANK2	-----	-----
Tetradon Kank1b	-----EVRERVEVMEKVNVDIL-----	-----MITRAVGIETKSRDAETNTEIPVE
Medaka Kank1b	-----	-----EIRERVENKDAAVGIQIFNTLGVGTEMKVR
Amazon molly Kank1b	-----	-----EIRERVETSDKAVGIQVFTSTVGVGTEIKLS
Platyfish Kank1b	-----	-----EIRERVETSEKAIGIQVSTSTVGVGTDIKLS
Frog Kank4	-----	-----
Zebrafish Kank1b	-----EVRRRVERKDQCVGSKCA-----	-----KTQSQCVGTTVCMCDATTITLETMK
Tilapia Kank1b	-----EVRRRVERKDQCVGSKCA-----	-----KTQSQCVGTTVCMCDATTITLETMK
Fugu Kank1b	-----EVRRRVERKDQCVGSKCA-----	-----KTQSQCVGTTVCMCDATTITLETMK
Cavefish Kank1b	-----EVRKKVQRRDQCVGKDYVP-----	-----TCSQCVGTAIVIRDTGMVTLELME
Spotted gar Kank4	-----	-----
Coelacanth KANK4	-----	-----
Frog Kank1	-----IVKQKVEMCDTGTGRDL-----	-----LCDKCVGNDQVLFEDALNIREPID
Shark Kank1	-----VVHEKVEVQEKVGGHV-----	-----MCDKTVTCGVNVCFSDMGVN---T
Coelacanth KANK1	-----VVHEKTEMQDKCIGQHIE-----	-----VCNKNVGVELCTCEVGINTEESIE
Mouse KANK1	-----VVKERVAMHDQCVGRSVE-----	-----TCDRSVGEVSVCEVTSNTEASGS
Rat KANK1	-----VVKERVGTHDRCVGRSVE-----	-----TCNRSVGEVSVCEVTSNTEASGS
Dog KANK1	-----IVKERVVDRDQCTSRSE-----	-----MCDKSVGEVSVCEVTSNTEESVN
Human KANK1	-----IVKERVEMHRCAGRSVE-----	-----MCDKSVGEVSVCEVTSNTEESVN
Anole lizard KANK1	-----IVKREDMRDQCISSVE-----	-----TCNQCVGTEISICETGVNTEESVD
Eagle KANK1	-----LVRERAQVDRDQAGRSVE-----	-----LRNKAVGAETSVCCEMGINTEEPAG
Chicken KANK1	-----LVRERAQMRDQCTGRSVE-----	-----LLDKKVGVEVSVCEVTSNTEESVG
Goose KANK1	-----LVRERAQVDRDQCTGRSVE-----	-----LYDKQVGVETSVCETGVNTEESVG
Turtle KANK1	-----LVKERADMRDQCTGRSIE-----	-----MCDKNVGTSEMSVCEVTSNTEESVD
Aligator KANK1	-----LVKERPELQDQCTGRSIE-----	-----KHDKCVGIEMSVCEVTSNTEESVD
Spotted gar Kank1	-----TVQERVQTDKCTGRSVE-----	-----MCSKNVGVELSVYETGVNTEESIVG
Herring Kank1	-----VVQERKEVMDQCVGRQVT-----	-----MSDKSVGLQLSMCEMGINTEETVE
Zebrafish Kank1a	-----IVQERTEVQDQCVGRHV-----	-----MCSQSVGVELSVCEVTSNTEETAE
Cave fish Kank1a	-----IVQERVEVQDQCVGKQVI-----	-----LCHQKVGVELSTCEMGNTEETVE
Stickleback Kank1a	-----VVGVRVEVRDQCVGREAG-----	-----PSVREAGVNTEESVD
Medaka Kank1a	-----VVRRRPPVHDKCVGREVE-----	-----TCHQLVGAEQSVCEVGNTEADPG
Fugu Kank1a	-----SVHELVEVKDQCVGRSME-----	-----TRDQQVGVQNVCEVGNTEESMD
Tetradon Kank1a	-----VVHELVEVKDQCVGRSVE-----	-----TCDQLVGVVNAEAGVNTEESMG
Tilapia Kank1a	-----VVHEQMEVSDKCVGRHVE-----	-----TCHQQVGVELSVCEVGNTEESVD

Dog KANK4	-----	-----
Human KANK4	-----	-----
Eagle KANK4	-----	-----
Chicken KANK4	-----	-----
Goose KANK4	-----	-----
Anole lizard KANK4	-----	-----
Turtle KANK4	-----	-----
Aligator KANK4	-----	-----
Frog Kank2	-----	-----
Mouse KANK2	-----	-----
Rat KANK2	-----	-----
Dog KANK2	-----	-----
Human KANK2	-----	-----
Aligator KANK2	-----	-----
Spotted gar Kank2	-----	-----
Cave fish Kank2	-----	-----
Herring Kank2	-----	-----
Zebrafish Kank2	-----	-----
Tetradon Kank2	-----	-----
Fugu Kank2	-----	-----
Medaka Kank2	-----	-----
Sticklebakc Kank2	-----	-----
Tilapia Kank2	-----	-----
Amazon molly Kank2	-----	-----
Platyfish Kank2	-----	-----
Coelacanth KANK2	-----	-----
Anole lizard KANK2	-----	-----
Turtle KANK2	-----	-----
Tetradon Kank1b	DLAPRK-----EKKYSSVACGDCSVHLAVPEGKS-----QTVSTST	
Medaka Kank1b	DAGSNTTEMPAENNWFKKEKVKCLSVGCGDFNSINDSAVKDMVSKSVTTDL---IRGVDLGMASPDTSQR-----TNTVSNLVSRET	
Amazon molly Kank1b	DAESNTDLPLEKLVFQKEKVKCHSVACGAYSVGLTICESKEMISQGITDS-IRRVDQGILASPOMASQR-----TNTVSSSVSRFT	
Platyfish Kank1b	DAESNTDELPLEKLVFQKEKVKCHSVACGAYSVDLTICESKEMTSQGITDS-IRRVDQGILASPQTASQR-----TNTVSSSVSRFTN	
Frog Kank4	-----	-----
Zebrafish Kank1b	NRR-----NISYRTVCGDYMVNADLRPIKSFVSQGTVTD-IRSVDLGVMVIPQTVSQR-----TSTAFCTISRSTS	
Tilapia Kank1b	NRR-----NISYRTVCGDYMVNADLRPIKSFVSQGTVTD-IRSVDLGVMVIPQTVSQR-----TSTAFCTISRSTS	
Fugu Kank1b	NRR-----NISYRTVCGDYMVNADLRPIKSFVSQGTVTD-IRSVDLGVMVIPQTVSQR-----TSTAFCTISRSTS	
Cavefish Kank1b	TLSKRK-----VSSRTVCGCDCTIDMNVNVVKPLVSKGMVTD- VKGIDLGITVNPQMSQR-----TNTTISTVSRCTG	
Spotted gar Kank4	-----	-----
Coelacanth KANK4	-----	-----
Frog Kank1	QDGTGDLKT-----KELRSVCGDSSVDVIVKPVMESLSCGVNTEF-VNKVDSSTVASFCTADQQ-----TNTEMDTANQYT	
Shark Kank1	DETVEDPDISGGPHSALRAKDVQSVGCGDCLVDVVVFAKELASSSTNTVA-VSTAE LAVMAAPQTTTQQ-----THTQIDTSCKFT	
Coelacanth KANK1	NLELFKRAE-----PKESRSVCGDCLVNVIVCLPKELVSCSTNTDI-LSKLD SAVMAVPQTAKA-----SNTVLETTNQFT	
Mouse KANK1	DLTLLKTNLN-----LKDVRISIGCGDCSVDVIVCFPKECTSRSMNTEA-VGQEEAAVMVPHTTDQH-----TSTNLERVDQCT	
Rat KANK1	DLTLLKTNLN-----LKDVRISIGCGDCSVDVIVCLPKECTSRSMNTEA-VGQEEAAVMVPHTTDQH-----TSTNLERVDQGT	
Dog KANK1	DLTLLKTNLN-----LKEVRSIGCGDCSVDVIVCFPKECTSRSMNTEA-ISQVDAAVTAVPQTASQH-----TSTVLGQVNGAT	
Human KANK1	DLTLLKTNLN-----LKEVRSIGCGDCSVDVIVCFPKECASRGVNTA-VSQVEAAVMVPHRTADQD-----TSTDLEQVHQFT	
Anole lizard KANK1	RLSLCKTEAK-----IKEVRSIGCGDCSVNVTVCPPKECVSRSTNTET-FPVNETISCSTNTEV-VCKVECAVMVPHRTAQG-----TNTVLEKTDQLT	
Eagle KANK1	VPSFRQTARS-----VGAVRSVCGDCSVDMVCTPKERVSRETATEA-VPRVEATVMVPHSTASRQ-----TSTALEMVSQCT	
Chicken KANK1	DLSLCRTARE-----VRETRISIGCGDCSVDVVVCAPKECVSRQTATET-VCRAEATVMVPHSTATQQ-----TSTAMEMVSRCT	
Goose KANK1	NLSLCRTAQE-----VRETRIVGCGDCSVDVIVHSPKECVSRRETATEA-VSRAEATVMVPHSTASQH-----TSTALETVSRCT	
Turtle KANK1	NLSLCKTEAE-----IKEVRSIGCGDCSVNVTVCPPKECVSRSTNTET-VCKVECAVMVPHRTAQG-----TSTVLMVNGFT	
Aligator KANK1	SLSLCKTEQE-----IKEVRSIGCGDCSVNVTVCPPKECMSRDNTNTEA-ICKVEATVMVPHRTATQQ-----TGTVLEVVNQFT	
Spotted gar Kank1	NLDLYKTRLE-----MAKFRSVGCGECSVNVTVCEPKDLVSGTNTDF-VNMVESGIMAVRHHTTSQY-----TNTAVDTVSTST	
Herring Kank1	SLGLCKAEAE-----QAKEVRSIGCGDCSVNVTVSPKIDLVSLGTVTDA-VSREDQGVVMVPHETLSQY-----CETDMLGVSRT	
Zebrafish Kank1a	GLGLCKREAE-----QAKEFRSICGDCSVDMVVRPIKEMATRSTGTDE-VHRTDFGVMLPICASQY-----TNIETETIDKLT	
Cave fish Kank1a	NLGLCKTEFE-----QAKEYRSIGCGDCSVDLVSPKELFSGQTATDL-VRKLD SAVMVSPTMHCQH-----TNTVEKTVSGRCT	
Stickleback Kank1a	RLALCRMAE-----LSRESRSVCGDCSVDVVVRPAKTLRSRGTDFPER-VGTADSAVTAAPESATRQ-----TNTETEVASKST	

```

Medaka Kank1a      GRT-----WAESRVSVCDCGDSVEV---PAKTFVSRGTEADA-VRRTDSAVMAAPLSATQQ-----TNTETQVAAKST
Fugu Kank1a       SLVLRKAKLS-----KESRSVGCDCSDVVIIVSPVKALVSRGTFDDL-IGKVDLGVMAAPESANQQ-----TSTDLEVASKST
Tetradon Kank1a  SLALS KAKFS-----KESRSVGCDCSDVDVTGVPKVLGSRGNTDL-ISKVDSSTVAAPESANQQ-----TNTDLEVVNKST
Tilapia Kank1a   SLTLSKPAVE-----ASKEQRSVGCDCSDVVIIVSPIKALVSQGTETDR-VSQVDSGVTAAPPELLTQE-----TSTEA E V AHKYT
Amazon molly Kank1a GPGFCRTAAE-----PIKQSRSVGCDCSDVVNVT PVKTFVSRGTDFDV-VGTIDSAVMAAPDSASQQ-----TGTDTEYERST
Mouse KANK3
Rat KANK3
Dog KANK3
Human KANK3
Lamprey
Coelacanth KANK3
Frog Kank3
Turtle KANK3
Aligator KANK3
Eagle KANK3
Chicken KANK3
Goose KANK3
Spotted gar Kank3
Zebrafish Kank3
Cavefish Kank3
Herring Kank3
Stickleback Kank3
Fugu Kank3
Tetradon Kank3
Medaka Kank3
Tilapia Kank3
Amazon molly Kank3
Platyfish Kank3

```

2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

```

Hydra      ...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...|...
Trichoplax -----CDKCNNLKTLS CGV GDC TIDNLLC DRC SNK TFFD -IGVSED---SVNYSCCTSC TQK SVRSIGI -GEGNINDTF-----
Aplasia    -----RNGHADNAAKTIS IADI QEENLNTD-----GEKDSQNKY-----
Snail      KLISKERTRSTTSGG TNRTVQQFSDGNV VGGEGEGGGGSSGT DGMWSSSL S QSQS -SSSSSYDRSYNGS AGGSLTYG SVS GGVSGGV TGTAGDAGGYQ
Fruitfly   RRSSAPVTLV GKQSE SLE TNM TMN SSK FQV S PRRS D S F Q E T V T H Y I I T K D G K -KLISE E K T T T S R G G H S S S V N H Y T G N A S I E G R S S L T D A S
Hookworm   GSQTTTAVV RSTGAQ VNPQQHSGVQ CATEQVSRQTD TKGLQRLTRS QTKAEQV S -E S V P R P T R R H T A S N T D K V E E A P A K V R T S H S A C N T E E V R
C.elegance -----KGD LLEYIAEK NKT VSTSP SAPATTPS-----GETADA-LKSKV LKKEV P P P P S N L P D P I P A R I
Tunicate   -----AAAADCE ECL R Q D V F T R N V G V G A C S I S D K I C V S C D N Q V V E A-----DENEAPGFKHD TKDDQK QRF EI -AKANAVKKL
Spider     ERVCIPNASVAVGT ELQTC DQC DTHVATR RTTSTIADIRKPSTDA-----VQQT-AD VATYNSSTDCDDIIP IVTSSTTNTQCV-TTQNVSTQY
Lingula    -----REVEKAFNQ NQ ILK H S V A V G D F N I L D T I C-----ALCLKA-KTSVGVGDS DINISFCDR CRSVKTVSTSC-GEASIYDVC
Lancelet   TGMTVSLDSTDLGPKQE IIPHHTIYGGKR IIDSSV GQGYKPSVATY TSMRSANRSPSPTE TSYRITESRERSGGGT VTGTVEGGDSGV THHTEY
Medaka Kank4b KPPVETASVSTNTFVVNTIDKVN TAVN LKTVAVNGVDLDCR CADVKTKT-VAVGVC---SIKDTICDR CNNME S K T V G V -G R C T I N D I T V
Amazon molly Kank4b -----LALRHP P Q K M S S R G G V E P A D G T A D S M S T-----
Platyfish Kank4b -----VITRTPPSQAQRH QDSVMSDGV T N T F I I-----
Stickleback Kank4b -----IISRTVP SHAQRHQD LIMSDGGTDT F I I-----
Fugu Kank4b -----GKSAGHGE GAGATVV-----
Tetraon Kank4b -----VRAEGTEEHS PENKTSEHAKVRKPEA-----SVQVQE-SGQCGL EEGLKPHHASKAPAKS HTE
Cave fish Kank4b -----SKVKLPKAQSKTDAQK P S S L S E L P S R P K S I Q T Q S Q S Q A S T S R R D S K E I E S Q Q P Q K G V G E T Q S L R R S S N E A A Q R R G S S E A Q A L R R G S G E A Q A A R R G
Medaka Kank4a -----PPHEDTQKKH PAPA PAQK PQRGE SQARTTRQG---SCDTQT-QTGSRKTSSEAKPAHKDGSDAQSLRRAS-GETAQR RGS
Fugu Kank4a -----PQRGKPPAADQAE P S T P Q Q P A P V R P R R G S S E A Q S Q Q -AQPSTKGPQVQ T Q G P P Q L E G T Q V P H P G P
Tetradon Kank4a -----SLAERPSAES S G K Q T K P Q R S E T Q G A P P G A S V K K R P K-----SIQA-QTRRHSKELKASQP P G G V P G E S Q T R P T G Q -V S H E A Q P S S
Stickleback Kank4a -----QQTETE MERRH D N N P A R S V E A E S Q L E A R S P E Q L S E T Q T Q T V S P G -S S E V Q G S R R S S S E A Q A P Q K D A S E T Q S L R R -G S S E A A Q R R
Tilapia Kank4a -----SAQPSEPRENDQMP SVPQVQDSSQA EKLPDKL I E K Q Y N V P Q Q G E S Q S V A I S S E I -Q V K S K P I Q P H S K S Q P A S R R D S K E Q K A P Q R -G S S V S H P Q S R E S G E
Platyfish Kank4a -----SAQPSEPEQENDQMP SVPQVQDSSQA EKLPDEL I K K E S N V P Q Q G E S Q S V S S S S E I -Q V K T K P I Q P H T K S Q H A S R R D S K E Q K A P Q R -G S S V S H P P S R E T G E
Amazon Molly Kank4a -----KKVLV E R V L E E N G V K E S D V I Q S A V T E P A P A E S E A V A N A K S E D V A K E P A V T K E T V G S P S S S E P A L K S P K E G Q P G Q E A Q S Q S R R R S S S E G S G S S A S S
Herring Kank4

