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| Figure s1. The genome list in the phylogenetic tree | |  |  |
| Gene name | Species | Accession number | Amino acid sequence |
| kit-ligand a | Oryzias latipes | XP\_011471186.1 | MKKSKSWIRVCVRFLLLITLGVPSCTFGSFQITDDISKLSVLKQNIPRDYNISVRYIPKELAGMCWVKLNIFFMEESLNELAKKFGNVSSNKNDIKIFIDMLQYMRLPLGNLEPLMYDFECHFRNEQWQTEQYFDYVKDLLKAAEDNISDDCDPPPCPTSLPTETFSTYSICTGCSPRTATYYGTPEKLLQSLPILFIPLLALVFLLVWKLQSKRNEEISQQYPLDGLFTRTEGTQPPQDEASETLNITETV |
| kit-ligand b | Oryzias latipes | XP\_023808347.1 | MRKKILQATWFLLSLLLSLKLSCGKFGAPITDDVNKLSVLKQNIPSDYEIPVSYIPKEVAGTCWVVLNIYPLEQSLRKLSTMFGAISSNKDTITVFIAMLKSLRFTFDHEELETVMQVFQCHYQEQSLQSSLYFDHIRDVLRAAAQGSSGFSCKPPPCRNHQQGQEKSRGHSWLMRSPLLLVLIPFTTCVVLIVWQVKCRRRLPAANTANGQMVTPDMIPTLSVSIPLETLTHAADTQPNGGGDR |
| kit-ligand a  (kitlga-201 peptide) | Xiphophorus maculatus | ENSXMAP00000018801 | MKKSKSWIDVCVHFLLFMTLGVHSAATGKVVNDIDRRVPDLRQNIPKDYKIPIKFIPKETGDMCWAKLNLYYLEESLKDLSEKFGNISSNKLNIQILIQFIEEKRIGISNMNPQMLEFECHYRVDKWETGKYFNFVEEVCNTADRERPEEECDPPPCPTTPIPTEESSSVQSTSGHDMSYNIATKDITRSSASSPSPLRQVVEKSLFSLLFVPLLALIFLLVWKVRSRRNVQHPRSNRGEEEGFTEPHLMAPRQDGETSEKNALNLPAEV |
| kit-ligand b | Xiphophorus maculatus | ENSXMAP00000003998 | MRKKIISTTCVLLGLFSSLHLCSGKFGTPITDDVSKLSVLKQNIPSDYEIPVGYIPREVAGTCWVVLNIYPLEQSLEKLASMFGAVSSNRDDVNIFVTMLKSLRLTFDHEELEAAMQDFQCHYREKSLLSGLYFDYIQDLLRAATQGTLSFSCQPQPCLNHPQTAEGQEESHKYRWLKSSSLLFVLIPFTACIVLIVWQVKSGRNSTACNTSNGQTASSDLIPTVSISIPLQTLTHADDSQPTGEAISEHESG |
| kit-ligand | Gasterosteus aculeatus  aculeatus | ABW91105.1 | MKKSKIWIRVCVHILLFITLGVHSSKFDVNPVTDDISRLSILRQNIPKDYKIPVNYIPREEGGMCWVKLNVFYLEESLKGLAHKFGNISSNRKDISIFIQMFQELRLNMGLLEAIMNDFQCHYREERWQTARYFDFVKDFLIAAQNKEDSDYCDPPPCPTTPYAVTTADYLNATSEPGPPKCADCKPKPETLSGVLEQSLLSLLFIPLVALIFLLVWKVRSCRNEENLQQSPGEGGLFPGAEATAPPLDTEISEKNMLNVIEIE |
| kit ligand-like | Oncorhynchus mykiss | XP\_021432382.1 | MKKPKIWIRVCVHLLLCITLGVQSSEFGNTVTDDITRISLLKQNIPKDYKIPVTYVPKEVGGMCWVALNVFHLELSLRGLADKFGSISSNKYNISILIEMLKETRYHMKNLEAITYDFECHYRNEQWQTGHYFHFVEDFLKTARLNRDLPEECDPPPCPTATMDTTIITQYPTSVNYPAIGTEFNMSAPDSETWNEPLRFLPEVVERSLLSLLVIPIAAVVFLFAWKVKSRRNQHQSDERNSVEGGLFTGPEGTLAPPLEEPSEKNRLNIVETV |