```


Zebradish Kank4 EGNNLEVLEMLENTDSIKNKEQECDIKDSELSQITDTKVSENVAESDTEEYVMVESAMVETLASEIEVTEPTVQKTESAESLGIESTVTEKERE-----
Cave fish Kank4a ---QAVETDVPISPTDNAQEDTDEQRDARYSDKDQVTEVQVSESIMIESDVAEGYVIVEKTEGELVETVAEENTTVRLSTVEYKLPESVNVVER-----
Mouse KANK4 --PECRAPRAEKNGFPWQNNHKSQSYSPPEEPVLPPQLSLPRGPE---QILASS-LCSCLSMELRIEEEGSEQEGGQEEGAGGL-SRAAGESW-----
Rat KANK4 -----ASRAEKNGFPWQNTNHSQSYSPPEPALPPQLSLPRGPEQILASSLSC-LSMELRIEEVSEQERDFDGGAGLSLREAGGSFWSRES-----
Dog KANK4 -----ARGEENGLLWGQAGHKPGDRSPFKLVPPPQLSLPQGFPE---MVLPTS-LHSCLSTELRIEEAGSEQEGSPQVGAEGL-GRAGGSW-----
Human KANK4 -----IRGEENGLLWGFQDGHNQSNPQAEKRVLLPQLSLPQGFPE---QVLTSS-VHSFLSTELRIEEAGTEQEGGPGGTRGAGGFLWGSDRK-----
Eagle KANK4 -----GLADAGTGAGHFGAESEAGLHASCFTQKLIDEHLSDDNQNH---RNNYDT-QSLAAHAVTAESYRGRTRIGSNASENKAGF-GEDKPRGGL-----
Chicken KANK4 -----WADVGTSGGGDGHFAKLSQTEAGLEPGLHAPGETELKIDEQSLDDNQ---NQSYRTRKTRGSSADENEAGF-GEDKTEDGM-----
Goose KANK4 -----GGTEGPGPHFAELTETEDDLEPGLHAPCLTELKIDEQSFDDNQNRNNY-DTRSLTAHAATAASYRATKTDNNTGKTKA-----
Anole lizard KANK4 MSNIPVCIQEKDSPSFQRQKEMRQDNDSSSTLELSYNELKIDEHTA---NDKSEK-KAYNNVSRGESSLSVGTDDSTTGKNEHNFQGDIRDSTE-----
Turtle KANK4 -----GLAAVHTGVREEGAASLAKQGTGIDTEPPVFTSCFTELKIDEQINDDCQHQRNSYDRQSCAASSLIGESCRTGRADSNQNK-----
Aligator KANK4 ---PIHTDQGLADVHAGIRKKTAFKQKRTGTDIEPAVHTSCFTELQINEHI-RDDCQSQRSYDTECVAPAPTGESYSGT-----
Frog Kank2 -----WRGAAKATDGEERVYKSKEVVEKPLLS-----PSGPAPKFHLVKKISITGHCSTEE-----
Mouse KANK2 -----SHEVVETMCPLPTATTGNVHTAKKIS-----ITERSCAGPRMTEPPSSVNRPAASAVVQEN-----
Rat KANK2 ---EVVETMCPLPTASTSNMHTAKKISITERNCTGAARMADPPP-----SPAEPSPSSYPAAEPENPAPAAQDTTDRREL-----
Dog KANK2 -----THEVVETAFPTATASTGNVHLVKKISITERSCDTAELPPAPAESPPSPGVEATSLAQPEKSAGGSAARAAD-----
Human KANK2 ---SQEVVETMCPVPAASNVHMKKISITERSCDGAAGLPEVPA-----ESSSSPPGSEVASLTPQEKSTGRVPTQEPH-----
Aligator KANK2 -----KVLGVGQTPGPGGQRLGVGSDAQQA---GERAEVVRVVQVPRGPEIAASTAAGPAAQPOHARGL-----
Spotted gar Kank2 GGTEAELTVTHRREPEQETSFPVHSSNQLQKKSVEGVPVSPGHYPNQGFLQEVNE-QVKATEDQDGTGKSNPTSPTAIHGKQDQLPYSVETPYGY-----
Cave fish Kank2 PRELPPIAISSKQVREVLRESEVMSVPVSSSALVMETKNQITSLCLRLEKEETHQQSPTELIQSQEDAAKPAQIRALKNFFTEYFGLFNTVLKL-----
Herring Kank2 EEEACQHTTVEVLQAEESTKSPASQPTLRSIMKRKADGEGSPPT---KKNLQF-IGVNGGYESTSSSESSSESEDESDESDTSEY-HEAPEKLPE-----
Zebrafish Kank2 AQLAEASHRRYGE SPAAGDSPHEFPPIAISSKQVREVLRESEVMSVPVNTQATMETKCNQVAVTCORLKEGEINQQPAAEAQVDPANPASQSNL-----
Tetradon Kank2 -----ICSPPAAATEGHRGGQAQGPVTRCVC-----CIPKRRTNHRTRRRPSTRM-----
Fugu Kank2 -----ICSPPAAAEGRHRLAEGLDASKTTYTPVEFLA-VSSKQVRDLKSELSTSVPIAAPAIARGRRTTASTSRFY-----
Medaka Kank2 ---SCSSPSPRAGVTESSQHKETEGLTQTSSGAANSQLOQTGLSTVPIAN-----AAVAVATGNQINLVQSEEEETSSSVQSQENS-----
Stickleback Kank2 ---ICSSPSSLPAACQVAGVLELRLAQAQCLADAVE-LPIAVSSKQVRDLVLSSELSTSVVAVPAFAV-----
Tilapia Kank2 ---TCSSPPIQPAAGGVEDHHRGRTEVITENACCSAFSLTPDAPVELPIAVSSKQ---SRLSTSVVAVPAIAVASDDDRIVHNKEANESN-----
Amazon molly Kank2 ---TCSSPQLQPAAGGVTEGHHKQTEAPVELPIAVSSKQVRDLVLSGSLSTSVVSNPAIVVAGSDQIGLVQTKESPEVFSKASSPQSSLRSIM-----
Platyfish Kank2 -----SKVPELPIAVSSKQVRDLV-----SGLSTSVFVSNPAIVVAGSDQIGLVQTK-----
Coelacanth Kank2 ---SASPVPVNLQAPVPQRTPEPEVSTVGAAPKVEGAYLDQVFFVFKLFTSKTE-VPYILYKNPEAVEVTFPIQADHCTEVLHVVKKISLTTET-----
Anole lizard KANK2 ---QTLESKEPYASLRALAESEEVKMPVCATYHSSEVMETTFPVHAGSATPSSTFHCVKKISIACTEEDGN-----
Turtle KANK2 ---ETAFFPIHAAPHAAPIHGVKIKISIAAEPEGGEETGPG-----GGASPAKINPAQTGIGASTHGL-----
Tetradon Kank1b NTAHALIRDASMNVTLHTRNRHSNTSQAMTRTVSVGNLADQMKRT-----PESCRCASALKQIQQAQSKVTRDIGV-GFININDSF-----
Medaka Kank1b NTRQAFINDSSNTLLSTQDKHNTHTLRRTVSVGS-RVRDFMC---TTEYRS-VGVNNTSLHESIRDPETVIKTRDSGV-GFTSIYENF-----
Amazon molly Kank1b NTSQTFNSDSSNTLLSKHKHTNTHSHFTFRVSVGNG-VGGIIC---TTEYRT-VGVNNT-NLECYKLPDPTVNKATRDGCV-GLTNIYENF-----
Platyfish Kank1b TSQTFNSDSSNTLLSKHKHTNTHSHFTFRVTVSVGS-VGGIIC---TTEYRT-VGVNTANS-ECYKLPDPTVNKATRDGCV-GLTNIYDNF-----
Frog Kank4 -----GPEAQSHITSNIDTEQRLDNSDMNITEAMP-SCITVETEHLDAHISQSHNLNNEPSSVVCITEDQPTPDA-----
Zebrafish Kank1b TLQACVSEASTNTHTLRERHTNTANTVTRSLAIGDGKVCVRVA---AVQMRM-VGTTAY---LDGCTSAADVPNVKTCDIGV-GMANINENI-----
Tilapia Kank1b TLQACVSEASTNTHTLRERHTNTANTVTRSLAIGDGKVCVRVA---AVQMRM-VGTTAY---LDGCTSAADVPNVKTCDIGV-GMANINENI-----
Fugu Kank1b TLQACVSEASTNTHTLRERHTNTANTVTRSLAIGDGKVCVRVA---AVQMRM-VGTTAY---LDGCTSAADVPNVKTCDIGV-GMANINENI-----
Cavefish Kank1b TSQAHVSESSNTTNMPTREHRTNTASVVTRSLAIGDGKVNQDQSP---ALKVRS-IAVGTGTY-LKESTIAPSVKVMTRDTGV-GLANVINY-----
Spotted gar Kank4 -----TETPKDLRSSKNQTDVSTNEVHVSVKVLIT---EDKVS-AVVSTCDKAVEQAQVLTACNPTAQEDPPI-DCTHNKDGV-----
Coelacanth KANK4 -DDTTDSSMSSGADRCDDKAKEAVIVVTDKAVDIDQVLLKSSIKLSSEKETT-VVQDPIKSKSNVQSLINDNDESITFAQTEGSRVLEES-----
Frog Kank1 NTDTLCCIDSSNTALSTYSKQNTETVEMRSVAGDGKVKVENS-----LPKTRSIGVSTSDSDFESSTP-KTKDFGV-GHINIMDNF-----
Shark Kank1 NTEQVAHMESSNTNLASSCDKETAIAIEMRTVAVGDRVKDVPST---ALKTRS-VGVGT---TATSDIDLEKSSVKTKDSGI-GQININENY-----
Coelacanth KANK1 STETAILDSSNTVTSAFDKQNTIIVETRTVAVGDRVKDFST---SPKTRS-IGVGPM---ASVSIIEKPTAVKTKDCGV-GLISISENY-----
Mouse KANK1 NTEAATVESCNTNLLSTMDKQFSTQVEMRTVAIGEGRVDRINP---STKTRS-VGVGTV---LSGNSFDRPCAVKTKESGV-GQINIQDNY-----
Rat KANK1 NTEVTTLEVESCNTNLLSTLDKQFSTQNVEMRTVAIGEGRVDRINP---STKTRS-VGVGTV---LSGSSDFDKPCAUKTKESGV-GQINIHNDY-----
Dog KANK1 NTEVATLEVESCNTSVSTLDKQFSTQVEMRTVAIGEGRVKDINS---SAKMRS-VGVGTV---LSGSAGFDRPSAVKTKESGV-GQININDNY-----
Human KANK1 NTEATLIEESCNTCLSTLDKQFSTQVEMRTVAVGDRVKDINS---STKTRS-IGVGTL---LSGHSDFDRPSAVKTKESGV-GQININDNY-----
Anole lizard KANK1 NTEVATVDESSTNTFLSTYDQVEMRTVAVGDRVKDINA---AAKTRS-VGVGTLL---LSTSSFDRLSLKTKDCGV-GQININENY-----
Eagle KANK1 GTEMAALVDCEINTALSSCDKQNTESVETRSVAVGDRVKDIIHA---SAKTRS-VGVGTLL---LSSHPPGFEPKPSAVKTKDCGV-GQINIHENY-----
Chicken KANK1 NTEAPVAVDCGNTVPSSRDQQTSTVSVEMRTVAVGDRVKDIIHA---SAKMRS-VGVGTLL---LSSHPPGFELSVIKTKDCGV-GQININENY-----
Goose KANK1 STEVLVLADCSSTNTVPSGHDKQNTVSVEMRTVAVGDRVKDIIHA---SAKTRS-VGVGTLL---YSSHPGFEPKPSAIKTKDCGV-GQININENY-----
Turtle KANK1 NTESASLLDSSNTILNTYDKQNTVNVEMRTVAVGDRVKDINT---SAKTRS-VGVGTLL---LSSDSSFDKPSVIKTKDCGV-GQINIHENY-----
Aligator KANK1 STETVSLMDSSSTNTVWSAYDKQNTVSVEMRTVAVGDRVKDINA---SVKTRS-VGVGTLL---LSSYSSSEKPSVVKTKDCGI-GQININENY-----
Spotted gar Kank1 NTEAVFMDTCTNTTLTKDQKQNTVPTETRTVAVGDRVKVQVQ---TVKTRS-VGVGT---VRSESELEKPSVVKTKDCGV-GQAQIHENF-----

Herring Kank1 STEQIVLVDSCTDTQLCTIDKHTSTASTETRIVAVGDLGVLDVQA---TVKTRS-IAVGTAA--LGDTESERLSAAAKTKDSGV-GQASMHDF-----
 Zebrafish Kank1a NTDKLVLTDTSTNTQSCSKDKQVGTETPLETRTIAVGDGLVLDAPA---TLKTRS-VSVGTT---SSDDAFLDKLPSCKTKETGI-GHTSIHDF-----
 Cave fish Kank1a NTESVILIDSCTNTQSNKDKQSTVPLLETRTVAIGEGLVKDIQA---TVKTRS-IAVGT---TASEDTTEKCLASSKTKEKSGV-GHASVHDF-----
 Stickleback Kank1a NTERSVRTDSSTDTGLLTCEKHTNTVGTDRTRTVAAGEGLVRDAH---AARGRT-VAVGTT---ADAGSILGGPAAARTRECGV-GPVSVQDF-----
 Medaka Kank1a NTNTPALTDSSHTMHLSTCNRHNTNTPPETRTVAVGEGLVKDALDALS---GAKMRS-VAVGTI---TDAPAKPASAKTKECGV-GPLSVRDNF-----
 Fugu Kank1a NTKTAVLTDSTDMTFFITCDKQNTAALETRTVAAGEGLVKDVNS---SAKARS-VAVGTAA---DMESFLGKSSCAKTKESGV-GAVSIHDF-----
 Tetradon Kank1a NTKTAVLTDCTDMSFFITCDKHTNTAVTETRTVAAAGEGLVKDVTS---ATKMRS-IAVGTAA---SVDAFLGKSSCHTKNKECGV-GAVSIHDF-----
 Tilapia Kank1a NTKHVLSDSFTHMESVTSDDKQNTVETRTVAAAGEGLVKDVHS---TAKMRS-IAVGT---SDVLELLGKLSSTKTKECGV-GPVSVHDF-----
 Amazon molly Kank1a NTRTAEVTDSCDTDMERTSCDKQNTAPPETRTVAAAGEGLVKDAPT---TAKTRS-VAVGT---SDVGLSLSPKPNPRTKECGV-GPVSIGHDF-----
 Mouse KANK3 -----PRPTAGDEMAP-----
 Rat KANK3 -----PRPTAGDEMAP-----
 Dog KANK3 -----PTDGDRAVAP-----
 Human KANK3 -----PGSMDGDRAVAP-----
 Lamprey -----ATQAATPAAEGEIIAD-----PTDTIR-RGPSESASDDVFETEGQAAPPVAEEAEQRGTGHVNAHF-----
 Coelacanth KANK3 -----KGSQTDPEKLGEVCVSSSIQKVDVNSREKSVFFD-QDMVKEVEVEPGEKRVVSDWEVRTSGK-----
 Frog Kank3 -----EKSTQANLEKNTVEVQSSMSSTIIEAISMPERSDLILKSKCK---MILLAQDEVDVAKNNQDITKHVEKCDKTEESITVAGKVTALNLTTEG-----
 Turtle KANK3 -----EKDQADIEAGIDAAMEETDQGVAGDKSK---QTPNGA-GEQGNQVDVAESGVSAGTKTAMPQGGTGT-VEVEQGSRL-----
 Alligator KANK3 -----EKATQANKSQFRGGEHCACCSSRSTGSADKSTQRQKAGETGNQVNVTEPGAAGGSKAAGAPGEKGPSE-----
 Eagle KANK3 -----DKGSQTDVGGTVLAGEVEPGAGHPSPGPS-----ARGTGAMGGTCCQSPVPRAATPETTHSGR-----
 Chicken KANK3 -----PEAIGAAVGPAAALSAEVEDGSQEPAQD-----
 Goose KANK3 -----
 Spotted gar Kank3 -----QINRDTQTESRGEAREAIPTV-----STGSQWEKQDGPETGGEQKAPVAVLK-----
 Zebrafish Kank3 -----QSIQTDPEETSKEQPVLISTGV-----
 Cavefish Kank3 -----IGVGVSDSDFPVSKTDQ---SMQADS-VECSSEKTPVTRVSTGVQCENLLST-----
 Herring Kank3 -----QQSVQTDEEVEVKKEEVAKVET-----VSTGSQWESPEEEDDEEGEEEPQQVQKRGQVITIAEAV-----
 Stickleback Kank3 -----AEKQEGDQGEKTSANAKTASIMA-----
 Fugu Kank3 -----QQSTQTDAPIKTAACDPAVLVSTGSQWENLSEDNTEHKVLLKRLIIAEYKVSPEELVSTAEEKK-----
 Tetradon Kank3 -----
 Medaka Kank3 -----AIQTDAMTAPPEPAPVEQVSIQCQWENMTE-----KAEEOQLTKKRQLTINEYKV-----
 Tilapia Kank3 -----
 Amazon molly Kank3 -----EQGTQTDATPEPEPEPEQTPVER-----VSVGCQWENLRGENPEEKKVAVPKK-----RQLTIAEYK-----
 Platyfish Kank3 -----EQGTQTDATPEPEPEPAMERFSVGC-----QWENEKKTGEQEEERTSDTKT-----

2110 2120 2130 2140 2150 2160 2170 2180 2190 2200

Hydra -----CSKCIANEDKVFIDIDLKLQQPAL-----
 Trichoplax -----
 Aplasia TSSSTTSYSGYSSGGSNLASGLTSGQQISSSSLLSGLSSVRESTGGYQTSMSSSSYSSSSRGVGGGQQQISSSSLLSGLSGVSGGGFQQTSMSSSGYSSSS
 Snail -----IHSNNDISTTEPKSSLDGHNTKHSGSSKVEKIHINLMTNP-----YRTLENLSEVSALVDSQSDIEDSNVSV-----
 Fruitfly -----KRDVGGCDIVKPHISIIACA-----ANYCDSCKEAIQDLARG-----
 Hookworm -----
 C.elegance -----LTNEQKSNFQRGTAVSKSARYDRKRSVDDLDYIVDKKNATSP-----ATSSQEAPPTVPDASESPLTKVVLKKEVFI-----
 Tunicate -----LTDKVDEATSTDDLKQKHSSTQ-----IDDYVDKVOQLLEEQQSL-----
 Spider -----DKGSVHQKENAAVGFDFVNDLSCEQC-----QNNSIQRNEMQS-----
 Lingula -----FISKRGSGDKTGTSGGGGGRRSSSRVEKVISSSGLPLESSAGGGFTKRTEYNVTSSGHVGSRRIGAGGGGGSGGYTRKTERIISSTSS-----
 Lancelet -----CDKCSNLKTRSIGCTTLANWNQKSVSVLAKVEQTDAGTGDDS-----VLEETVDSGKQDQETKIDIGVEDSIFPLEEVKPPV-----
 Medaka Kank4b -----AAVLHHIRRIKNNLLDQQWEC-----
 Amazon molly Kank4b -----RHIKRIKSLLDQQWEC-----
 Platyfish Kank4b -----RHIKRIKSLLDQQWEC-----
 Stickleback Kank4b -----
 Fugu Kank4b -----HHIRKLKRLLDQQWEC-----
 Tetraon Kank4b -----
 Cave fish Kank4b -----MEHHVKRVKELHEQWEC-----
 Medaka Kank4a -----SSDSPSPALGQVVTRLTGLLGEQWAO-----
 Fugu Kank4a -----SEAQASRRDSGDGQTPRRSGESPT-----SPAALGQVVTRLTGLLGEQWAO-----
 Tetradon Kank4a -----SLSHNEDVAEKLGEPGSGESPTSPA-----ALGQVVTRLTGLLGEQWAO-----
 Stickleback Kank4a -----QGSRRSSAETQAPQKMPGETQSGSGESPTSPA-----ALGQVVTRLTGLLGEQWAO-----

Tilapia Kank4a -----GSSEAQGSRRDPGEAQPPRRGSSESPT-----SPAALGQVVTRITGLLGEQWAH
Platyfish Kank4a TKTRQIRHGSGDAQSHSLSRRSSTEAPSSQKDARETQSLRRGSSEAQRGSSSEAKALRRESGESQTARRGSGESPTSPAALGQVVTRITGLLGEQWAQ
Amazon Molly Kank4a TKTRQIRHGSGDTQSHSLSRRSSTEAPSSQKDARETQSLRRGSSEAHRGSSSEAKALRRESGESQTARRGSGESPTSPAALGQVVTRITGLLGEQWAQ
Herring Kank4 -----PAANVVTRIQLLNEQWSSLGSGSPEPSQSAPPTPPPPKFFSSIQKGEGSSSSSLTAVRYRHKGSGSGSASSPAANVVTRIQLLNEQWSS
Zebrafish Kank4 -----EGSSGLTQQEPKETQGDPPHQSQRASE-----ATASPAAIQVVNRIQGLFNEQWAS
Cave fish Kank4a -----VVIETSTGDTSTGESQQGDQKQEQQDTQPQPQTQPQ-----RSTETATSPAAIQVVNRIQGLLNEQWAS
Mouse KANK4 -----STRESAPVIREEATSELPGAERPGRPASSPQ-----DATIGQYVKKIQELLHEQWNC
Rat KANK4 -----APVIREEASSQLPGAERPGRPASSPQ-----DATIGQYVKKIQELLHEQWNC
Dog KANK4 -----SSDRKTPPAGREEASSEPLGKERPCRPSSFP-----DATIGQYVKKIQELLQEQWSC
Human KANK4 -----TPPAGREETSSNLPCKEHPGRPPSSPT-----DATIGQYVKKIQELLQEQWNC
Eagle KANK4 -----EEEGPPDHEDLPAVDPIGQYVKKIQELLQEQWLC
Chicken KANK4 -----GEEGLDPKDFPA-----VDPIGQYVKKIQELLQEQWMC
Goose KANK4 -----GFDEDKTEDGMEDDGHDPHKDFPA-----VDPIGQYVKKIQELLQEQWMC
Anole lizard KANK4 -----EGNNSEPKKVTDP-----SVSQYVKKIQDILLQEQWMC
Turtle KANK4 -----PGGNKPVFAGDVKQDLIEENHTEQDSSA-----DDPIGQYVKKIQELLQEQWMC
Aligator KANK4 -----DLKKGPAEDVKQVLMEEERHTDQDSSD-----ADPISQYVKKIQELLQEQWMC
Frog Kank2 -----
Mouse KANK2 -----
Rat KANK2 -----
Dog KANK2 -----
Human KANK2 -----
Aligator KANK2 -----
Spotted gar Kank2 -----RLDDLFLKYVNDIEKNTIKKVPHPIC-----SKEVREVLQKSEVS
Cave fish Kank2 -----LLRFLMFLHKLINCSFAYVNFCDLHYRYESTTTTESSSESSEAES-----DVSEYHEATEKLPDSTAAE
Herring Kank2 -----SGARPPHPEATGPPATAAAQEPFPEPPQQLS-----TAQPTANEPFPVQSTSQSFPVTDASLQQTVS
Zebrafish Kank2 -----RSIMKRKADGEPGSPYTKKNLQFLGVNGGYESTSSSESSE-----SSEDESASEYHEATEKLPESATPQ
Tetradon Kank2 -----
Fugu Kank2 -----
Medaka Kank2 -----
Stickleback Kank2 -----
Tilapia Kank2 -----
Amazon molly Kank2 -----KRKAEGEPGSPSTKKNLQFIGVNGGYESTSSDSSSE-----SSDDGSDSSEYHEAREKLPSTNQL
Platyfish Kank2 -----
Coelacanth KANK2 -----YEDKLGVDPAVLV
Anole lizard KANK2 -----GNEDLTESQRLI
Turtle KANK2 -----WRQVIRMGWVL
Tetradon Kank1b -----LVGLKTRNMASGSPSHLADPIRMRSVGVGGRIRDVGLSSHP-----ADKLQPRWDPELNHYIGKMHKLLGQEDCV
Medaka Kank1b -----LVGLKTRNMASGSPSHLDPVKTKSVGVDGRVQEFVTSSSTS-----GHTTQCQRGHELNHYIDKLHRLLEHGDIL
Amazon molly Kank1b -----LVGLKTRNMASGSPSHIPDPKTRSIGVGDGRIRDFSMSSCAP-----KPKFQQPSQFQWDHELNHYIEKMHRLKDHGDIL
Platyfish Kank1b -----LVGLKTRNMASGSPSHIPDPKTRSIGVGDGRIRDFTSSCAP-----KPKSQQFSQFQWDHELNHYIEKMHRLKENGDL
Frog Kank4 -----LVGLKTRNMASGSPSHIPDPKTRSIGVGDGRIRDVNGHIQ-----VLAHPLQPHLCAESEPGLDHYIDRMQKLLKEQQCL
Zebrafish Kank1b -----LIGLHTRNIACGPSRLPDPVKTRSIGVEVGDGRIRDPEGQMF-----VQNEPGLDHYIDRMQKLLKEQQDL
Tilapia Kank1b -----LIGLHTRNIACGPSRLPDPVKTRSIGVEVGDGRIRDPEGQMF-----VQNEPGLDHYIDRMQKLLKEQQDL
Fugu Kank1b -----LIGLHTRNIACGPSRLPDPVKTRSIGVEVGDGRIRDPEGQMF-----VQNEPGLDHYIDRMQKLLKEQQDL
Cavefish Kank1b -----LVGLKTRNIACGPSRLPDPKTRSIGVEVGDGRIRDVNGHIQ-----VLAHPLQPHLCAESEPGLDHYIDRMQKLLKEQQCL
Spotted gar Kank4 -----GCVAEQMQEWQKEGTDESGSKALHQEQETDESTS-----SQAALGHYVTRIQELLHEQWAC
Coelacanth KANK4 -----GQSEQSECDSMNVNTRKAFQDGLGNKEQVKDETQ-----QYPAIVGQYVVKIQLVLLQEQWAC
Frog Kank1 -----LIGMKSRSIACGPSE-ALPLGPDTRSIAGVDEPFQEQECIPL-----INKEPTPTPAVIDQYIEQVQKLLQEQQML
Shark Kank1 -----LVGLKTRHICGTVSPTL-ANGNTRKSVGVGDEPAQVAEGGQP-----AVQDPAPQLHHYIELVQKLLQEQQTL
Coelacanth KANK1 -----LIGLKTRNIACGPTNLPN-MPANTRSVGVGDKLISVASQEAQ-----SEATVGDVHYIERVQKLLQEQQML
Mouse KANK1 -----LVGLKTRTIACGPPQLTVGLMGSRRSVGVGNEPVGDLLEDPL-----QPQVPSGMMTGLDHYIERVQKLLQEQQTL
Rat KANK1 -----LVGLKTRTIACGPPQLTVGLMGSRRSVGVGNEPVGDLLEDPL-----QPQVPSGMMTGLDHYIERVQKLLQEQQTL
Dog KANK1 -----LVGLKTRTIACGPPQLTVGLMGSRRSVGVGDEPVGDFMESFP-----LQAPPMMTGLDHYIERVQKLLQEQQML
Human KANK1 -----LVGLKTRTIACGPPQLTVGLMGSRRSVGVGDDPVGESLENPQ-----PQAPLMMTGLDHYIERIQKLLQEQQTL
Anole lizard KANK1 -----LVGLKTRNIACGPPVSV-APSSSTRSIGVDESVESENFVL-----DCPLPLPEMKTGLDHYIERVQKLLQEQQML
Eagle KANK1 -----LVGLKTRSIACGPPPLPV-VPAGTRSIGVGGESVCEPVSGLL-----ESPLPPPELRTGLDHYIERVQKLLQEQQML
Chicken KANK1 -----LVGLKTRSIACGPPPLV-VPTSTRSIGVGGDPVCEVSSLL-----ESPLPPPELRTGLDHYIERVQKLLQEQQML

Goose KANK1 -----LVGLKMRSIACGPPPLVV-VPTGTRSIGVGGEPVCEVSVSGLL-----ENPLPPELRTGLDHYIERVQKLLQEQQML
Turtle KANK1 -----LVGLKMRNIACGPPPLSV-VSASTRSIGVDEPVYEPVSIIV-----ESPLPPEMRTGLDHYIERVQKLLQEQQML
Aligator KANK1 -----LVGLKMRNIACGPPPPSV-VPASTRSVGVGDEPVYQSVSALV-----ESSLPPEMRTGLDHYIERVQKLLQEQQML
Spotted gar Kank1 -----LVGLKTRTISCGPSH-QITDSAKTRSIGVDESISEAGQIQQ-----SOLGTAAAGLDHYIEQVQKLLQEQQML
Herring Kank1 -----LVGLKTRTIA CGPSLPQLPNLSQVGE SPAPT LIQV PPLACPL -----PDQPATGAGLDHYIERVQKLLQEQQML
Zebrafish Kank1a -----LVGQKTRNIACGPSQSPPTHVKSNEE SVLTEGPNQSQAGA -----GVGLDHYIERVQKLLQEQQML
Cave fish Kank1a -----LVGLKTRNIACGPSQPCNQASEKSTTVERMVTPEKSLQLQAS -----ACCGVSLDHYIEKVQKLLQEQQML
Stickleback Kank1a -----LVGLKTRNIACGPSQPSGSEGAVRVE-----DHYIERVQKLLQEQQML
Medaka Kank1a -----LIGLKTRSIACGPASSVELSQEAAAPLAA-----AVGLDHYIERVQKLLQEQQML
Fugu Kank1a -----LVGRNTRNIACGPSQAGSPTSKEATEVKASPAPAQAQECFG-----LDHYIGRVQKLLQEQQML
Tetradon Kank1a -----LVGRNTRNIACGPSQPNGLTSKETTEVKASPAPAQAQE-----GAGLDHYIERVQKLLQEQQML
Tilapia Kank1a -----LVGLKTRNIACGPSQPAESVASIGTQETA EVK PALAAVHADP -----ATLQAHGGVSLDHYIERVQKLLQEQQML
Amazon molly Kank1a -----LIGLKTRNIACGPSQPRDAAPSKEKTEAAAAAP-----PPGGVGLDHYIERVQKLLQEQQML

Mouse KANK3 -----
Rat KANK3 -----
Dog KANK3 -----
Human KANK3 -----
Lamprey -----
Coelacanth KANK3 -----TVEVITVHKRIT
Frog Kank3 -----GDEHCL
Turtle KANK3 -----
Aligator KANK3 -----
Eagle KANK3 -----
Chicken KANK3 -----
Goose KANK3 -----
Spotted gar Kank3 -----
Zebrafish Kank3 -----QWEC
Cavefish Kank3 -----
Herring Kank3 -----MGSGAGR RV
Stickleback Kank3 -----
Fugu Kank3 -----
Tetradon Kank3 -----
Medaka Kank3 -----
Tilapia Kank3 -----
Amazon molly Kank3 -----
Platyfish Kank3 -----

2210 2220 2230 2240 2250 2260 2270 2280 2290 2300

Hydra CHYCG-----NKVDLNDTNLDES-
Trichoplax -----
Aplasia GGVSGGVSGGVSGGVSGGVGGGQQQISSSSSSVVSGGDVSTRVEKSYSTVVTN PYRTVENLAAASSLVSGDSL DGGSSSSSSSSSR LMSKT SSE
Snail ISKTSSD-----GNLYSERTSLNET-
Fruitfly FSKAS-----PTATRTGGAVRRS-
Hookworm -----PRPKISKYALPAE-
C.elegance EPPKQ-----MLPDPPIPARIPRF-
Tunicate LAENY-----EGFNDVIN-----KEEKTEKKVSRF-
Spider VGINT-----TIDSSSHLNVSSG-
Lingula GSGGVSSSTVSSSSGGGSGMAGSGRSSEER-----TVTSTVHHDLP SN
Lancelet LIQEE-----KTVNVVSFATAAR-----PPELIVESSSSDE-
Medaka Kank4b VCAEG-----KPGDKGRAL-----KHLDPKVNSLQEE-
Amazon molly Kank4b LCGEF-----GEKCKPP-----KHPDSKVNLSLQEE-
Platyfish Kank4b VCGQF-----GEKCKPL-----KHPDPKVNLSLQEE-
Stickleback Kank4b -----QPPGEQ-
Fugu Kank4b LCANI-----PSGNPKVRS LQEE-
Tetraon Kank4b -----
Cave fish Kank4b LCR-----

Medaka Kank4a LKPAG-----KPGPSKMSSIQSQ
 Fugu Kank4a LGSSS-----GAQQTAG-----QQGPSKMSSIQSQ
 Tetradon Kank4a LGSSS-----GAQQPASQ-----Q-----ESFASKMSSIQSQ
 Stickleback Kank4a LGSST-----TAGKAAG-----KPGPSKMSSIQSQ
 Tilapia Kank4a LGSSS-----GAQQTAS-----QQGTSKMSSIQSQ
 Platyfish Kank4a LGSSSGAQQTAGQQESP IAPKQTATKRAEAGK-----GTPAKPAGKGAPAAATTGKAAG-----KSSASKMSSIQSQ
 Amazon Molly Kank4a LGSSSGAQQTVGQQESP IAPKQTATKRAEAGK-----GTPAKPAGKGAPAAATTGKAAG-----KSSASKMSSIQSQ
 Herring Kank4 LGSGS-----PEPSQSAPPK-----PPQPSKFSSIQSQ
 Zebrafish Kank4 LGSGG-----QDAKGESSQ-----KPHSSKISSIQSH
 Cave fish Kank4a LGSGS-----QEGKGESSQ-----KQPVSKISSIQSH
 Mouse KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Rat KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Dog KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Human KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Eagle KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Chicken KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Goose KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Anole lizard KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Turtle KANK4 LEHGY-----PELASAI-----KHPASKLSSIQNQ
 Aligator KANK4 LEHGY-----PELASAI-----KQPASKLSSIQNQ
 Frog Kank2 -----PATEGNTGGILAQ-----
 Mouse KANK2 -----PVPAAQDTTDKKP-----
 Rat KANK2 -----TRPVASQDSQAAE-----
 Dog KANK2 -----GEPTRQAASCQSQ-----
 Human KANK2 -----REPTRQAASQESE-----
 Aligator KANK2 -----ERDGPDLLEMA-----
 Spotted gar Kank2 SSVFV-----CSPAVVME TVSAT-----
 Cave fish Kank2 QPETS-----STSVPSVPSVTE-----
 Herring Kank2 LS-----PATAVATGHCATQ-----
 Zebrafish Kank2 SLVSSCI-----PQLASETPATQTA-----
 Tetradon Kank2 -----EPPQAFPPFRSE-----
 Fugu Kank2 -----ARAASSP-----
 Medaka Kank2 -----SKPGSLSFLASSP-----
 Sticklebacc Kank2 -----GTSGNQMGLLHAK-----
 Tilapia Kank2 -----QSQEGLPKTASSP-----
 Amazon molly Kank2 QRVTVNKT-----SQPQEESTSVPQQ-----
 Platyfish Kank2 -----ESPEIFSKSASSP-----
 Coelacanth KANK2 PAVSS-----SEEVSEVLQ-----KPSQMIVLSASSA
 Anole lizard KANK2 VRA-----EHPSSHPLQTEQV-----
 Turtle KANK2 -----GQFRGFRNGGPF-----
 Tetradon Kank1b QEKVYYFLVQKCH-----SPPQCS PDSSDCD-----
 Medaka Kank1b LTGVG-----VGNSTSKTVQSGNTMSEEG-----KEKHKRFCSEPTF
 Amazon molly Kank1b LTGDQSD-----HYPSSKPLSNIKS-----
 Platyfish Kank1b LTGDQSD-----HYPSSKPLSNFKS-----
 Frog Kank4 LEHGY-----PDLANAI-----RQPASKLSSIQGGQ
 Zebrafish Kank1b LTDSH-----
 Tilapia Kank1b LTDSH-----
 Fugu Kank1b LTDSH-----
 Cavefish Kank1b LTDGHF-----EAREEQEVTIQIQ
 Spotted gar Kank4 LENGH-----PELASTL-----RQPASKISSIQNQ
 Coelacanth KANK4 LEHGY-----PELANAL-----KQPASKISSIQNQ
 Frog Kank1 LAENY-----TELAETF-----GEPYSQIGT LNSQ
 Shark Kank1 LAENY-----TELADAF-----GEPGSHIGSLNCQ
 Coelacanth KANK1 LAQNY-----SELADAF-----GQPNSQIGSLNCQ
 Mouse KANK1 LAENY-----SELAEAF-----GEPHSQIGSLNSQ
 Rat KANK1 LAENY-----SELAEAF-----GEPHSQIGSLNSQ
 Dog KANK1 LAENY-----SELAEAF-----GEPHSQIGSLNSQ

Human KANK1	LAENY-----SELAEAF-----GEPHSQMGSLNSQ-
Anole lizard KANK1	LAENY-----AELADAF-----GEPHSQIGSLNSQ-
Eagle KANK1	LAENY-----SELAEAF-----GEPHSQIGSLNSQ-
Chicken KANK1	LAENY-----SELAEAF-----GEPHSQIGSLNSQ-
Goose KANK1	LAENY-----SELAEAF-----GEPHSQIGSLNSQ-
Turtle KANK1	LAENY-----SELAEAF-----GEPHSQIGSLNSQ-
Aligator KANK1	LAENY-----SELAEAF-----GEPHSQIGSLNSQ-
Spotted gar Kank1	LAENY-----SELADAF-----GQPHSQIGSLNSQ-
Herring Kank1	LAENY-----SELADAF-----GQPHTQFGSINSE-
Zebrafish Kank1a	LAQNY-----SELADAFG-----PPQSQFSSINSE-
Cave fish Kank1a	LAENY-----SELADAFG-----PPQSQFSNINSE-
Stickleback Kank1a	LAENY-----SELADAF-----GQPQSQFGSINCQ-
Medaka Kank1a	LAENY-----SELADAF-----GQPQSQIGSLNSQ-
Fugu Kank1a	LAENY-----SELADAF-----GQPQSQFGSINSQ-
Tetradon Kank1a	LAENY-----SELADAF-----GQPQSQFGSINSQ-
Tilapia Kank1a	LAENY-----TELAEAF-----GQPQSQFGVINSQ-
Amazon molly Kank1a	LAENY-----SELADAF-----GQPQSQFGSINSQ-
Mouse KANK3	-----
Rat KANK3	-----
Dog KANK3	-----
Human KANK3	-----
Lamprey	-----
Coelacanth KANK3	M-----RSPSSDVTENHCL-
Frog Kank3	IIQNS-----GEQPEDNDTQKGS-
Turtle KANK3	-----IPQDSRRGVHECA-
Aligator KANK3	-----KKQSPCLSLKDSK-
Eagle KANK3	-----DPSAAQDAGAAPP-
Chicken KANK3	-----GRAAPSPA-----
Goose KANK3	-----ASPA-----
Spotted gar Kank3	-----
Zebrafish Kank3	LDDTE-----PQDSEEQTTSAET-
Cavefish Kank3	-----DPQDNQEQSISAEQ-
Herring Kank3	-----GEDVVAAFPATPSP-
Stickleback Kank3	-----
Fugu Kank3	-----EDVAATTTACSAR-
Tetradon Kank3	-----KHASAQSGAEVAA-
Medaka Kank3	-----SAEEEEIVGVVKNK-
Tilapia Kank3	-----
Amazon molly Kank3	-----VSPPEEIVVAEEEE-
Platyfish Kank3	-----
	2310 2320 2330 2340 2350 2360 2370 2380 2390 2400

Hydra	-----
Trichoplax	-----
Aplasia	GNLYKENKKNMSRSEA-VQSMETIYDMRRAGSVEDFMPDDIRKYMSIDPSTSKDSGFGEDLLQRFSEKSSSSSTSSSSAAPPSSDKARSMKSMKVSKTVTT
Snail	-----KSVDTFDMRRAGSVEDFMPDDIKKYMSIETSLTKDSGFEDLQSRFSGNLVSSSEGLSSGGASRSVKLSKTIITTTSTSKSG
Fruitfly	-----TSADSRIPRPKHLSSPSPVRKEFMRQNTYTLATPSPPTPSPQVERKARLSSLOEKPPS-----
Hookworm	-----SAETPDEEEEAADR-----
C.elegance	-----KISKWAVTSEEEAAETPDEQEEAQR-----
Tunicate	-----INPAF-AQKDNLVVEEKLKEQTSAAISASFHYMQSTPETDESSEEDDEEDGYIPLHEPSIVD-----
Spider	-----IHCIDKCSATHSVAKDLATNTVDSK-----
Lingula	-----RKSR-TEKRVTVSSTGHSGGTSRMGGGDGRTFKTKIVISPTGEMSEDMGFQSQVSNAEQLMSDFHGRIMGSAMQGMTSGTGDDRNV
Lancelet	-----V-----EDEDMMIPPLQQAASIKTTEPQVAE-----VQPVRHIVRETVVRETVVTVTPQDGYEELDGEVVKHKEEEKESELEAVDGF
Medaka Kank4b	-----M-----MELVDILLSHYQQNGDASKSTIKTDTCQK-----
Amazon molly Kank4b	-----M-MELVDVLMGSHKHPEDSDGQKIQRASKSALESDDGSGTQT-----
Platyfish Kank4b	-----M-MELVDVLMGSHKHEDSDGQKIQRASKSTLESDDGSGTQT-----


```

Stickleback Kank4b -----
Fugu Kank4b      -----M-MGLVDIITSYYTQHS DGEEPQLR-----
Tetraon Kank4b -----
Cave fish Kank4b -----
Medaka Kank4a   -----LVSSLSVLSAFYSPSQKGA AASKHPWTPSSTCFPPRVPLPAISS-----
Fugu Kank4a     -----L-VSSLSVLSAFYSPGQKAAGAGKNPP-----FSLLSRSLRLLPLSSD-----
Tetradon Kank4a -----L-VSSLSVLSAFYSPGQKATSASKHPPFSLSSLSLHLPSSD-----
Stickleback Kank4a -----L-VSSLSVLSAFYSPGQKAAAASKQRD-----QGRNTTPPPSPPSLFLFI-----
Tilapia Kank4a  -----L-VSSLSVLSAFYSPSQKAAAASKQEQASPLPLALSSS-----
Platyfish Kank4a -----L-VSSLSVLSAFYSPGQKTAATSKQQ-----
Amazon Molly Kank4a -----L-VSSLSVLSAFYSPGQKAAATSKQQ-----
Herring Kank4   -----L-VSSLSVLSAFYSPGQKKA AAAASR-----
Zebrafish Kank4 -----L-RGSLSALS AFYSPVQKGAAR-----
Cave fish Kank4a -----L-RGSLSALS AFYSPVQKGAAK-----
Mouse KANK4     -----L-LSSLNLLL SAYSQAPEPEPKETPAPPPSTPPPPPPPEISP-----
Rat KANK4       -----L-LSSLNLLL SAYSQAPEPEKSEVPPSSTPPPPPEISP-----
Dog KANK4       -----L-LSSLNLLL SAYS SAHAPPQKGP PAPSASPPMEISP-----
Human KANK4     -----L-LSSLNLLL SAYSQAHPPEKPPASSSSPPVEISP-----
Eagle KANK4     -----L-VNSLN SLLSAYSTQGPADKENSNT H-----YQOLEISP-----
Chicken KANK4   -----L-VNSLN SLLSAYSSQRPADKENSNT HYQOLETSS-----
Goose KANK4     -----L-VNSLN SLLSAYSTQRPADKENSNT HYQOLEISP-----
Anole lizard KANK4 -----L-VNSLNLLL SAYSTQPTDKENSNTQYQOLEISP-----
Turtle KANK4    -----I-VNSLNLLL SAYSTQAPSDKENSNTQYQOLEISP-----
Aligator KANK4  -----L-VNSLNLLL SAYSTQASPDKENSNAQYQQLDLS P-----
Frog Kank2      -----TATWSQMNVS GAAAGREGDG-----
Mouse KANK2     -----TRPAAA SQDSQAADG-----
Rat KANK2       -----GAGGA-----
Dog KANK2       -----EVGGAGEP-----
Human KANK2     -----EAGGTAPPLSSPPGGP-----
Aligator KANK2 -----LPRVLVLA PAHGHAHG AHKISIIETGAA-----
Spotted gar Kank2 -----QLV-SNQLAPL CQRLKEGDMTQOTPHETAPAQEDNSSQPASP-----
Cave fish Kank2 -----TI-APQHRTVPTPQSLSQSPASDSTDTQHCAAGQSSPTATPPQDR-----
Herring Kank2   -----I-VATASV PPLASGSSSGQGDAS PQQTASHGLVFDTORPAVQP-----
Zebrafish Kank2 -----QHSTAQIPTNHTPAAQTTSQSHTTDATTQHV TQSPA AEADVQHCVS QSSVTTTPPP-----
Tetradon Kank2 -----LDPCSSPASSP-----
Fugu Kank2      -----
Medaka Kank2    -----
Sticklebacc Kank2 -----EDETSVQTRPEAVQSQEGPATASSP-----
Tilapia Kank2  -----
Amazon molly Kank2 -----T-AIKMPAITHLQDTKLPENAHQSPA-----
Platyfish Kank2 -----
Coelacanth KANK2 -----PVAVEMGGTVLSASAQQEGPPSPEANTCSSSVASEQGSALSTRDAPQPASP-----
Anole lizard KANK2 -----ARCLSQEPDLNVQTEGEDQASF-----
Turtle KANK2   -----VSDPGLSARLPAASA-----
Tetradon Kank1b -----INLETLAARDSEVKRMITQKLEQQTSSVLQGEYVACTCAFALLVLNLT ELRKWLPPAWVQQSEGFHLQCLNKMWCRAPTRFADKPAK-----
Medaka Kank1b  -----LIRSE-SCHLD FVAAKLEMLPTPQPLDEDCCQSTTNEAEMCHRNSNEVKRMIQLLEQQASSAALQDKP-----
Amazon molly Kank1b -----MTEGEAVIHRFTSHPTDLLSPSQPLNVSKHSEISQDDRSAS-----
Platyfish Kank1b -----MTEGEAVIHRFTSHPTDLLSPSQPLNVSKHPEVVSQDGNASEVKKMIKMLEQQAASAVQDRSAN-----
Frog Kank4     -----L-VNSLNLLL SAYSQAAPAKGH SKMKNHRAEAVP-----
Zebrafish Kank1b -----
Tilapia Kank1b -----
Fugu Kank1b    -----
Cavefish Kank1b -----DHRDTQHGVFGYGSPSKNNISEHKMRHPTRSFNDSASD-----
Spotted gar KANK4 -----L-VSSLNVLSSMYSSQVHKEKTVSLNSGSKSTRCSP-----
Coelacanth KANK4 -----L-MSSLNVLSSVYSTQTSSEKNV GKSSPELVRS P-----
Frog Kank1     -----L-ISTLSSFNSVMKYGSSEELHSGFKRHS AE LDP SAGSNLDCFPESQFISQYANGNTQTINLNQLPEATQCEVQNVPKSAGKPS-----
Shark Kank1    -----L-INTLSSISSAMKYGST EIRSGDAVDLRPDSAEIDTGISCHEHSLSTKSTSLVTTTSQSAIATRVEQVTTVTTIESCETLLQQDN-----