| kit ligand-like | Salmo salar | XP\_013981138.1 | MKKPKIWIRVCVHLLLCITLGVQSSEFGNTVTDDITSISLLKQNIPKDYKIPVTYVPKEVGGMCWVALNVFHLELSLRGLADKFGSISSNKYNISILIEMLKETRYHMKNLEAITYDFECHYRNEQWQTGHYFHFVEDFLKTARLNRDFPEECDPPPCPTATMATTITTQYPTSVNYPAIGTEFNMSAPDSETWNEPLRFLPEVVERSLLSLLVIPIAAVVFLFAWKVKSRRNQHQSDERNSVEGGLFTGPEGTLAPPLEEPSEKNRLNIIETV |
| stem cell factor precursor | Takifugu rubripes | NP\_001153658.1 | MKKSKIRIRICVHLLLFITLGVHSTKFDVNPVTDDISRLSVLKNNIPKDYKIPLDYIPKATGGICWVKLNVFCLENSLHNLSHTFGNISSNRKDLSIFIKMFQELRFNLEPVEPIMYEFDCHYRKERWQTAKYFDLVKEFLIAAQNGDNSDDCEPPPCPTSPRPVTTEEYLTESSTVISSNGPECTTGCTTYHNPSPLSEVVERSLLSLLFIPLLALVFLLVWKVRSRRNREDMEQDSGERGCFTGAEGTASPLDADISEKNNLSTIETV |
| kit-ligand | Astyanax mexicanus | XP\_022539640.1 | MKKSKIWIRTCVHLLLYITVAAYSREIGNPITDDIKKISLLKQNIPKDYKITIKYLPEEVSGTCWVNLNVFHLEESLKVLAQKFGNISSNKDNIETFVQMLREMRFHIGHTLEDDMQQFECHYREEKWLTARYFEFVEGFFNTANSSREEAGCDSPPCPTTTKTTISTTVTASVTHHHSRGSSFAQNSTAEKEATNQRILPEVLERSLLSLLFIPLIGVVFLLIWKVKSRRNDPPVQRSSEGPPLFIGAEASAPPLDDISEKNRLTLVREV |
| unnamed protein product | Tetraodon nigroviridis | CAG05577.1 | MATALCALSRSADIRIRSCVHLLLFITLGVHSSKFDVNPVTDDISRLSILKNNIPKDYRIPLDYIPKATGGMCWVKLNVFCLENSLHNLSHTFGNISSNRKNLSIFIKMFQELRFNLEPVEPIMYEFDCHYRKEWWYTAQYFDLIKEFLIAAQNGDTSDDCEPPPCPTTPQPESTEEYLTDHEPSALSEVVERSLLSLLFIPLLAMVFLLVWKVRLMLTLGMSSAQHLKIRLEV |
| uncharacterized protein  (LOC101068411) | Takifugu rubripes | XP\_011611710.1 | MTPITDDVSKLSSLKQNVPSDYEIPVSSIPKDVAGTCWVVLNIYPLEQSLRNLAGMFGAVSSNREQISVFISMLKSLRFTFNHEELEAAMQLFQCHYRERGLMSGLYFDYIKDILHAASQGTSGLPCKPPPCLNQHPSPGGQEEGRGSSWSIRAPWILVLIPFTACAVILLWLGKSGRLSPSCNVEDLRLRPFDMIPTVSISIPLQTLPNPADSEPVQDSVREHESS |
| uncharacterized protein  (LOC110500014 ) | Oncorhynchus mykiss | XP\_021432813.1 | MKSKIRTTTCVLLFLFTSLGVCSGGFGNPVTDDVSRLMLLKHNIPKDYNISIHYIPKERSGVCWVLLNIYPLEQSLRELARVFGAISSNKDNIMIFITMLQNLRFKFDHEELEATMQVFKCHYRAVKWPSGQYFDYIRDILNSAAQGEGGFRCVPPPCPAPTTPGSEAQDHEQTRSRGSLLSLLPIPVTACVFLIVWAIKSRRGGSPESNLERGHRRLSTDVERTITIPIPPVTSPTDTPIMGEA |