```


Lancelet	ENKHALSPGSSPAISN-----LRPLRSLCKGKHS-TKK-----VNIKKEIQFVG---V--NGN-
Medaka Kank4b	SETLRSVFNERL-TAKGNLSDSDCKIQSLHARR-----SETLRSVFNERL-TAKGNLSDSDCKIQSLHARR-----
Amazon molly Kank4b	LKKLQSEEDANEGV-QMS--TKGSVVGQDNVVKLCGEASVV--PRG-
Platyfish Kank4b	LKKLQSV DANEGV-QMS--TKGSVIGQDNVKLCGEASVV--PRG-
Stickleback Kank4b	-----MERRSG-----
Fugu Kank4b	DGRARSSKRRHSG-----GDNDGKNAVGOYRG-----HQS-
Tetraon Kank4b	-----DGG-
Cave fish Kank4b	-----KESSEGRVLSSEHL-PPR---VCSIQEQLVTLVS---L--LSL-
Medaka Kank4a	-----AGRLKLSIMKKNGA-ADK--QGNKGAKKNLKFVG---V--NGG-
Fugu Kank4a	-----SPGLKLSIMKKEGA-ADK--QGNKRAKKNLKFVG---V--NGG-
Tetradon Kank4a	-----SPGLKLSIMKKGV-ADK--QGNKRAKKNLKFVG---V--NGG-
Stickleback Kank4a	-----HLCLKLSIMKKNV-ADK--QGNKGAKKNLKFVG---V--NGG-
Tilapia Kank4a	-----SLGLKLSIMKKNGA-AGK--QGNKGAKKNLKFVG---V--NGG-
Platyfish Kank4a	-----EQGLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Amazon Molly Kank4a	-----EQGLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Herring Kank4	-----QSGLKLSIMKKGDC-PQK--PGNGAAKKNLKFVG---V--NGG-
Zebradish Kank4	-----QSGLKLSIMKKNDC-PDK--QNGGAKKNLKFVG---V--NGG-
Cave fish Kank4a	-----QSGLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Mouse KANK4	-----STSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Rat KANK4	-----STSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Dog KANK4	-----STSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Human KANK4	-----STSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Eagle KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Chicken KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Goose KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Anole lizard KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Turtle KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Aligator KANK4	-----TTSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Frog Kank2	-----TDPTKEQDKGRN-----AQEDPQPKPAQFPR---L--NGE-
Mouse KANK2	-----AGRASLATKRKED-----PADPEVNRNLQFVG---V--NGG-
Rat KANK2	-----SLGVQSALKRKEV-----PADPDVHQRNLQFVG---I--NGG-
Dog KANK2	-----QGVRSIMKRKEE-----PADPAARRSLQFVG---V--NGG-
Human KANK2	-----PAGVRSIMKRKEE-----VADPTAHRSLQFVG---V--NGG-
Aligator KANK2	-----QAEARASARTIGE-----DPEPPGGSSYHLGG---I--NGG-
Spotted gar Kank2	-----QSSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Cave fish Kank2	-----VQPIPATDSTQHT-PPH--STATPPEPSSVQSAACTVL--EQT-
Herring Kank2	-----ASTSPPASEQTAP-QAK--PTDTSATQSDAQELT-----
Zebrafish Kank2	-----EGDVQCVFQGCNP-----PSTATSLEQNSVQLSSATQQSKATDSN
Tetradon Kank2	-----PPSLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGG-
Fugu Kank2	-----SSTLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGG-
Medaka Kank2	-----QSLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGG-
Stickleback Kank2	-----QSSLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGG-
Tilapia Kank2	-----QLSLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGGI
Amazon molly Kank2	-----TDSERKCAHSHTST-TNSTSTPPAKDSASFPVDQIADKHTV--TQE-
Platyfish Kank2	-----QSSLRSIMKRKAE-----GEPGSPSTTKKNLQFIG---V--NGG-
Coelacanth KANK2	-----ETSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Anole lizard KANK2	-----TAGIRSIMKRKEE-----HTEIVASKKSLHFVG---I--NGG-
Turtle KANK2	-----QGGVRSQTKRQEE-----APELVGKKSLLQFVG---I--NGG-
Tetradon Kank1b	-----SSLLPSEGKQKQK-----DQCCSSTRKNMCLLR---L--NPP-
Medaka Kank1b	-----TNMCKSVIKKPSG-----DQCSSNRKNMKFVE---A-ATGL-
Amazon molly Kank1b	-----AAKPWSAKKQGA-----AQCHSSNRKSMKFMK---V--SAG-
Platyfish Kank1b	-----ASKPWSAMKQGT-----DQCHSSNRKSMKFMK---V--SAG-
Frog Kank4	-----RSSLKLSIMKKNV-ADK--QSGKAKKNLKFVG---V--NGG-
Zebrafish Kank1b	-----TGSKPDLLQSQF-----
Tilapia Kank1b	-----TGSKPDLLQSQF-----
Fugu Kank1b	-----TGSKPDLLQSQF-----
Cavefish Kank1b	-----LSSPERSIIKQDI-SPR-----AECRRTVKCLA-----AG-

Spotted gar Kank4 -----PSALKSIMKKKDC-SVR--LGSSGAKKNLKQFVG---V--NGG-
 Coelacanth KANK4 -----TTMLKSIMKKKNC-----NPEDNGTKKNLQFVG---I--NGG-
 Frog Kank1 ACIPASPAEGETEFCVSASG-----QTTLKSIMKRKDE-----KKESTNTKKNLQFVG---I--NGG-
 Shark Kank1 LTPQTDSPSQPATSTICAVSPSS-----TGILKSIMKKKDS-PKK--HETNGTKKNLQFVG---V--NGG-
 Coelacanth KANK1 DSKTFSPVEDMTSQLNVIDQPMASLYVSSCS-----PGALKSIMKKKDG-----RQDSNGTKKNLQFVG---I--NGG-
 Mouse KANK1 LPPVNLTDQIATGLYVCPNN-----ENTLKSIMKKSDG-----NKDSNGAKKNLQFIG---I--NGG-
 Rat KANK1 PVLNLTDDQIATGLYVCPNN-----ENTLKSIMKKSDG-----NKDSNGAKKNLQFIG---V--NGG-
 Dog KANK1 LSPVNLTDQIAAGLYVCTNS-----ENTLKSIMKKKDG-----NRDSNGAKKNLQFVG---I--NGG-
 Human KANK1 LSPVNLTDQIAAGLYACTNN-----ESTLKSIMKKKDG-----NKDSNGAKKNLQFVG---I--NGG-
 Anole lizard KANK1 DKTMSPINLTDQQLASGLYVCTS-----DSMLKSIMKKKDG-----KKEENAKKNLQFVG---I--NGG-
 Eagle KANK1 KSFSSQDKTLTPINLTDQQLASGLYVCTNS-----ENTLKSIMKKRDG-----KKDMSNTKKNLQFVG---I--NGG-
 Chicken KANK1 KSFSSQDKTLAAILNLTDDQQLASGLYVCSNS-----ENTLKSIMKKRDG-----KKDLSNTKKNLQFVG---I--NGG-
 Goose KANK1 RKSFSPODKTLAAILNLTDDQQLASGLYVCSNN-----ENTLKSIMKKRDG-----KKDLSNTKKNLQFVG---I--NGG-
 Turtle KANK1 KSLSSQDNAIPPIINLTDQQLASGLYVCAANN-----ESTLKSIMKKRDG-----EKDLNGAKKNLQFVG---I--NGG-
 Aligator KANK1 RTSSSEDDAVPPLNLTDDQQLASGLYVCTNN-----ESTLKSIMKKRDG-----KKDSNGTKKNLQFVG---I--NGG-
 Spotted gar Kank1 DSTSSALRQSRTSQMTLMDQQMSALHGQSCS-----SNTLKSIMKKKDG-----RQGSNSTKKNLQFVG---V--NGG-
 Herring Kank1 STALHGS-----QNTLKSIMKKKDG-----RQGSNGTKKNLQFVG---V--NGG-
 Zebrafish Kank1a TALHGS-----HSTLKSIMKKDGH-----QHNGTKKNLQFVG---V--NGG-
 Cave fish Kank1a ALHGG-----QSTLKSIMKKKDG-----RQGTNGTKKNLQFVG---V--NGG-
 Stickleback Kank1a AAATTGGGGGRCLIP-----QSTLKSIMKKKDG-----RPDSNGTKKNLQFVG---V--NGG-
 Medaka Kank1a -----QSTLKSIMKKKDG-----RPE-SNGTKKNLQFVG---V--NGG-
 Fugu Kank1a QKSSMDLQMSALHGQSPSS-----QSALKSIMKKKDG-----KADANSTKKNLQFVG---V--NGG-
 Tetradon Kank1a LVLPEDELSRGTHILPSS-----QSTLKSIMKKKDG-----KPD-SNGTKKNLQFVG---V--NGG-
 Tilapia Kank1a -----QSTLKSIMKKKDG-----RAD-SNGTKKNLQFVG---V--NGG-
 Amazon molly Kank1a -----QNTLKSIMKKKDG-----RPDASGTTKKNLQFVG---V--NGG-
 Mouse KANK3 VGLKSIMKKKDG-IPG--AQSSQGPKSLQFVG---V-LNGE-
 Rat KANK3 AGILKSIMKKKDG-TPG--AQSSQGPKSLQFVG---V-LNGE-
 Dog KANK3 AGILKSIMKRRDG-TPG--AQSPGPKSLQFVG---V-LNGE-
 Human KANK3 AGILKSIMKRRDG--TPGAQPSSGPKSLQFVG---V-LNGE-
 Lamprey SPTLKSIMKKKDG-AGSAGGDPSSGTTKSLQFVG---V--NGG-
 Coelacanth KANK3 VGALKSIMKKDGT-S--NKETNRGKSLQFVG---V-LNGE-
 Frog Kank3 RGALKSIMKNDG-ASK--SQINREKKSLLQFVG---I-LNGE-
 Turtle KANK3 AGALKSIMKRRDG-FPK--SEAEGRKSLQFVG---V-LNGE-
 Aligator KANK3 TGSLSIMKRRDG-LPK--NEAEGRKSLQFVG---V-LNGE-
 Eagle KANK3 SGALKSIMKRRDG-PPR--SEADGSKSLQFVG---V-LNGE-
 Chicken KANK3 ARALKSIMKRRDG-PPR--SEAEGRKSLQFVG---V-LNGE-
 Goose KANK3 AGALKSIMKRRDG-APR--SEAEGRKSLQFVG---V-LNGE-
 Spotted gar Kank3 RSVLKSIMKRRDG-S--TQREPGSRKSLQFVG---V-LNGE-
 Zebrafish Kank3 AGPLKSIMKRRDG-SGA--GAASSSGKSLQFVG---I-LNGG-
 Cavefish Kank3 TGPLKSIMKRRDG-SGS--GVACSGGKSLKQFVG---I-LNGG-
 Herring Kank3 MGTLSIMKRRDG-SSS--SQTRNTGKSLQFVG---I-LNGG-
 Stickleback Kank3 AGMLKSIMKRRDG-----NNSGEKKSLLQFVG---I-LNGG-
 Fugu Kank3 TGIKLSIMKRRDG-SSS--DENRTSSKSLQFVG---I-LNGGA-
 Tetradon Kank3 AGVLKSIMKRRDG-SSA--EQSRTSSKSLQFVG---I-LNGG-
 Medaka Kank3 TGMKLSIMKRRDG-STS--SDSNSAGKSLQFVG---I-LNGG-
 Tilapia Kank3 TGLLKSIMKRRDG-NNA--GENRSSGKSLQFVG---I-LNGG-
 Amazon molly Kank3 TGMKLSIMKRRDG-----SNSSENRKSLLQFVG---I-LNGG-
 Platyfish Kank3 -----AGMLKSIMKRRDG-----SNSSENRKSLLQFVG---I-LNGG-

2510 2520 2530 2540 2550 2560 2570 2580 2590 2600

Hydra -----FYKSKD-----DLE-----SPEDDYRAIMSDDEDDANGRCKA
 Trichoplax -----YDIATS-----SGL-----EKEMCNDSVTIANLSDHKDNVQA
 Aplasia -----DSNLISSERDASALSGSFSSSSGGVGSMS-----YSETTISTVGSSSGSGSSSEQQ
 Snail HSNFFSSNGATENEMSSSTYSSS-----YSSRT-----DVSVEQDSDSYTQISTDSMTTSSGNYG
 Fruitfly -----EKRVSISWSRDAS-----PAPLMTSSGTTKSESPEQEPAMS
 Hookworm -----YKTGSE-----SDE-----DSDSEGSYDTHEDGVDHEES--

C.elegance	-----QEDVSD-----	-----SDAESDCSAHSDATFEVNDVDFD
Tunicate	-----AEGVKS-----DDS	-----SSEEDYSSSSDEEEEQSTSADETK
Spider	-----IHVTSS-----DDA	-----VVDSVVRNRFSDDLVTKRNELE
Lingula	REALNMYKNIQDNERESMSDGSGRVTSFQSSSTTTSSSHESPVKEGVTRIAVTHAPETTGVREVKSVVETDIDADITGETTTTSSSSSSSTASRQTS	
Lancelet	-G-----HDESSS-----DDS	-----SSEESSEDETDDEDSSSEESS
Medaka Kank4b	-----VDAAQT-----DAK	-----SVQQTGMAAKQQPEKVPVTPVERKD
Amazon molly Kank4b	-----MEATQV-----DVH	-----PAKRRVQTDKSKQTCPEGHATPV
Platyfish Kank4b	-----MEATQV-----DVH	-----PAKRRIQTDESKQTCPEGHATPV
Stickleback Kank4b	-----TTRG-----	-----
Fugu Kank4b	-----EERESSVGPGAMAA-----	-----AQVEANRSGEAAQQQIRSGGAGP
Tetraon Kank4b	-----	-----AKPKAEAEAPERTAKLKPHP
Cave fish Kank4b	-----YVSPAG-----ELQ	-----AQQPAQTSKLEDPIISVLHKSRVE
Medaka Kank4a	-----YETTSS-----EES	-----SGDEKSKVEVEEVPADKGDASAD
Fugu Kank4a	-----YESTSS-----EES	-----SGEEKPKAEVEEENSSEPEETE
Tetradon Kank4a	-----YESTSS-----EES	-----SGEDKPKAAVEDEDSSGAEK
Stickleback Kank4a	-----YESTSS-----EES	-----SGDEKSKVEVEEEKGSSSPEEKD
Tilapia Kank4a	-----YETTSS-----EES	-----SGDEKSNVEVEEEDSSEPEVEKE
Platyfish Kank4a	-----YETTSS-----EDS	-----SADEKSRAEVEEEDKSEVVVEKE
Amazon Molly Kank4a	-----YETTSS-----EDS	-----SGDEKSRVEVEEEDKSEVVVEKE
Herring Kank4	-----YESTSS-----EES	-----SGAENQEEQEQQEDSSEPEEDK
Zebradish Kank4	-----YESTSS-----EDS	-----SGEENQDAVEVESSEPEVEQGE
Cave fish Kank4a	-----YESTSS-----EES	-----SGEENEDEGKEEEEEVDSSPEE
Mouse KANK4	-----YETTSS-----EET	-----SGEDSSPEDLSDSETEKKQDCSE
Rat KANK4	-----YETTSS-----EDT	-----SGEDSSPEDLSDSETEKKQDCSE
Dog KANK4	-----YETTSS-----EET	-----SGEDSSPEDLSDSEAEKKCDGPE
Human KANK4	-----YETTSS-----EET	-----SGEDSTPEDLSDSEAEKKCDGPD
Eagle KANK4	-----YETTSS-----EDT	-----SCEDSPSDGDVESETERRAEDLE
Chicken KANK4	-----YETTSS-----EDT	-----SCEDSPSDGDMESDTERGAGGLE
Goose KANK4	-----YETTSS-----EDT	-----SCEDSPSEGDAESETERRAGGLE
Anole lizard KANK4	-----YETTSS-----EDS	-----SCEETSSEGNDSETERKCDNEE
Turtle KANK4	-----YETTSS-----EDT	-----SCEDSSSEGNDSSEMERKYDTLE
Aligator KANK4	-----YETTSS-----EDT	-----SCEDSSSEGNSDCETERKYESLA
Frog Kank2	-----MDSASS-----EDS	-----GTMENPDSSESTESEYHEASEALA
Mouse KANK2	-----YESPSE-----DSS	-----TAENSEHESTENEGPEPPARVLS
Rat KANK2	-----YESSSE-----DSS	-----TAENSEHESTENEAPPPVRLS
Dog KANK2	-----YESSSE-----DSS	-----TAENFSDNESTENEAPPEERVP
Human KANK2	-----YESSSE-----DSS	-----TAENISDNDSTENEAPPRERVP
Aligator KANK2	-----YESASS-----DSS	-----TAENSEAESTESEYHEASEGLPA
Spotted gar Kank2	-----YESTSS-----DSS	-----SESSDSSSESEYHEANERLPPTQ
Cave fish Kank2	-----LNQPKT-----TDS	-----SSQQVSHQSEAFSPPPQQPTAPP
Herring Kank2	-----TQTTSP-----TPQ	-----QQASQSKTTDLTPQQGASKSPAT
Zebrafish Kank2	VQPD-----LAQTDV-----SDF	-----AAQQTQTQTQFTSAKPQQEASQS
Tetradon Kank2	-----YESTSS-----DDS	-----SSQSSDEGSDSSEYHEPPATDCP
Fugu Kank2	-----YESTSS-----DDS	-----SSESSDEGSDSSEYHEAREKLPE
Medaka Kank2	-----YESSSS-----DES	-----SSESSDEGSDSSEYHEAREKLPA
Stickleback Kank2	-----YESTSS-----DDS	-----SSESSDEGSDSSEYHEAREKLPA
Tilapia Kank2	S-----YESTSS-----EDS	-----SSESSDEGSDSSEYHEAREKLPE
Amazon molly Kank2	-----ITSTSP-----	-----NSESAPIAIKSSSTCITKSAEVN
Platyfish Kank2	-----YESTSS-----DDS	-----SSESSDDGSDSSEYHEEITSTSP
Coelacanth KANK2	-----YESTSS-----DT	-----SSEDSSENESESEYHEANEGP
Anole lizard KANK2	-----YESTSS-----EDS	-----STAENVSDNESTESEYHEASEGL
Turtle KANK2	-----YESTSS-----GSS	-----TAENSSDNESTESEYHEASEGPP
Tetradon Kank1b	-----YKPYAV-----EKA	-----SSEEEKTERRRERSKVDLPRRP
Medaka Kank1b	-----	-----LVQEQQERGENETFGKFSPPQGHQ
Amazon molly Kank1b	-----LEPTSA-----YEH	-----EEREGRGSDTFRKVSQEGWQA
Platyfish Kank1b	-----LKPTSA-----F	-----EHEREGRGSDTFGKVSQDGWQA
Frog Kank4	-----YETTSS-----EDS	-----SSSEEF CGTGKNDVSDSCEA QAS

Zebrafish Kank1b	-----Y-----SDE-----	-----SEDSFSEGCADSEDEENRKRKME-----
Tilapia Kank1b	-----Y-----SDE-----	-----SDEDEENDDSEEREDGGVEAAQS-----
Fugu Kank1b	-----Y-----SDE-----	-----SDEDEENDDNSGCDVVEKCDSSV-----
Cavefish Kank1b	-----FERSV-----	-----SDEDEENDDNSGCDVVEKCDSSV-----
Spotted gar Kank4	-----YETTSS-----EES-----	-----SSDDSSSESDECEEEESFNEE-----
Coelacanth KANK4	-----YETTSS-----EDS-----	-----SSDESSSESDECELEFPDSCDDE-----
Frog Kank1	-----YETTSS-----DES-----	-----SSESSSSETDDECDGNGYNVEE-----
Shark Kank1	-----YETTSS-----DDS-----	-----SSDGSSSESDEECDTIGYPPEE-----
Coelacanth KANK1	-----YETTSS-----DDS-----	-----SSGGSSSESDEECDTNGYPPEE-----
Mouse KANK1	-----YETTSS-----DES-----	-----SSDESSSESDEECDVIEFPPEE-----
Rat KANK1	-----YETTSS-----DDS-----	-----SSDESSSESDEECDVIEYPLEE-----
Dog KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECVENEYQIE-----
Human KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Anole lizard KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Eagle KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Chicken KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Goose KANK1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Turtle KANK1	-----YETTSS-----DES-----	-----SSESSSSESDEECGHEYPHDR-----
Aligator KANK1	-----YETTSS-----DES-----	-----SSESSSSESDEECGHEYPHDR-----
Spotted gar Kank1	-----YETTSS-----DES-----	-----SSESSSSESDEECGHEYPHDR-----
Herring Kank1	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Zebrafish Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Cave fish Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Stickleback Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Medaka Kank1a	-----YETTSS-----DES-----	-----SSESSSSESDEECGHEYPHDR-----
Fugu Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Tetradon Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Tilapia Kank1a	-----YETTSS-----DDS-----	-----SSESSSSESDEECGHEYPHDR-----
Amazon molly Kank1a	-----YETTSS-----DES-----	-----SSESSSSESDEECGHEYPHDR-----
Mouse KANK3	-----YESSSS-----EDG-----	-----NSDDEDGVAEHPRSSSSGSDSS-----
Rat KANK3	-----YESSSS-----EDA-----	-----SNSDDEDVAELPRSSSSGSGDD-----
Dog KANK3	-----YESSSS-----EDD-----	-----SDSDSDGAAEPPRSSSSGDDSG-----
Human KANK3	-----YESSSS-----EDA-----	-----SDSDGDSSENGGAEPGSSSSGSGD-----
Lamprey	-----YETTSS-----EES-----	-----SSESSSSESDEEDDDDDDEEEE-----
Coelacanth KANK3	-----YETTSS-----EES-----	-----SENEENSSDKVSGDSSD TDVENF-----
Frog Kank3	-----YESTSS-----EES-----	-----SDNEGDSDDKVSSEDSSDSEALN-----
Turtle KANK3	-E-----YESTSS-----EEE-----	-----EEDSEDSSSEKISPTSSDSDAED-----
Aligator KANK3	-----YESTSS-----EEE-----	-----GGDSSSEKISPNSDSDAEGGTD-----
Eagle KANK3	-----YESTSS-----EEE-----	-----EEEEEGDSSSEKASADSSNSSEEQ-----
Chicken KANK3	-----YESTSS-----EEE-----	-----EEEEEEEEEGDSSSEKASADSSD-----
Goose KANK3	-----YESTSS-----EEE-----	-----EEDGDSSSEKASADSSDSEEGG-----
Spotted gar Kank3	-----YESTSS-----EEE-----	-----EDGEEEGTSSGGSGGGSDSSE-----
Zebrafish Kank3	-----YESTSS-----EEE-----	-----EEEESSSDGSEAGACDSSVVE-----
Cavefish Kank3	-----YESSSS-----EEE-----	-----EEEEDEEGEESADGACSDSS-----
Herring Kank3	-----YESTSS-----EEE-----	-----DEEEDGSSSDGSGAGESSSE-----
Stickleback Kank3	-----YESTSR-----	-----TSSGESGEGCLDSTEDEAALE-----
Fugu Kank3	SPR-----YESTSS-----EED-----	-----EEDGSSSDSESGEGCLDSTEDE-----
Tetradon Kank3	-----YESTSS-----	-----EKEEEEEDGSSSDSDESGEGCLDS-----
Medaka Kank3	-----YESTSS-----EEE-----	-----EEEEEDGSSSGESGEGCLDSTE-----
Tilapia Kank3	-----YESTSS-----EEE-----	-----EEEEEDGSSSGESVGECLDST-----
Amazon molly Kank3	-----YESTSS-----EEE-----	-----EEDDEEVGSSSGESGEGCLDS-----
Platyfish Kank3	-----YESTSS-----EEE-----	-----EEEEEEEEEDGSSSGESGEGCL-----

2610 2620 2630 2640 2650 2660 2670 2680 2690 2700

Hydra DV-----
Trichoplax PM-----DLPQDQIINGNSD-----S

Aplasia QQEQEMMSYGSILDRRTGQLKSIMKHTKAELEAASGKKGITFAESVTTGGTSSSSDDSDSTASFEEGSYDSHQGAVVYRCQDDEAIAQGLPGAQMFQ--N
Snail SLDRATGKLSIMKQSKSEAEERDKKTGIRFAESVTTGGTGS----SSEEDDDTSDSDSTTSFDEGSYDSQQGEVVYKCKDDEVIAQGRPGAQMFQ--N
Fruitfly SS-----SDSSPPIDVQIAQGARKKS-----STPLKSSQSEGSQV-----TVIEQPATKAQLHQLAQADSE
Hookworm -----
C.elegance AA-----
Tunicate EE-----LKEILMREIEKENDVKVKEEDMKNMVC-----DVGKEVVDQHKENS-----KKEEISLVAAMAKTVKTSVIEERIVGDGAEDE
Spider NK-----AKSADDTGSFS-----ECSENLPNFLNLPV-----P
Lingula STNGANGTIRSIMKSSYKSSKSSKKGISFSDDDVTGGYAS-----SSGEESEPESEDES-----FDEGSYDGRHMTITYTCKDDEKIADGAPGTGMFDQ--N
Lancelet DE-----GGYNC-----ELGKVIKKGKEDQKKD-----VKTISSEIICEDI-----KETDRL-----VSR--E
Medaka Kank4b GQ-----RDGGAVTAGADCKEK-----KPPRQQKEGNSGSG-----
Amazon molly Kank4b GA-----ISGQTDGGTVLLEAEGPEKQSKTLEDRTGT-----N
Platyfish Kank4b GA-----ISGQTDGGTVLLEAEGPENKSKTLEDRTGS-----N
Stickleback Kank4b -----
Fugu Kank4b QR-----TDGGAKEKADGPEKTAALKPSPREQMEGSSASG-----CP
Tetraon Kank4b RE-----QMEGSSASGCPSRG-----
Cave fish Kank4b SP-----MQVDARERSGDGSDAV-----EYSTQPAELPEES-----D
Medaka Kank4a QK-----EVERGLMDPEEGHELL-----EEEEGFLGGGKLRLL-----GRK
Fugu Kank4a KK-----TESQP-----VEKPVVEAEAQQKEE-----DVPAAEGGASGAEQ-----QSERGLMDPEVR-----H
Tetradon Kank4a RK-----AEPQPAEKPEKEAEAQQKEE-----DVPAAEGGASAAEQ-----RSDRGLL-----D
Stickleback Kank4a AE-----VSTEGGGAVAAET-----EGERGLLDIEGSQE-----LPEEKAE-----
Tilapia Kank4a PE-----KEPEKQPEEGAEAQ-----RKDAEVPAGEGSAV-----AQEKETERGLLDPESGQELLEE
Platyfish Kank4a TD-----KESEESVGIIVADAEVAAA-----APAPSAAAAEEEG-----AVGEDKEVERGLLDLEGGHELLQ
Amazon Molly Kank4a TD-----KESEESVGIIVADAEVAAA-----AAPAAAAAEEEG-----AVGEEKEVERGLLDLEGGHELLQ
Herring Kank4 DK-----EKEQGHEAGAEAQEEADSAGAQQEEEEEEAGGPEG-----ATEPRGAEAFM
Zebrafish Kank4 ED-----SGAAQEEAAAAGEQSEGVQAEGETEGSEEPDVCQAS-----MS
Cave fish Kank4a QG-----EEKENGAQEEEEDEKEAAATGEQADEAQAKGSECSEEPKPEA-----IID
Mouse KANK4 SR-----EDRDLHPSCEAGQGVV-----EGTRNSGHTSDRGE-----E
Rat KANK4 PR-----EDRDMHLSCEAGQGVV-----KGTGNSGHMSEPRK-----G
Dog KANK4 HR-----RGKEAHNTCKAGQ-----GIPEGISSTGQESG-----PGGD
Human KANK4 HK-----HVKDAHLTCEAGQGIP-----EGTCHAAQESGPE-----E
Eagle KANK4 PT-----QAEAGGESEGSSS-----GTSSQERREDGDLQ-----EPSAEAAPCAQ-----H
Chicken KANK4 PT-----QEQGGGSEGE-----ASFVTSVQETREDD-----D
Goose KANK4 PT-----QEEGGGESTGASS-----GTSSQERREDDDLQ-----EPVAEAT-----P
Anole lizard KANK4 HR-----WREDGDEGDENASGTSQCVKHEDTDGKLEETLRG-----S
Turtle KANK4 HR-----QVKAARENKHASS-----GVSECTRHEDNEPQ-----ELEEITM-----A
Aligator KANK4 HR-----QVRAAGDRDRASP-----GVSQCTRHKDEELQ-----EREEPPAM-----A
Frog Kank2 GA-----QAEHLHSLAAGNSDTPKEP-----EREQPAPTATIVSPP-----K
Mouse KANK2 PA-----ECPQLRPPGAAVATTSLEGP-----QLSQESQRPVPAPEV-----ASG
Rat KANK2 TA-----EGPQLRPLGPAVGKTSQDER-----QLSQESQRPVPAPEV-----APG
Dog KANK2 SV-----VEAPQLRPSGTAAAKTSQEEC-----QLPRESQHPVPAEA-----ASG
Human KANK2 SV-----AEAPQLRPAAGTAAAKTSRQEC-----QLSRESQH IPTAEG-----ASG
Aligator KANK2 GG-----AETPKATEEEA-----AAGAALSTTQGSND-----
Spotted gar Kank2 DA-----PRAHSEEAAPGPLQEAATATAFPPAPSEGAEEQDRSTT-----QE
Cave fish Kank2 ST-----TVPAHTGASQSQT-----DLTTQQEAIQSEAQ-----ISLQSSDMSVQQGAAPPPFDAHAAN
Herring Kank2 DS-----SSQQHTSQSTATTEPA-----TGNVCSASSANQES-----
Zebrafish Kank2 KT-----ADLTAQKGAHSTDGSARQDIAISSTTKPAADTAT-----P
Tetradon Kank2 PA-----AGGAPNPASTAAADVAKESQ-----ETTIRAEQKPAES-----S
Fugu Kank2 ST-----LQHQQQLTHNRLSDGTGVPQQAATQPSPHQPPAVDMG-----Q
Medaka Kank2 VK-----TSDATKQODTAQSEASAASSQODSKPAERVPNNS-----G
Stickleback Kank2 AA-----TRHQQTPEITTPRPTDRSETT-----VPGSRSEFTPPDAT-----A
Tilapia Kank2 ST-----VHQQTTHNKDSKQEHVLSLKSIVTPSSGTASSQNANQ-----Q
Amazon molly Kank2 PL-----SQTSTTSCQPESK-----AAPESVKHESSKPV-----
Platyfish Kank2 NT-----ESAPITIKSSICITKSAEVALSMTTSCQPESKAAPESV-----K
Coelacanth KANK2 PA-----GHAGQPAEQKQPQ-----EMETSDTNNNEKED-----SEGEKPTLVTAAGGESASSEEA
Anole lizard KANK2 PA-----AQAAIAEPAKPSGTAATHPRIATEEGGEIPTPAEGQ-----S
Turtle KANK2 AG-----QTETPRPPATAPQR-----VPAESDTATAGEPP-----R
Tetradon Kank1b KC-----ARDHKRSQSNVSQL-----SSCFHSESANFLSV-----T

Medaka Kank1b AT-----KGKEGF-----SKRLKDTTKLHKQQ-----
 Amazon molly Kank1b KK-----GKDGSNKSGKSLK-----L
 Platyfish Kank1b KK-----GKDGSNKSGKSLK-----LP
 Frog Kank4 SD-----DKIETVLMPSSEVK-----EIAQEDPEPMVPSQ-----Q
 Zebrafish Kank1b -----
 Tilapia Kank1b -----
 Fugu Kank1b -----
 Cavefish Kank1b KQ-----LEESSRSTSMRASKM-----E
 Spotted gar Kank4 TN-----TIWSHCGLNAFFPGD-----D
 Coelacanth KANK4 EN-----HLQAASNGSEAVSKTIQ-----GKRVPDTEPNELDV-----NATDGFQ-----Q
 Frog Kank1 SG-----ELYHGVASVIPGSPSN-----LEEKQLNEKEPEKV-----E
 Shark Kank1 FE-----GNSSEESSEGPVV-----RQPETEKGVSSESE-----ELDKEVDKV-----E
 Coelacanth KANK1 DG-----HVEQMAGELDGYSNKGILPVSVEEMKEKEAETG-----E
 Mouse KANK1 EE-----EEEEKDHDRGMAEGHHAVINLGGFKSARVEDEV-----QVPECEPEKE-----E
 Rat KANK1 EE-----EEEEEEEDHTRGMAEGRHAV-----NIEGFQSARVEDEV-----QVPECEPEKE-----E
 Dog KANK1 EE-----EEEEEEEDTRGVAEGQHAVNMEGFKSAGAEMEM-----QVPECEPEKV-----E
 Human KANK1 EE-----EEDEDTRGMAEGHHAVINLGGFKSARVEDEM-----QVQECEPEKV-----E
 Anole lizard KANK1 EN-----GSLLNAAEERHGLNREEKSA-----RVGGVVDQDEPEPE-----KVE
 Eagle KANK1 HT-----EEGQPAPRAAPEVVCAMGA-----EKDSTPPECEAEEV-----E
 Chicken KANK1 VT-----DGEHPVLGPPETSAAGT-----AKDGPPLCEAEEV-----E
 Goose KANK1 GA-----EEEEEDPALSAPETGAVGA-----EKDRPPLECEAEEV-----E
 Turtle KANK1 ME-----GGHHELNAEDVGCVGV-----DEEVQAQSESEPEKV-----E
 Aligator KANK1 GS-----SLPNMEEGHSKI-----NIEDSCSVQVEES-----QVQENEPEKL-----E
 Spotted gar Kank1 AT-----RSGEGHGKPKREFCNEGAMVVKRECEEREAEKV-----E
 Herring Kank1 KQ-----AQENVGEEKTGGEEFCNEGAVEVGKRAELSGSEKQ-----E
 Zebrafish Kank1a RE-----RRKEEFRNNEAV-----DEDRDTELDGQDKR-----E
 Cave fish Kank1a VK-----EKRRKEEFRNNEGAV-----DVERDVEDMGQDKQ-----E
 Stickleback Kank1a EE-----EYENVARSVSEEFKPVGFREAGDEREVT-----EPCVSTRDPTNNKS-----ID
 Medaka Kank1a KG-----EEFHTEGGEDE-----DKEEEESCEKRE-----E
 Fugu Kank1a KE-----ELKAVEGKSTGEEFQSEGVENVDKKDENECSEKQ-----G
 Tetradon Kank1a -----
 Tilapia Kank1a KE-----EHQKVEGESMREEFQPEGAEDVKKDEESSENR-----E
 Amazon molly Kank1a QE-----VGGRRIGEEFQ-----NEGAEDDKDEEE-----G
 Mouse KANK3 GG-----SDAGTPGPHNDKADGDC-----LETHPELTAGREG-----E
 Rat KANK3 SS-----GGSDAGTPGPHNDQ-----DAGDCELEMHPEQK-----T
 Dog KANK3 RD-----VGDDSGGDVL-----DPEREPEPEAEPPQ-----G
 Human KANK3 DS-----GGGSDSGTPGP-----PSGGDIRDPEPEAE-----AE
 Lamprey EE-----EEDDEGLGEVIHQPNNGGAAGRSEAE-----RQDGAQEVGREEP-----VAEAKQ-----E
 Coelacanth KANK3 IE-----TSEELNVMNEDSDSFENLQHVTGKMKKAERREE-----HEEQGMDLG-----E
 Frog Kank3 YE-----DTSEEMNVMQDTSDDIEDCAVEEKRKEEKVKRKRDRREQ-----P
 Turtle KANK3 DA-----NTWDEEIGANVGETASSVEVPEPGTEQRKR-----NGEQTESAPALDP-----T-----E
 Aligator KANK3 SS-----DEDVNVGENESDLENPEVDTEQRKREEQHEHREH-----IPAPEPP-----E
 Eagle KANK3 GD-----TETSDEEAEEGEREPG-----QEREGCVTLPEPP-----E
 Chicken KANK3 SE-----EPGGTDTSEEEEEEDAVDGDQSELCGQQEGEGGSMAPPEPP-----E
 Goose KANK3 TD-----TSEEEEDAGGGQ-----SEAGEQQEHEGANV-----APPEPT-----E
 Spotted gar Kank3 GE-----DGALIDTSEDER-----NVNLDDSDSEGEPP-----AAEREEGQQS-----A
 Zebrafish Kank3 AA-----ALEDTSDDEEMNINADESDE-----NMPACTEELKDQAE-----E
 Cavefish Kank3 EE-----EAAALEDTSDEER-----NINLESDSDENVQ-----AVTEEGKEQTE-----E
 Herring Kank3 EE-----EEAALQETSDEERNINLDESDESDEGQTGSGGQQE-----T
 Stickleback Kank3 DE-----TSEER-----NVNLDESdTDEETL-----RDTSYS-----E
 Fugu Kank3 AA-----LEEEETSEER-----NINLDESdTDEETL-----RDATYSSD-----V
 Tetradon Kank3 TE-----DEAALDEETSEER-----NVNLDESdTDEDTP-----SAYSSVA-----E
 Medaka Kank3 ED-----EAPLEETSEER-----NVNLDESdTDEEML-----QTANYSPD-----A
 Tilapia Kank3 EE-----DEAALDEETSEER-----NVNLDESdTDEETL-----RAANYSSD-----G
 Amazon molly Kank3 TE-----EDEAALDEETSEER-----NINLDESdTDEETL-----RAPSYSDDA-----E
 Platyfish Kank3 DS-----TEEDEAALDEETSEER-----NVNLDESdTDEETL-----RAPNYSSD-----A

2710 2720 2730 2740 2750 2760 2770 2780 2790 2800

Hydra -----IESCKMLHAHFSG---ENQLK-QPAV---LQYMSIIQALWFKTVKRRKRANAIVKSYIDLFQQRVPELLETIMNMSDDEGNTALHF

Trichoplax LEI----RDFINQDFKFNFKLDDHLNE---INILS-SSKL---DEILNQLRKQWFVEVLADNLQIAMLKQWIETTKISSSKALSVIIDMDLNGNTLHH

Aplasia IRE----TYELSGEVREACKILATYALMD---STTIQ-TKQL---NASLNVIQQEWFQVSSHKLSTPHQVEDFLSSVNEISKRLLEYIVNMTDANGNTAIHY

Snail IRE----TYELSEEVREACTILATYALID---STDIQ-TKQL---NACQNIQQEWFVSSMKLSSAHQVEDFLSSVNEISKRLLEYIVNMTDANGNTAIHY

Fruitfly PRK----KTELSQSLKDALKIINDSLLKKGAKPIS-SQSL---KSAKATTIQDHFWTNSSTGKSDPHQVEDYLDYFESLSIPLLEYCVNLSDSNGNTAMHY

Hookworm -----PYEISSPMREAMESLNSHLIQ---PGTIT-PETA---DWALKYVQHEWLKCAARKGSQAGAVDILIEQLRELSPALLKVVVNITDQNGNTALHY

C.elegance -----PFEVSDRLREALENFNSSILE---PGSVA-EETV---EWSAKLVRHVWMTTAGNSSSRyenVDRFVAELGNLGPQILHMVVNFCDQNGNTALHY

Tunicate VFQDENKKYQFTSELLDACDILEMHRV---PKSVN-HSQL---ENATSTVQQEWFVSSMKLSSAHQVEDFLSSVNEISKRLLEYIVNMTDANGNTALHY

Spider PRK----KTELNKEVRAACKVLDNDYLLK---PDRGG-EKKT---LSSLNIIQNEWFKVANQKNSDPHVIEDYLDAFEEFSKLLLERVVNLSDSNGNTALHY

Lingula IRE----TYELSEEMQASCELLSRHLED---PNTIP-TEQV---TAAATIIQQEWFKAAQKQLSSPYMVEDFLSCFNEYSKELLERIVNMTDANGNTALHY

Lancelet LKE----THELSEELQEAACGVLEKHWTT---PKSVP-PREL---MMAMNTIQQEWMKGAQKQSDVQVVRDYLAAFEQMATGVLGKIVNLADGNGNTALHY

Medaka Kank4b ARA----REANDADFVSACHFVKAHMGN---MDNP---SEDM---RKALVTFQHFVWFTTAAEEASEACNVAAACVRGVKKEFPSLLAFLVNLADDNGNTALHY

Amazon molly Kank4b MKG----RDILSADFMTACHFVKDHMDI---TENP---NDDM---RKALVTFQHFVWFTTAAEEASEPSRVAAYLKEVKSEAPPLLAFLVNLADDNGNTALHY

Platyfish Kank4b TKG----RDILSADFMSACHFVKDRMDI---TENP---NDDM---RQALVTFQHFVWFTTAAEEASETSRVAAYLKEVKSEAPPLLAFLVNLADDNGNTALHY

Stickleback Kank4b -----RETVNLDFLAAACHLLKDHMDH---IDNP---NEDM---RKALVTFQHFVWFTTAAEEASESEAGRVSAYLSDVKKTFPSLLAFLVNLADDNGNTALHY

Fugu Kank4b SRG----REIVSSDFMTACQFLNDHMDN---MDNP---NNEM---RKALVTFQHFVWFTTAAEEASESMVGDLAAYLREVRKSTPTLLAFLVNLADDNGNTALHY

Tetraon Kank4b -----RETVSSDFMTACRFLNDHMDN---MDNP---NNEM---RKALVTFQHFVWFTTAAEEASESVPGDLAAYLREVRKATPTLLAFLVNLADDNGNTALHY

Cave fish Kank4b L-----KTFPPDQIIEISIVFKKQKTRIEDPTET-TRE---EEEEEMKQEPQRTCEAECDDPPVKDESEQVETCSGVEEQELSE--DGRGETEI--

Medaka Kank4a VSELFQAQIYKVDKGFIDACVYVKDRMEE---VSSP---DKEM---RQVLVLYQEWFRVSSQKDSQADTVRLYLQVGRTPPTLLPYVNLTDGNGNMAHY

Fugu Kank4a LRE----TREKVDKRFIDACVYVKDRMEE---VSSP---DKEM---RQVLVLYQEWFRVSSQKDSQADTVRSYLQVSLTPTLLPYVNLTDGNGNMAHY

Tetradon Kank4a PEGSSLELEEQAEGFIDACVYVKDRMEE---VSSP---DKEMVRRQVLVLYQEWFRVSSQKDSQADTVRSYLQVSLTPTLLPYVNLTDGNGNMAHY

Stickleback Kank4a -----GEKVNQGFIDACLYVDRMEE---VSSP---DKEM---RQVLVLYQEWFKISSQKESQADTVRLYLQVGFPTPTLLPYVNLTDGNGNMAHY

Tilapia Kank4a QAE----GGKVDKGFIDACLYVDRMEE---VSSP---DKEM---RQVLVLYQEWFRVSSQKDSQADTVRLYLQVGMTPPTLLPYVNLTDGNGNMAHY

Platyfish Kank4a VEE---AEREKVDKGFIDACVYVKDRMEE---VSSP---DKEM---RQVLVLYQEWFRVSSQKDSQADTVRLYLQVGLTPTLLPYVNLTDGNGNMAHY

Amazon Molly Kank4a VEE---AEREKVDKGFIDACVYVKDRMEE---VSSP---DKEM---RQVLVLYQEWFRVSSQKDSQADTVRLYLQVGLTPTLLPYVNLTDGNGNMAHY

Herring Kank4 SSPQPVSEVVDKDFMAACYYLDRRNE---VDNP---NKEM---RQVLMILYQEWFRVSSQKDSQAEAVTLYLREVGNATPTLLSYIVNLADGNGNTALHY

Zebradish Kank4 PQEEQPVSELVDKNFMAACHFLKDRMAE---VSAP---NKEM---RQVLMMLYQEWFRVSSQKDSQAEAVTLYLREVGFHTPTLLRYIVNLADGNGNMAHY

Cave fish Kank4a PQEEQPVSEFVDKNFMAACHFLKDRMAE---VSTP---NKDM---RQVLMVLYQEWFRVSSQKDSQAEAVTLYLREIGNQTPPTLLRYIVNLADGNGNTALHY

Mouse KANK4 VSHLRAERYKPSSEFLNACQTLSQHLPE---TGDTT-KQLL---RQSLNTISQEWFRVSSRKLSSPEAVAAAYLREVQPHSPYLLKLLVNLADRSNGNTALHY

Rat KANK4 VSHMKAERYKPSSEFLNACQALSQHLPE---AGATN-KQLL---RQSLNTISQEWFRVSSRKLSSPEAVAAACLEEVQPSPHLLKLLVNLADRSNGNTALHY

Dog KANK4 LPHPKAERYKPSSEFINACRALSQHLPE---TGATT-EQLL---RQSLNTIRQEWFRVSSRKLSSPEAVAAAYLRGVQPHSPHFLLKLLVNLADGNGNTALHY

Human KANK4 VPHSKAERYKPSSEFLNACRALSQHLPE---TGTTT-DQLL---RQSLNTISQEWFRVSSRKLSSPEAVAAAYLREVQPHSPHFLLKLLVNLADHNGNTALHY

Eagle KANK4 KAD---RCKPSEDFLADCQLLSKHLSE---IRTTS-DKHL---RHVLTVCQEWFRVSSRKLSSPEVVGAYLKALGAIQPPQLLAMVNLADRNNGNTALHY

Chicken KANK4 LQEPGAETCKPSEDFLADCQLLSKHLSE---IRATS-DQHL---RHVLTVCQEWFRVSSRKLSSPEVVTAYLQALGTIQLQLEAVVNLADRNNGNTALHY

Goose KANK4 GTEHKADRCKPSEDFLADCQLLSKHLSE---IRTTS-DEHL---RHVLTVCQEWFRVSSRKLSSPEAVAAAYLQVGLAIQPPQLEAVVNLADRNNGNTALHY

Anole lizard KANK4 MQPHKAERFKPSADFLKGCQLLSKHIPE---IRNTK-DKLL---RHVLTVCQEWFRVSSRKLSSPEAVAAAYLREVQPHSPHFLLKLLVNLADGNGNTALHY

Turtle KANK4 SIQPKTDRCKPSEDFLDCQLLSKHLSE---IRTTN-DKHL---RHVLTVCQEWFRVSSRKLSSPEVVAAYLKEFKAIHPQLLKMIINLADGNGNTALHY

Aligator KANK4 STQHKTDRYKPSDFLNGCRLLRKHLSE---IRTTG-DKHL---RHVFNVCQEWFRVSSRKLSSPEVVAAYLREFQAIQPPQLKRIVNLADGNGNXALHY

Frog Kank2 PTP----RVELSNVLISGCVALKSLDE---GTALP-EMEK---SAAHSVILQEWMMKILRKQVDPAVIRHHLTVFRAMSPRLEVIINMADAKGNTAVHY

Mouse KANK2 PDPEEEIRMDLSPDLISACLALAKYLEN---PNALT-EREL---KVAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Rat KANK2 PDPEEEIRMDLSPDLISACLALAKYLEN---PNALT-EREL---KVAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Dog KANK2 ANAEEIIRMELSPDLISACLALAKYLDN---PNALT-EREL---KVAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSVRLDYVNLADSNNGNTALHY

Human KANK2 SNTPEEIRMELSPDLISACLALAKYLDN---PNALT-EREL---KVAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Aligator KANK2 -----GLGLGQELLSACTILKRYLET---PNASM-DTKT---RDAYGVVQDGLGLACGQAVEATAVSQRLDTYRAFSPRVLATALNMTDGHGNTALHH

Spotted gar Kank2 TQPEDSTRLESDTLMSACTIVLQKALGE---PNAFS-QQEA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Cave fish Kank2 VAAQQEIRGELSESLMTALQTLQKALGE---PNAFS-QQGA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Herring Kank2 -----KLELSESLITALHTLQKALGE---PNAFS-QQEA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Zebrafish Kank2 PTNKQTDSELSGGLMSALHILQKALGE---PNAFS-HQDA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Tetradon Kank2 DAPAKPVRVELSDGLMSALHILQKALGE---PNAFS-HQAA---RAAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Fugu Kank2 SEKANPVRVELSDGLMSALHILQKALGD---PNAFS-HQEA---RAAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Medaka Kank2 AASSNQVRAELSKNLSALQTLRQKALGE---PNAFS-QQAA---REAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Sticklebac Kank2 AAPPKQVRDLSDSLMSTLHALQKALGE---PNAFS-QQGA---RAAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Tilapia Kank2 LN-----RLELSDSLMLALHALQKALGE---PNAFS-QQGA---RAAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Amazon molly Kank2 -----RLELSESLMSALYTLQKALGE---PNAFS-QQAA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Platyfish Kank2 QESSKPVRELESESLMSALYTLQKALGD---PNAFS-QQAA---RTAYTTVLQEWLRLACRSDAHPELVRRHLVTFRAMSARLLDYVNLADSNNGNTALHY

Coelacanth KANK2 TEQ----KFQMSSELLSASMTLQKYLEN---PDAVS-NMAM--KAAAYATVLDWLRI SCHKAADQNVVRHHMIVFQAMSPQLLEFVVMADGNGNTALHY

Anole lizard KANK2 KEQPSTTGMVLSKELLACEVLQKYLEN---PNAHM-DEEM--KLAYTTVLPYWLRLSCHKEADPELVSLHLAAFRISPDLLEFIINMADANGNTALHY

Turtle KANK2 AAPGSGTGTGLSPPELLAACETLQKYLEN---PDMLM-DKEM--KAAATVLDWLQLSCHREAAPEAVGGHLLAAYRALSPRLLEFVLNMDGNGNTALHY

Tetradon Kank1b CNILFHFRCKLSEKMFSAQALKVHLS---SRALS-SREL--LDCLQTVQEWFSVSSQKSAPDVTVDTYLSAFRVSVPVQLQHIANMADGNGNTALHY

Medaka Kank1b -----RYRLNEKMFSAQILKHLSE---ATPLS-NKEL--QECLHTTISQEWFSVSSQKSAPDVTVDKYLMSFELISTSVLQHIANMADGSGNTALHY

Amazon molly Kank1b SRQH---RCNLSERMFSAQALKHLS---NPAMS-SREL--QDCLCSLQEQWFSVSSQKSAPDIVGEYLSAFRMISSPSVLQHIVNMADSNNGNTALHY

Platyfish Kank1b TQH---RCNLSERMFSAQDLKMLHSE---NPATS-SREL--QDCLRSLQEQWFSVSSQKSAPDVTGGEYLSAFRMISSPSVLQHVVNMADGNGNTALHY

Frog Kank4 VTQ---RCTVSDAFRSECQKLSKHLG---LQGT-NDQL--RQTLTYTCQEWFRVSSQKTSSSDLVTIVYLEELRSICPQLLQMVNMSDENNGNTALHY

Zebrafish Kank1b IRG-----IDLVRRC-FLRAKLSR---FTSMA-ARPY----PIENI-----QKRVCPOIVEDFLFACCQVSPDVLQCYVANMPDQNGNTALHY

Tilapia Kank1b IRG-----IDLVRRC-FLRAKLSR---FTSMA-ARPY----PIENI-----QKRVCPOIVEDFLFACCQVSPDVLQCYVANMPDQNGNTALHY

Fugu Kank1b IRG-----IDLVRRC-FLRAKLSR---FTSMA-ARPY----PIENI-----QKRVCPOIVEDFLFACCQVSPDVLQCYVANMPDQNGNTALHY

Cavefish Kank1b RRE---KYEMSEKVLSCYCHSLKAHLNG---SKALS-NREL--RSCLNTIQEQWFRVSSQKACPDTVEDFLCLCRHVSPAVLTHVANMADQNGNTALHY

Spotted gar Kank4 ILHHLHFRETVDDEFMAACLFLKDLHSE---VISPSREL--RQVLSVVCYEWFRVSSQKSAQHALLALYLQELKAVSPLEVLFIINSADGNGNTALHY

Coelacanth KANK4 KTE---RVQIGEDFLAACLKLLSHHLS---IRTTT-DRQL--QOQLNTLQHDWFRVSSQKLSVPEPEVEDYLKFKFSISLELMLIMNIADGNGNTALHY

Frog Kank1 IRE---RYELSEKMLSACNVLKDVTSD---PKALA-NKDV--RLCLTTVQNEWFRVSSQKSAPVPMVEDYITAFKDLSPAVLSYIINMADGNGNTALHY

Shark Kank1 IRE---RYELSEKMLVSAKLLKSQLCD---PKAMA-SKAV--RLCLNSVQHEWFRVSSQKSAPVPMVEDYITAFKDLSPAVLSYIINMADGNGNTALHY

Coelacanth KANK1 IRE---RYELSEKMMSCSVLKNNSID---PKALT-SKDV--RACLNTIQEQWFRVSSQKSAPVPMVGDYLAALFKGVSPDVLRYVVNMADGNGNTALHY

Mouse KANK1 IRE---RYELSEKMLSACNLLKYNID---PKALA-SKDM--RICLNTLQHEWFRVSSQKSAPVPMVGDYIAAFEAIVSPDVLRYIINMADGNGNTALHY

Rat KANK1 IRE---RYELSEKMLSACNLLKYNID---PKALA-SKDM--RICLNTLQHEWFRVSSQKSAPVPMVGDYIAAFEAIVSPDVLRYIINMADGNGNTALHY

Dog KANK1 IRE---RYELSEKMLSACHLLKNNIND---PKALT-SKDM--RFCLNTLQHEWFRVSSQKSAPVPMVGDYIAAFEAIVSPDVLRYIINMADGNGNTALHY

Human KANK1 IRE---RYELSEKMLSACNLLKNTIND---PKALT-SKDM--RFCLNTLQHEWFRVSSQKSAPVPMVGDYIAAFEAIVSPDVLRYIINMADGNGNTALHY

Anole lizard KANK1 IRE---RYELSEKMLSACNLLKNSIDD---PKAMN-SKET--RFCLNTIQHEWFRVSSQKSAPVPMVGDYIAAFEEVSPVLRHIINMADGNGNTALHY

Eagle KANK1 IRE---RYELSEKMLSACHLLRNNIDD---PKALT-NKDV--RFCLNTIQHEWFRVSSQKSAPVPMVGDYITAFEEISPAVLRHIINMADGNGNTALHY

Chicken KANK1 IRE---RYELSEKMLSACHLLKNNIDD---PKALT-NKDV--RFCLNTIQHEWFRVSSQKSAPVPMVGDYITAFEEISPAVLRHIINMADGNGNTALHY

Goose KANK1 IRE---RYELSEKMLSACHLLKNNIDD---PKALT-NKDV--RFCLNTIQHEWFRVSSQKSAPVPMVGDYITAFEEISPVTLRHVINMADGNGNTALHY

Turtle KANK1 IRE---RYELSEKMLSACNLLKNSLDD---PKALA-SKDM--RFCLNTLQHEWFRVSSQKSAPVPMVGDYIAAFEEELSPVLRHIINMADGNGNTALHY

Aligator KANK1 TRE---RYELSEKMLSACNLLKNNIDD---SKAMA-TKDM--RFCLNTIQHEWFRVSSQKLAIVPEMVGDIYIAAFREVSSTVLRHIINMADGNGNTALHY

Spotted gar Kank1 IRE---RYELSEKMLSACTVLRNHLND---SKALT-SKEV--RACLNTIQHEWFRVSSQKSALPAMVEDYLSAFREVSFAVLRHIINMADGNGNTALHY

Herring Kank1 RRE---RYELSEKMLVSAACNVLKAHLND---SKSLT-SKDV--RASLNTVQEQWFRVSSQKSAPVPMVEDYLAALFKGVSSSVLRHVNMADGNGNTALHY

Zebrafish Kank1a -----RYELSEKMLAACNLLKNSLND---PKALS-SKDV--RACVNTVQHEWFRVSSQKTAVAEMVEDYLSAFRDISPALLQHIVNMADGNGNTALHY

Cave fish Kank1a TRE---RYELSEKMLAACNVVKAHLND---PKASS-SKEV--RMCMTVQHEWFRVSSQKTAVATMVEDYLSAFRDISPALLKHVVNLADGNGNTALHY

Stickleback Kank1a CVH---RYSLEKMLSATNVLRAHLS---PKAVS-SKDL--RTCINTVQHEWFRVSSQKSAPVPMVGDYLAALFAGVSPAVLRHVNMADGNGNTALHY

Medaka Kank1a -----SYELSEKMAVACGVLKAHLDD---PNAVS-GKDL--RACINTLQHEWFRVSSQKALAAMVDDYLRFRFEAVSPAVLRHIINMADGNGNTALHY

Fugu Kank1a IRE---RYKPSKMLAACNLLKNSLND---PKAVG-SKDL--RACVNTVQHEWFRVSSQKTAALAMVEDYLSAFRDISPDLVHHIANMADGNGNTALHY

Tetradon Kank1a -----RYKPSKMLAACSVLSAHLCD---SKAVS-SKDL--RACVNTVQHEWFRVSSQKTAALATMVEDYLSAFRDISPDLVHHIANMADGNGNTALHY

Tilapia Kank1a TRE---RYELSEKMLAACNVLKSLSHLS---PKAVT-SKDL--RGCLNTVQHEWFRVSSQKAAVAAMVEDYLSAFRDISPDLVHHIANMADGNGNTALHY

Amazon molly Kank1a SENEKRERYELSEKMLAACDVLKTHLS---SKAVS-SKDL--RASLNTVQHEWFRVSSQKALAPMVEDYLRFFEAIVSMDVLRHVNMADGNGNTALHY

Mouse KANK3 -----RCELNPRLEACIALNQQLNR---PRGVT-SRDG---NAARLVAQEWFRVSSQKQAEVAGVLRGVKSLGPELLAHVVNLADGNGNTALHY

Rat KANK3 GREG---RCELNPRLEACIALNQQLMR---PRGVT-SRDG---NAARLVAQEWFRVSSQKQAEVAGVLRGVKSLGPELLAHVVNLADGNGNTALHY

Dog KANK3 AQQ---RCELSPRLEACAALQQLSR---PRGV-ARDG---GAARLVAQEWFRVSSQKQAEVAGVLRGVKSLGPELLAHVVNLADGNGNTALHY

Human KANK3 PQQVAQGRCELSPRLEACVALQQLSR---PRGVA-SDGG---AVRVAQEWFRVSSQKQAEVAVARMLGVRRLGPELLAHVVNLADGNGNTALHY

Lamprey EQELCHCRYEMSESMHTACSTLKAHLED---HKSLN-TKEV-----VMADGNGNTALHY

Coelacanth KANK3 VKE---KFELSPKMREACLILKNHND---ADTSR-SKDV--MSSVNLVQEQWFLVSSQKTSFSETVADYLMFAEISPALLGYVNMDSGNGNTALHY

Frog Kank3 TQHDTKKSCVLSQKMQEACLVS IHLCE---PNAVK-TKQS--LASSHIVQEQWFRASSQKSSVAETVAAYLKAFMDISPMLSHVVNLTDGNGNTALHY

Turtle KANK3 VKE---KFELSPRMREACMIVKSHLSH---PSAVK-SKEV--LASSSILQEQWFRVSSQKSVPPELVASHLLAFAEVSPGMLAHVVNLSDGNGNTALHY

Aligator KANK3 VKE---KFELSPRMREACMIVKSHLSH---PSSAK-SKEV--LSSSSILQEQWFRVSSQKSSVSEEMVANHLMFAETVSPALLTHVINLSDGNGNTALHY

Eagle KANK3 VKE---KFELSPRMREACLIVKTHLGH---PSATK-SKEV--LASSSIVLQEQWFRVSSQKSSIPDVTANHLLAFAEVSPALLAHVVNLADGNGNTALHY

Chicken KANK3 VKE---KFELSPRMREACLIVKTHLGH---PTATK-SKEV--LASSSIVLQEQWFRVSSQKSSVPDVTANHLLAFAEVSPALLTHVVNLADGNGNTALHY

Goose KANK3 VKE---KFELSPRMREACLIVKTHLGH---PGATK-SKEA--LASSSIVLQEQWFRVSSQKSSVPDVTANHLLAFAEVSPALLAHVVNLADGNGNTALHY

Spotted gar Kank3 VKE---KFELSKMREACLILKNHND---DINALK-SKEV--LSSTHTVQEQWFRVSSAKTALPSRVADYLMFAFSEVSPALLRHVVNMNTDSGNGNTALHY

Zebrafish Kank3 VKE---KFELSKMREACLILKNHND---GEKAVK-SKEV--LSSSTHTVQEQWFRVSSAKMAQPLRVSNYLMFAFSEVSPVLLLEHVNMNTDNGNTALHY

Cavefish Kank3 VKE---KFELSKMREACLILKNHND---GAKAAK-SKEL--LSSTHTVQEQWFRVSSAKMSQPTRVSNYLMFAFSEVSPVLLGHVVNMNTDNGNTALHY

Herring Kank3 VKE---KFELSMKREACLILKNHND---DAKAMK-SKEV--LSSTHTVQEQWFRVSSAKAAQPLRVSNYLMFAFSEVSPVLLLEHVNMNTDNGNTALHY

Stickleback Kank3 CDAVKENRFELSKMREACLILKNHLD---DIAALKICHPK--LSSTHTVQEQWFRVSSAKMAQSPRVSDYLMFAFSEVSSALLEHVNMNTDNGNTALHY

Fugu Kank3 VKENF---REFSSKMREACLILKNHND---DARAPK-SKEV--LSSTHTVQEQWFRVSSAKTAQPSRVSDYLMFAFSEVSPVLLLEHVNMNTDNGNTALHY

Tetradon Kank3 VKE---KFEFSGKMREACLILKNHND---EAKALR-SKEV--LSSTHTVQEQWFRVSSAKTAQPSRVSDYLMFAFSEVSPVLLLEHVNMNTDNGNTALHY

Medaka Kank3 VKE---KFEFSSKMREACLILKNHND---DVTTLK-SKEV--LSSTHTVQEQWFRVSSAKTAQPSRVSDYLMFAFSEVSSALLEHVNMNTDNGNTALHY

Sticklebacc Kank2 TVSHSNFPPVVKLLLDTTGLCNADKQNKAGYTAIMLTALAAAFH-SDNDLQTVLQQLLRTGDVNAKAS-QAGQTAI MLAVSHGRGDMVRALLSCGAQVNI RDD
Tilapia Kank2 TVSHSNFPPVVKLLLD-TGLCNADKQNKAGYTAIMLTALAAAFH-SDSDLQTVLQQLLRTGDVNAKAS-QAGQTAI MLAVSHGRGDMVRALLSCGAQVNI RDD
Amazon molly Kank2 TVSHSNFPPVVKLLLD-TGLCNADKQNKAGYTAIMLTALAAAFH-SDSDLQTVLQQLLRTGDVNAKAS-QAGQTAI MLAVSHGRGDMVRALLSCGAQVNI RDD
Platyfish Kank2 TVSHSNFPPVVKLLLD-TGLCNADKQNKAGYTAIMLTALAAAFH-SDSDLQTVLQQLLRTGDVNAKAS-QAGQTAI MLAVSHGRGDMVRALLSCGAQVNI RDD
Coelacanth KANK2 TVSHSNFPIVRLLE-TGMCNVDPQNKAGYTAIMLTALAAAFR-SEGDMETVTVQLLHHGNVNAKAS-QAGQTAI MLAVSHGRIDMVKALLAGGADVNLQDD
Amazon lizard KANK2 TVSHSNFPPVAKLLE-TGLCHVDQNKAGYTAIMLALAAASR-SESDMTVTVQLLHGMGNVNAKAS-QAGQTAI MLAVSHGRIDMVRALLASSADVNLQDD
Turtle KANK2 TVSHSNFPPVQRLE-TGLCNVDKQNKAGYTAIMLTALAAATR-SDDDMAIIRQLLQGLDVNAKAS-QAGQTAI MLAVSHGRQDMVRALLACAADVNLQDA
Tetradon Kank1b SVSHSNFQIVQKLE-ADV CNMNHQNKAGYTPIMLALAAAVE-SPDDMKVVEQLFRKGDVNAKAS-QAGQTAI MLAVSHGRVGMVRALLELGADVNLQDD
Medaka Kank1b SLSHSNFEEVVKLLD-AGVCNVNLQNAAGYTPIMLALAAAVE-NPDDMRVVEKLFAGGNVNAKAS-QAGQTAI MLAVSHGRDMVETLLAQGADVNI RDD
Amazon molly Kank1b SVSHSNFQVVKLLD-AEVCNVNQNAAGYTPVMLALAAAVE-RPDDMRVVEQLFSGGDVNAKAI-QAGQTAI MLAVSHGRIDMVRALLAQGAEVNI QDD
Platyfish Kank1b SVSHSNFQVVKLLD-AEVCNVNQNAAGYTPVMLALAAAVE-RPDDMRVVEQLFSTGDVNAKAI-QAGQTAI MLAVSHGRIDMVRALLAQGAEVNI QDD
Frog Kank4 SVSHSNFIVKLLK-TGVCVYDQNKAGYTPVMLTVAATE-TDEDMEVVLTLTEGNVLCAT-QGRQTSI MLAVSHGRIDMVTVLLNCGADVNLQDE
Zebrafish Kank1b SVSHSNFVVKVLLA-AGVCNIDHQNKAGYTPIMLASAAVE-TKEDMIVVQELFSRGDVNAKAS-QAGQTAI MLAVSHGRIDMVQALLAAGAEVNI QDD
Tilapia Kank1b SVSHSNFVVKVLLA-AGVCNIDHQNKAGYTPIMLASAAVE-TKEDMIVVQELFSRGDVNAKAS-QAGQTAI MLAVSHGRIDMVQALLAAGAEVNI QDD
Fugu Kank1b SVSHSNFVVKVLLA-AGVCNIDHQNKAGYTPIMLASAAVE-TKEDMIVVQELFSRGDVNAKAS-QAGQTAI MLAVSHGRIDMVQALLAAGAEVNI QDD
Cavefish Kank1b SVSHSNFRVVKLLD-ADV CNIDQNKAGYTPIMLALAAAVE-TQEDMRVVEQLFSGGDVNAKAI-QAGQTAI MLAVSHGRDMVVKVLLASGSTVNVQDD
Spotted gar Kank4 SVSHSNFRIVKLLD-TGLCKVDHQNKAGYTAIMLASLTAAD-SREDMDVALQLLQGDINTRAS-QAGQTAI MLAVSHGRIDMVRLLLSCNADVNAQDD
Coelacanth KANK4 SVSHSNFQIVKLLD-TGVCVDVQNKAGYTPIMLALAAATE-TKEDMIVVQELFSRGDVNAKAI-QAGQTAI MLAVSHGRFDMVKALLSCGADLNLQDD
Frog Kank1 SVSHSNFDIVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-APKDMGVVEELFGSGDVNAKAS-QAGQTAI MLAVSHGRIDMVRALLACGADVNI QDD
Shark Kank1 SVSHSNFEIVKMLD-ANVCNVNQNKAGYTPIMLALAAAVE-TEKMKIVDELFSQGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLLCAADVNI QDD
Coelacanth KANK1 SVSHSNFEIVKLLD-AG-----
Mouse KANK1 SVSHSNFQIVKLLD-ADV CNVDHQNKAGYTPIMLALAAAVE-AEKDMQVVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKGLLACGADVNI QDD
Rat KANK1 SVSHSNFQIVKLLD-ADV CNVDHQNKAGYTPIMLALAAAVE-AEKDMQVVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKGLLACGADVNI QDD
Dog KANK1 SVSHSNFEIVKLLD-ADV CNVDHQNKAGYTPIMLALAAAVE-AQKDMRVVEELFGCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKGLLACGADVNI QDD
Human KANK1 SVSHSNFEIVKLLD-ADV CNVDHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFGCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKGLLACGADVNI QDD
Anole lizard KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-TKEDMIVVQELFSRGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACRADVNI QDD
Eagle KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACGADVNI QDD
Chicken KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACGADVNI QDD
Goose KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACGADVNI QDD
Turtle KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFSCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACGADVNI QDD
Aligator KANK1 SVSHSNFEIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-AEKDMRIVEELFGCGDVNAKAS-QAGQTAI MLAVSHGRIDMVKALLACGADVNI QDD
Spotted gar Kank1 SVSHSNFEIVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-AEKDMQVVEELFGKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACRADVNI QDD
Herring Kank1 SVSHSNFDIVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-SPKDMHIVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Zebrafish Kank1a SVSHSNFHIVKLLLE-ADV CNVQNKAGYTPIMLALAAAVE-APKDMRVVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Cave fish Kank1a SVSHSNFHIVKLLD-ANVCNVNHQNKAGYTPIMLALAAAVE-APKDMRVVEELFSKGDVNSKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Stickleback Kank1a SVSHSNFIVVKELLD-AGEGGRGGKGAAGHTPIMLALAAAVE-SPKDMRIVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Medaka Kank1a SVSHSNFQVVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-TPKDMSVVEELFGKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Fugu Kank1a SVSHSNFHIVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-TPKDMRVVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Tetradon Kank1a SVSHSNFHIVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-TPKDMRVVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Tilapia Kank1a SVSHSNFQVVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-TPKDMRIVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Amazon molly Kank1a SVSHSNFQVVKLLD-ADV CNVQNKAGYTPIMLALAAAVE-TAKDMRIVEELFSKGDVNAKAS-QAGQTAI MLAVSHGRDMVVKALLACGADVNI QDD
Mouse KANK3 SVSHGNLAISSLLD-TGVCVDVNHQNRAGYSALMLAALTSVQEEEDMAVVQRLFSMGNVNAKAS-QTGQTAI MLAI SHGHQDMVAALLECCGADVNI QDA
Rat KANK3 SVSHGNLAISSLLD-TGVCVDVNHQNRAGYSALMLAALTSVQEEEDMAVVQRLFSMGNVNAKAS-QTGQTAI MLAI SHGHQDMVAALLECCGADVNI QDA
Dog KANK3 SVSHGNLAISSLLD-TGVCDDIDRQNRAGYSALMLAALTSVQEEEDMAVVQRLFHLGNVNAKAT-QTGQTAI MLAI SHGRQDMVAALLSCGADVNAQDA
Human KANK3 SVSHGNLAIASLLD-TGACEVNRQNRAGYSALMLAALTSVQEEEDMAVVQRLFCMGNVNAKAS-QTGQTAI MLAI SHGRQDMVAATLLACGADVNAQDA
Lamprey SVSHSNFAIVQMLLDTGECNVDAQNKAGYTAIMLASLAIN-SERDMAVVQRLSLGDVNAKASQAGQTAI MLAVSHGRKDMVRALLACGADVNI QDD
Coelacanth KANK3 SVSHSNFHVKLLLE-TGVCNVDRQNKAGYTAIMLALAAAVE-IDEDMRVVRLLFSMGNVNAKAS-QAGQTAI MLAVSHGRIMVVRALLDCGADVNI QDD
Frog Kank3 SVSHSNFFIVQLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-KEDDMNVVSRFLSGGNVNAKAS-QAGQTAI MLAVSHGRQEMVQALLACGANVNI QDD
Turtle KANK3 SVSHSNFQIVQLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-HEEDMNVVRRFLFSMGNVNAKAS-QAGQTAI MLAVSHGRQEMVEALLACGADVNI QDE
Aligator KANK3 SVSHSNFQIVRLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-HEEDMNVVRRFLFSMGNVNAKAS-QAGQTAI MLAVSHGRQEMVEALLACGADVNI QDE
Eagle KANK3 SVSHSNFHIVRLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-QEDDMNVVRRFLFSMGNVNAKAS-QAGQTAI MLAVSHGRQEMVEALLACGADVNI QDE
Chicken KANK3 SVSHSNFHIVKLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-QEDDMNVVRRFLFSMGNVNAKAS-QAGQTAI MLAVSHGRQEMVEALLACGADVNI QDE
Goose KANK3 SVSHSNFHIVQLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-QEDDMNVVRRFLFSMGNVNAKAS-QAGQTAI MLAVSHGRQEMVEALLACGADVNI QDE
Spotted gar Kank3 SVSHSNFTVVGLLD-TGVCNVDRQNKAGYTAIMLALAAAVE-EEDDMRVVRLKFLSGVNAKAS-QFSQTIQVLA VKMGSIDDL-FLLSTVNLV SFHKD
Zebrafish Kank3 SVSHSNFAVVDLLD-TGMCNVQNKAGYTAIMLALAAAVE-EEDDMRVVRLKFLSGVNAKAS-QAGQTAI MLAVSHGRQEMVRALLDCGANVNI QDD
Cavefish Kank3 SVSHSNFTVVGLLD-TGKCNVDQNKAGYTAIMLALAAAVE-EEDDMRVVVKLFSQGNVNAKAS-QAGQTAI MLAVSHGRQEMVRALLECCGADVNI QDD
Herring Kank3 SVSHSNFVVGLLD-TGVCNVQNKAGYTAIMLALAAAVE-EEDDMRVVVKLFSQGNVNAKAS-QAGQTAI MLAVSHGRQEMVRALLECCGANVNI QDD

Stickleback Kank3 SVSHSNFVSVGLLLD-TGLCRVDKQNKAGYTAIMLAALSTVK-EEKDMAVVKRLFSQGNVNAKAS-QAGQ TALMLAVSHGRQEMVRALLECGADVNVQDD
 Fugu Kank3 SVSHSNFVSVGLLLD-TGVCSVDKPNKAGYTAIMLAALSTVKEEEDM VVVVKLFQCGNVNAKAS-QAGQ TALMLAVSHGRQEMVRALLECGADVNVQDD
 Tetradon Kank3 SVSHSNFVSVGLLLD-TGVCSVDKPNKAGYTAIMLAALSTVKEEEDM GVVVKLFQCGNVNAKAS-QAGQ TALMLAVSHGRQEMVRALLECGADVNVQDD
 Medaka Kank3 SVSHSNFHVRLLLD-TGVCCVDKQNKAGYTAIMLAALSTVK-EEEDMAVVRKLFSGGNVNAKAS-QAGQ TALMLAVSHGRQEMVRALLECGADVNVQDD
 Tilapia Kank3 SVSHSNFVSVGLLLD-TGVCSVDKQNKAGYTAIMLAALSTVK-KEEDM VVVVKLFSGGNVNAKAS-QAGQ TALMLAVSHGRQEMVRALLECGADVNVQDD
 Amazon molly Kank3 SVSHSNFVSVRLLLD-TGVCCVDKQNKAGYTAIMLAALSTVKEEEDMAVVKLFGQGNVNAKAS-QAGQ TALMLAVSHGRQEMVQALLECGADVNVQDD
 Platyfish Kank3 SVSHSNFVSVQLLLD-TGVCCVDKQNKAGYTAIMLAALSTVK-EEEDMAVVKLFGQGNVNAKAS-QAGQ TALMLAVSHGRQEMVQALLECGADVNVQDD

2910 2920 2930 2940 2950 2960 2970 2980 2990 3000

Hydra DGATALMCACDHGNVNIVKTLGPN-PCDVTI EDN-----
 Trichoplax DGSTALMTACEHGLKDIVKLLLAQ-PNINVTTLDY-----DNYDAL S-IAMGNFKDCGILLYSYI-----
 Aplasia DGSTALMCACEHGHM DIVSYLLSQ-PNIDANLMDN-----ENSTALT-IAMEAGHKDVGVVLYKHL-NFSTK---ASSP-----
 Snail DGSTALMCACEHGHLEIVKLLLSQ-PNIDAKITDN-----ENSTALS-IAMEAGHKDVGVVLYKHL-NFS-K---PTSP-----
 Fruitfly DGSTALMCAA EHG RVDVIKHLSSH-PECD SLVTDV-----DGSTAFK-IAWQAGHRDVGLLIYVHE-QML-R---SKLP-----
 Hookworm EGSTALMCAA EHG HKDIVKLLLAQ-PGDAAL TDC-----DSS TALS-IAVENGRHDIGVLIYAHL-NYS-R-----
 C.elegance DGSTALMCAA EHG HKELVKMLLAE-NLVNASLTDV-----DNSTALS-IALENDHREIGVMIYAYL-NYG-----
 Tunicate DGSTPLMCAVEHGGQIEIVKLLLNH-PMCDAAAKDS-----DGSTAMN-IAMDAGHREIAILLYAQL-NFK-P-----NS--
 Spider DGSTALMCAA EHG HLEIVKLLLSH-PECDPTIVDN-----DECNALT-IAMEAGHKDIGLLIYT NM-NFS-R---GSSPYSTLKNRKRSTPRS
 Lingula DGSTALMCASEHGHSEIVRLLLSM-AECDASLADN-----DGSTALS-IAMEAGHKDIGILLYARQ-NIK-S---SPGL---AR--
 Lancelet DGSTALMCASEHGHLEIVKLLLAQ-PGCDATITDN-----DDSTALS-IAMEAGHRDIGVLLYAQV-NMG-K-----
 Medaka Kank4b QGTTALMFASERGH THIVARLLER-SQCDLTLTDK-----RCRTALS-IALQGSHTDAALLQAHA---K---ARAL-----
 Amazon molly Kank4b QGTTSLMFASERGH THIVARLLER-SQCDLTLTDK-----VRLQPTAKSSSGLSQSTT-----
 Platyfish Kank4b QGTTSLMFASERGH THIVARLLER-SQCDLTLTDK-----RGQTALS-IAKQGSHTDAALLQAHA---K---ARAL-----
 Stickleback Kank4b QGTTALMFASERGH THIVARLLER-SRCDLTLTDK-----RGQTALS-IAMQGSHTDAALLQAHA---K---ARAL-----
 Fugu Kank4b QGTTALMFASERGH THIVARLLER-SQCDLTLTDK-----RCRTALA-IAMQGSHTDTATLLQAHA---K---VRAL-----
 Tetraon Kank4b QGTTALMFASERGH THIVARLLER-SHCDLSLTDK-----V-----R-----
 Cave fish Kank4b PPNPPKTC-----PH-NAPLAPD-----
 Medaka Kank4a EGSTALMCASEHGH THIVRLLLET-GRCNASLTDK-----NGRTALS-AAEEAFHQDIAELL---R-----
 Fugu Kank4a EGSTALMCASEHGH THIVGLLLET-GRCDSLTDK-----NGQTAQK-VAAGSSHQDIVDLLKAHA---K-----
 Tetradon Kank4a EGSTALMCASEHGH AHIVGLLLET-GRCDSLADK-----NGQTAQK-VAEGASHQDIIDLKAHA-----
 Stickleback Kank4a EGSTALMCASEHGH TNIVRMLLET-GRCDSLTDK-----NGQTARS-VAEGA AHQDIRDLKAHA---E-----
 Tilapia Kank4a EGSTALMCASEHGH THIVRLLLET-GRCDSLTDK-----NGQTALL-VAEGASQDIDLKANA---E-----
 Platyfish Kank4a EGSTALMCASEHGH THIACLLLET-GRCDSLTDK-----NGQTALS-VAEAAAHQDIIDLKSHA-----
 Amazon Molly Kank4a EGSTALMCASEHGH THIACLLLET-GHCDIGLTDK-----NGQTALS-VAEAAAHQDIIDLKSHA-----
 Herring Kank4 DGSTALMCACEHGHAEI TRMLLKHPPGCDTSLKDK-----DGHTALS-VATQASHMEVIDLLKAHT-GTP-----
 Zebradish Kank4 DGSTALMCACEHGHTEIAKILLER-PGCDLTLTDK-----DGHTALS-VAMKASHT EIDLNLARS---DPGP-----
 Cave fish Kank4a DGSTALMCASEHGHAEIAKLLLDV-SQCDLTDK-----AGHTALS-VAIKASHPEIVDLLKAHA-----
 Mouse KANK4 DGSSALMLACHQGNADLVRLLLAH-PACNSSLTDK-----AGRTALSIVLNSPAHVEIAELLRAHS-EPG-----
 Rat KANK4 DGSSALMLACHQGNADLVRLLLAH-ADCNSLTDK-----AGQTALSIVLNSPAHVEIAELLRAHS-EQG-----
 Dog KANK4 EGSSALMLACHRHGNADMVRLLLAH-PACDSSLTDK-----AGRTALSIVLNSPAHVEIAELLRAHA-EQG-R---SLGP-----
 Human KANK4 DGSSALMVACHHGNVDLVRLLAH-PACDSSLTDK-----AGRTALSIALKSPHMEIAGLLRAHA-EQG-R---SLGL-----
 Eagle KANK4 EGT TALMVACRQGNADIVRLLLAQ-PGCVQVLTDK-----GGNSALS---LARRG DIAALLRAHA-----
 Chicken KANK4 QGSTALMVACRQGSTDMVRLLLAQ-PGQQLALTDK-----DGD TALS-IAQRSAHEDIAALLHSAQ---H---GFND-----
 Goose KANK4 HGT TALMVACRQGNADMVRLLLAQ-PGQQLALTDKLEPTGKRHP SACTE PGRSARSSDPGQVPAGITQAQGD TVMSGQ---TAAP-----
 Anole lizard KANK4 TGLSPLMVASQYGNMDIVKLLLDH-PGCDTTLNDK-----AGNSALS-MALKSAHVEIAEILQSHK-QHS-W---PLNT-----
 Turtle KANK4 NGTALMVACQHGNAEIAKLLLAH-PGCDNTLTDK-----GNSALS-VALKSAHMEIAEILQAHK-EQS-R---SLAK-----
 Aligator KANK4 NGVSALMVACQGNAEIVKFLAH-PDCNATLTDK-----DGNSALS-VALKSAHVEIAEILQAH I-EQS-S---SLSK-----
 Frog Kank2 DGSTALMCACEHGHADIVSLLLA V-PACDVSLTDN-----DGSTALS-IALEAGQNDIAMLLSAHN-SKI-S---NQDE-----GT--
 Mouse KANK2 DGSTALMCACEHGHKEITGLLLAV-PSCDISLTD R-----DGSTALM-VALDAGQSEIASMLYSRM-NIK-C---SFAP-----
 Rat KANK2 DGSTALMCACEHGHKEITGLLLAV-PSCDISLTD R-----DGSTALM-VALDAGQSEIASMLYSRM-NIK-C---SFAP-----
 Dog KANK2 DGSTALMCACEHGHKEITGLLLAV-PSCDISLTD R-----DGSTALM-VALDAGQSEIASMLYSRM-NIK-C---SFAP-----
 Human KANK2 DGSTALMCACEHGHKEIAGLLLA V-PSCDISLTD R-----DGSTALM-VALDAGQSEIASMLYSRM-NIK-C---SFAP-----
 Aligator KANK2 DGSTALMCACEHGHAAIAHLLLA A-PACRVDLADN-----DGSTALS-IAQEAGQTDIVNMT EACL-GAP-A---LGNP-----LP--
 Spotted gar Kank2 DGSTALMCACEHGHVDIVKQLLA V-PGCDATLTDN-----DGSTALS-IAMEANQNDIAVLLYAHL-NFA-K---PPSP-----VQVL
 Cave fish Kank2 DGSTALMCACEHGHVDIVRQLLSV-PGCDATLTDN-----DGSTALS-IALEASQNDIAVLLYAHL-NFA-K---PPSP-----VS--
 Herring Kank2 DGSTALMCACEHGHVDIVRQLLSV-PGCDATLTDN-----DGSTALS-IALEASQNDIAVLLYAHL-NFA-K---PPSP-----VS--

Zebrafish Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----	VS	
Tetradon Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDASLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Fugu Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Medaka Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Stickleback Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Tilapia Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Amazon molly Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSP	-----		
Platyfish Kank2	DG	STALM	CACEHGHVDIVRQLLSV	PGCDATLTDN	-----	DG	STALS	-IALEASQNDIAVLLYAHL-NFA-K	---	PPSPVS	-----		
Coelacanth KANK2	DG	STALM	CACEHGHVEIVRLLLA	V-PGCDVTLTDN	-----	DG	STALS	-VALEANQNEIAMLLHSHM-NLT-K	---	ALAPV	-----		
Anole lizard KANK2	DG	STALM	CACEHGHAEIVRLLLA	T-PGCDVALSDN	-----	DG	STALS	-IAVEAGQNDIAIMLYAQL-NFA-K	---	STSP	-----	GT	
Turtle KANK2	DG	STALM	CACEHGHAEIARLLLA	T-PACHVGLADH	-----	DG	STALS	-IALEAGQNDIAVMLYAHL-NFA-K	---	PPSP	-----	GT	
Tetradon Kank1b	EG	STALM	CAGEHGHADMVRLLLA	Q-AHCDATLTD	S-----	DG	STALS	-IALEAGHNDIAVLLYAHT-NYS-R	-----		-----		
Medaka Kank1b	EG	STALM	CASEHGYADIVKLLLA	Q-PECDATLTD	S-----	DE	STALS	-IALEAGHSDIAVLLYAHT-TFS-R	---	QTG	-----	AG	
Amazon molly Kank1b	EG	STALM	CASEHGHADIVKLLLA	Q-PDCDATLTD	S-----	DD	SALS	-VALEAGHNDIAVLLYAHA-NFS-R	---	CTA	-----	GA	
Platyfish Kank1b	EG	STALM	CASEHGHADIVKLLLA	Q-PDCDATLTD	S-----	DD	SALS	-VALEAGHNDIAVLLYAHA-NFS-R	---	CTV	-----	GA	
Frog Kank4	DG	E	TALMACR	LGNMDLVKLLLAQ	PGCDTELSDK	-----	V	N	TALS	-IVLNSAHS	EIAEFLQAHT-EHR-R	-----	
Zebrafish Kank1b	EG	SSALM	CAGEHGHADIVKLLLA	Q-PGCDATLTDN	-----	DE	STALS	-IALEAGHKDIAMLIYAHV-NYS-K	---	SQPRSQ	-----	GS	
Tilapia Kank1b	EG	SSALM	CAGEHGHADIVKLLLA	Q-PGCDATLTDN	-----	DE	STALS	-IALEAGHKDIAMLIYAHV-NYS-K	---	SQPRSQ	-----	GS	
Fugu Kank1b	EG	SSALM	CAGEHGHADIVKLLLA	Q-PGCDATLTDN	-----	DE	STALS	-IALEAGHKDIAMLIYAHV-NYS-K	---	SQPRSQ	-----	GS	
Cavefish Kank1b	EG	STALM	CASEHGHADIVKLLLA	Q-PGCDATLSDN	-----	DD	STALS	-IALEAGHKDIAMLIYAHV-NYA-K	---	GQ-AM	-----	GT	
Spotted gar Kank4	DG	STALM	CACEHGHADIVRLLLA	L-PACDASITDN	-----	EG	N	SALS	-IALEASHTEIVDLLKAHT	-----	-----		
Coelacanth KANK4	TG	STALM	CACEQGNVEIVKLLLA	TQ-PCSCVELTDK	-----	V	G	N	A	F	S	-IALEVSHK	IAEELLNAHV-SHC
Frog Kank1	EG	STALM	CASEHGHVEIVKLLLA	Q-HGCNALEDN	-----	DG	SSALS	-IALDAGHKDIAVILYAHL-NFS-K	---	TPSP	-----	GT	
Shark Kank1	EG	STALM	CASEHGHAEIVKLLLA	Q-PGCDATLTDN	-----	DE	STALS	-IALDAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Coelacanth KANK1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Mouse KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGHLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	ST	
Rat KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCSGHLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	ST	
Dog KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGHLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFA-K	---	APSP	-----	GT	
Human KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGHLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFA-K	---	AQSP	-----	GT	
Anole lizard KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-SGCNGTLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	TQSP	-----	GT	
Eagle KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGTLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	TQSP	-----	GT	
Chicken KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGTLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	TQSP	-----	GT	
Goose KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGTLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	TQSP	-----	GT	
Turtle KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-SGCNGTLQDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	PQSP	-----	ST	
Aligator KANK1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCNGTLEDN	-----	DG	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	TQSP	-----	GT	
Spotted gar Kank1	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLTDG	-----	DE	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Herring Kank1	EG	STALM	CASEHGHVEIVKLLLA	Q-SGCDATLSDS	-----	DE	SNALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Zebrafish Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDPTLSDN	-----	DE	SNALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSPSVFNLSVTGIL	-----		
Cave fish Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLSDN	-----	DE	STALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Stickleback Kank1a	EG	STALM	CASEHGHVEIVKLLLA	R-AGCDATLSDS	-----	DE	SNALS	-IALEAGHKDIAMLIYAHV-NFS-K	---	AQSP	-----	GT	
Medaka Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLSDG	-----	DG	SSALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Fugu Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLSDS	-----	DE	SNALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Tetradon Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLSDS	-----	DE	SNALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Tilapia Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-PGCDATLSDS	-----	DE	SSALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Amazon molly Kank1a	EG	STALM	CASEHGHVEIVKLLLA	Q-AGCNATLSDS	-----	DG	SNALS	-IALEAGHKDIAVLLYAHL-NFS-K	---	AQSP	-----	GT	
Mouse KANK3	DG	A	TALM	CASEYGR	LDTVQLLLA	Q-PGCDLTILDN	-----	EG	T	S	A	-IALEAEQ	DEVAALLHAHL
Rat KANK3	DG	A	TALM	CASEYGR	LDTVQLLLA	Q-PGCDLTILDN	-----	EG	T	S	A	-IALEAEQ	DEVAALLHAHL
Dog KANK3	DG	A	TALM	CASEYGR	LDTVRLLLA	Q-PGCDPALD	N-----	EG	T	S	A	-IALEAEQ	DEVAALLHAHL
Human KANK3	DG	A	TALM	CASEYGR	LDTVRLLLA	Q-PGCDPALD	N-----	EG	T	S	A	-IALEAEQ	DEVAALLHAHL
Lamprey	DG	STALM	CASEHGHVDIVRLLLA	Q-PGCNAAIADNLWHLGCVCAQD	GS	STALS	-IALEAGHNDIAVLLYAHL-NYA-K	-----	-----	-----	-----		
Coelacanth KANK3	EG	STALM	CASEHGRVEIVKLLLA	Q-AGCDISILDN	-----	DG	SSALS	-IALEANHNDIAVLLYAHL-NFS-K	---	AQSPQ	-----	AT	
Frog Kank3	EG	STALM	CASEHGRAEIVKLLLA	Q-TDCDVSTITDN	-----	DG	SNALS	-IALEAGQNDIAMLIYAHV-NFS-K	---	VQSP	-----		
Turtle KANK3	EG	STALM	CACEHGRLETIVRLLLA	Q-PACDVSIVDN	-----	DG	N	N	A	V	A	-IALEAGHSN	IAVLMYAHL-NNS-K
Aligator KANK3	EG	STALM	CACEHGRVETIVRLLLA	Q-PVCDLSIVDN	-----	DG	N	N	A	V	A	-IALEAGHSN	IAVLMYAHL-NSS-K
Eagle KANK3	EG	STALM	CACEHGRVETIVKLLLA	Q-PTCNISIVDS	-----	DG	N	N	A	V	A	-IALEAGHSN	IAVLLYAHL-NGT-K
Chicken KANK3	EG	STALM	CACEHGRVETIVKLLLA	Q-PTCDVSIVDS	-----	DG	N	N	A	V	A	-IALEAGHSN	IAVLLYAHL-NGT-K
Goose KANK3	EG	STALM	CACEHGRVETIVKLLLA	Q-PTCNISIVDS	-----	DG	N	N	A	V	A	-IALEAGHSN	IAVLLYAHL-NGT-K

Spotted gar Kank3 YKRQICRCNTNHKRTKKIHNVLCF-DFLQASFWNL-----DGSNALS-IALEASHNDIAVLLYAHM-NYS-N---SQAA-----R--
 Zebrafish Kank3 EGSTALMCASEHGRAEIVSLLLEQ-PGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYS-K---TQADA-----S---
 Cavefish Kank3 EGSTALMCASEHGRAEIVSLLLEQ-AGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYS-K---AQGEA-----QV--
 Herring Kank3 EGSTALMCASEHGRAEIVAMLLDQ-LDCDISVVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYS-K---SQAA-----GV--
 Stickleback Kank3 EGSTALMCASEHGRAEIVKLLLEQ-PGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYA-R---TPPV-----GS--
 Fugu Kank3 EGSTALMCASEHGRAEIVKLLER-PGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYA-K---TQSAV-----
 Tetradon Kank3 EGSTALMCASEHGRAEIVQLLLEQ-PGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYA-K---NQSAG-----
 Medaka Kank3 EGSTALMCASEHGRAEIVKLLLEQ-PGCDISIVDN-----DGSNALS-IALEAASHNDIAVLLYAHM-NYA-K---APSPA-----GS--
 Tilapia Kank3 EGSTALMCASEHGRTEIVKLLLEQ-PGCDISIVDN-----DGSNALS-IALEASHNDIAVLLYAHM-NYA-K---
 Amazon molly Kank3 EGSTALMCASEHGRAEIVKLLLEQ-PGCDISIVDN-----DGSNALS-IALEAASHNDIAVLLYAHM-KYA-K---SQTTL-----GS--
 Platyfish Kank3 EGSTALMCASEHGRAEIVKLLLEQ-PGCDISIVDN-----DGSNALS-IALEAASHNDIAVLLYAHM-NYA-K---SQTTL-----GS--

3010 3020 3030 3040 3050 3060 3070 3080 3090

Hydra
 Trichoplax -----SKTSKAHS-----
 Aplasia -----GVHRKRKSSSSPTPSSFEELR-----
 Snail -----RPARGYHKRKRKSSSSPTPSSFEIHF-----
 Fruitfly -----NRGDATRSSLISPPRHKRQPSQ-----
 Hookworm -----AETIEDT-----
 C.elegance -----RLDISGPTSTI-----
 Tunicate -----RSRPRVDGAKQKSSPVHRKTKS-----
 Spider TPPPRTPTLR---TPPLPSPSARSTNSIPASFHFPS-----
 Lingula -----SHKEGSMASRLPVSLSKK-----
 Lancelet -----TAPGGGKGRRRLSPSPTRRKS-----
 Medaka Kank4b -----LSAVRPPDFNDNMPPVRLLD-----
 Amazon molly Kank4b -----
 Platyfish Kank4b -----
 Stickleback Kank4b -----
 Fugu Kank4b -----
 Tetraon Kank4b -----
 Cave fish Kank4b -----
 Medaka Kank4a -----
 Fugu Kank4a -----
 Tetradon Kank4a -----EASSTADL-----
 Stickleback Kank4a -----TRGPESFETT-----
 Tilapia Kank4a -----VQTSESTSTADLL-----
 Platyfish Kank4a -----SEPMSAADLL-----
 Amazon Molly Kank4a -----SEPMSAADLL-----
 Herring Kank4 -----TLQAAAPH-----
 Zebrafish Kank4 -----VTDSAAPL-----
 Cave fish Kank4a -----EKAGSSQAAGLL-----
 Mouse KANK4 -----RSLGPKELQKN-----
 Rat KANK4 -----RSLGLKELQKN-----
 Dog KANK4 -----
 Human KANK4 -----
 Eagle KANK4 -----EQSPSLSA-----
 Chicken KANK4 -----
 Goose KANK4 -----CRASPRPGLLGAHLSPGGVGWRGLVQPHPR-----
 Anole lizard KANK4 -----
 Turtle KANK4 -----
 Aligator KANK4 -----
 Frog Kank2 -----DPKR-----QRVNPSDESQ-----
 Mouse KANK2 -----MSDYESPASSSAEE-----
 Rat KANK2 -----MSDYESPASSSAEE-----
 Dog KANK2 -----MSDDESPASSSAEE-----
 Human KANK2 -----MSDDESPASSSAEE-----

Aligator KANK2	-----VTTE-----TAVTTEAPGDTQ-----
Spotted gar Kank2	QNNPQVRRTP-----RQLSPAPSPPIHQDQOTDGGRGASLEVGAGEAWLGLWDKGOOETGPGAESFFHFGFFRPANKPPRPPAALSAERPRGEREVLGS
Cave fish Kank2	-----PKSP-----ILGSPSSSELK-----
Herring Kank2	-----PKSP-----LLGSSPPTGEMK-----
Zebrafish Kank2	-----PKSP-----ILGSSPPSSSELK-----
Tetradon Kank2	-----QVSEKSPILLGSSPP-----
Fugu Kank2	-----VGKDQSPTSASAKK-----
Medaka Kank2	-----EKKNSAPKSDGFEQ-----
Sticklebac Kank2	-----SSIQQSPQKGSATE-----
Tilapia Kank2	-----LSNKSLPRLSTHPIH-----
Amazon molly Kank2	-----VSPKSPILLGSSPPSGEPK-----
Platyfish Kank2	-----TELSWNVPGSGKLEN-----
Coelacanth KANK2	-----KETQPGPPPNAPAEAAQQ-----
Anole lizard KANK2	-----PKQP-----KPDNTALTSSDNNTKDDGGTSH-----
Turtle KANK2	-----PKQP-----KAETAAAVLPPEAQ-----
Tetradon Kank1b	-----
Medaka Kank1b	-----ARRS-----GRFSSSSGGRSVFE-----
Amazon molly Kank1b	-----ARHG-----GRFPSSSSGGWSIFET-----
Platyfish Kank1b	-----ARHS-----GRFPSSSSGGWSIFET-----
Frog Kank4	-----SRSAAEEMKGAFL-----
Zebrafish Kank1b	-----PR-----SKTPPASRTSS-SD-----
Tilapia Kank1b	-----PR-----SKTPPASRTSS-SD-----
Fugu Kank1b	-----PR-----SKTPPASRTSS-SD-----
Cavefish Kank1b	-----PR-----SRTPPAAAARGFFE-----
Spotted gar Kank4	-----DHGTPDTS-----
Coelacanth KANK4	-----
Frog Kank1	-----PRLS-----RKFPSPPTQKGPTDH-----
Shark Kank1	-----PRLG-----RKTSPSPTRRSKFE-----
Coelacanth KANK1	-----
Mouse KANK1	-----PRLG-----RKTSPGPTHRSFDF-----
Rat KANK1	-----PRLG-----RKTSPGPTHRSFDF-----
Dog KANK1	-----PRLG-----RKTSPAPTHRSSFD-----
Human KANK1	-----PRLG-----RKTSPGPTHRSFDF-----
Anole lizard KANK1	-----PRLG-----RKPSPGPAHRSPFDC-----
Eagle KANK1	-----PRLS-----RRTSPGPTHRAFTE-----
Chicken KANK1	-----PRLS-----RKTSPGPTHRAFTE-----
Goose KANK1	-----PRLS-----RKTSPGPTHRAFTE-----
Turtle KANK1	-----PRLS-----RKTSPGPTRRAMFD-----
Aligator KANK1	-----PRLG-----RKTSPGPTHRTFE-----
Spotted gar Kank1	-----PRLG-----RKTSPSPTRRSMEFD-----
Herring Kank1	-----PRLS-----RKMSPSPTRKSADF-----
Zebrafish Kank1a	-----CRQGVYIINRIVPTNLFRRPMVEDNVSSSVCMFA-----
Cave fish Kank1a	-----PRLG-----RKTSPSPTRRGMEFD-----
Stickleback Kank1a	-----PRLS-----RKTSPSPTRQGVFD-----
Medaka Kank1a	-----PRLS-----RKASPSPTRRSVFD-----
Fugu Kank1a	-----PRLG-----RKMSPSPTRRSMFD-----
Tetradon Kank1a	-----PRLG-----RKMSPSPTRRGMFD-----
Tilapia Kank1a	-----PRLG-----RKTSPSPTRRGMEFD-----
Amazon molly Kank1a	-----PRLG-----RKTSPSPTRRGLEFD-----
Mouse KANK3	-----SNH-----QGSSSTGSPTAKECNDK-----
Rat KANK3	-----GSPTATLQRDTGPQL-----
Dog KANK3	-----LESTPDVPDEGECSDHREDPQPQ-----
Human KANK3	-----AGVQRHNLSSLQPPPRFKKFSCLSLPSSWDYNSCEPSRLAQLTIF-----
Lamprey	-----PPSPVSTSG-----
Coelacanth KANK3	-----PKMG-----LKSAANTAKKSVVE-----
Frog Kank3	-----SSDVLAMGKASSSHGKPE-----
Turtle KANK3	-----QETPPIALKSSSNLMKKH-----

Aligator KANK3	-----QGKSPTIPRKQH-----
Eagle KANK3	-----SLTA-----MKSPGSPKPN-----
Chicken KANK3	-----STAG-----TKSPGSPKPN-----
Goose KANK3	-----STAG-----TKSPGNPKKLN-----
Spotted gar Kank3	-----SLLA-----SRSDSSRVRTSPSL-----
Zebrafish Kank3	-----PKAN-----SRSPSSPRKTWPSE-----
Cavefish Kank3	-----PKAN-----PRSPSSPRKLWPSE-----
Herring Kank3	-----NKGN-----TRSPSTSPQKWPPE-----
Stickleback Kank3	-----PTVQ-----PRSPSTSSHKSWPSD-----
Fugu Kank3	-----VSPSSRPSLPGDKM-----
Tetradon Kank3	-----VSPSSRPCQPG-----
Medaka Kank3	-----PKSQ-----ARSPSTSPHKSWPAE-----
Tilapia Kank3	-----TQTAAETLLHTAIECNSE-----
Amazon molly Kank3	-----PKAQ-----PRSPTNPHKSWPAD-----
Platyfish Kank3	-----PKAQ-----PRSPTNPHKSWPAD-----