| kit-ligand b  (kitlgb-201 peptide) | Esox lucius | ENSELUP00000001403 | MKSKIRTTTCVILFLLTSFGICSGGFGNPVTDDVSRLLLLLKNNIPKDYKIPINHIPKNMSGVCWFLLNIYPLEQSLRELAQVFGAISSNKDNIMLFITMLQNLRFKFDHEELEVTMQMFKCHYREVKWPTGQYFDYVRAILNSAGKGKGGFRCAPPPCPAPSSAPGSEAQDHDQTRSRGSLLCLLLIPVTACVFLIVWVVKSRTGGSPEMNQQILSSDVERASTIPIPLQQLTSPSDVPVTGSA |
| kit-ligand a  (kitlga-201 peptide) | Esox lucius | ENSELUP00000011575 | MKKPKIWIRVCVHLLLCIITLVQSSEFGNAVTDDITSISLLKQNIPKDYKIPVSYIPEDVGGMCWVTLNVFRLEVSLQGLAEKFGNISSNKYNISILIEMLKETRYHIKNLEAVMNDFECHYRDDQWQTGRYFHFVENILKTARSNRNSPEECDPPPCPTTAPTTTPLPYPSSEPVNYPTKCDIAEKSCSTRTESLVSPEVLGKSLLSLLVIPIVAIVFLFVWKVKSRRNKDKPDENNSVEGGLFTGIEGNVVPPLEETSEKNRLNIIETV |
| kit-ligand b | Danio rerio | NP\_001018137.1 | MFHMREVKIGESICVLVLLFSGLVTCSGVFGSPLTDDVATLDTLSENIPSDYRIPIKFITKDVGGACWLHLNLYPVESSLKKLAVKFGNQSTNKANITIFITMLQDFRFTLNSDDLEDRMQAFKCHYRREKWPTRRFFSYVKSVLTVAGSTYGDIPPCTPPPCQTLAAPPFTPGQSRQQNGMNSAVHGLLALLIIPSVAILVLTIQMALGRRGRCGARMREIEPHDRAEENRNELHSGAAQEDPASTSASEQDRAWLDSLGCADTEV |
| kit-ligand a  (kitlga-203 peptide) | Danio rerio | ENSDARP00000145973 | MKKSNIWICTCVHLLLYITVAAYSIEIGNPITDDIKKISLLKQNIPKDYKITVRYIPKEVSGMCWVKLNVFHLEVSLKGLAQKFGNISSNKDNIGTFVQILQDMRYHIGPGLEDSMLDFECHYVEEMWLTAKYFEFLEDFFNTANSSRDAEDCEPPPCPTSTKTTITTTTTASTTSAQHSTNEKRNGLPDDPEKGAFLSKVLESNLMWLLTIPFAIAVVVLLVWKIKSRRNTPQTDRSPEEGPALFSGEEANISPLDVGISEKNRLNIIMDV |
| kit-ligand a  (kitlga-201 peptide) | Oreochromis niloticus | ENSONIP00000004881 | MKKSKSWIHVCVHFLLFITLGVHSDRLNINPVTDDIAKLSTLRQNIPKDYLIPLEYIPKEEAGMCWMKLNIFYLEESLERLSEKFGNVSSNKENISIFIQILQEQRVHMQDLNDIMLDFECHYREERFDTNQYFDFIEDLLRAVENKEDAHDCDVPPCPTSPLTEKYSEESPTPTSNAPLCPNDCKTSQQQRLLPEVVERSLLSLLFIPLLAIVFLLVWKVRSRRNQDGVQQNPAEEGLTGTEGTAPPLDTEISEKNMLNVIEIV |
| ENSONIP00000014821 | Oreochromis niloticus | ENSONIT00000014833.1 | MDVKVPCLLLSLLTNLNLCFEYGSPVTDLVALMKQDLPNNYLIPISYVPKEVAGTCWVVLNIYPMEKSLEKLTNNFGDKSTNRESLLIFIEILQTVWLKFDHMEVEILMQYFDCHYQEQH IPSGPYFDYMENLLRGADQGLFDFSCEPPPCPSTQQTFTTPQETSQSPHNLSTQQTPEFLEDDNLMPLIFVTISIAVCVTVCLFLWLSRSRRRLHVCSTENIQMQPTKMSQTPTASLKHD |
| kit-ligand a  (kitlga-201 peptide) | Gadus morhua | ENSGMOP00000010996 | PLAPQIWIRAYVHVLLCITLGVYSSEFDVNPVTDDIDRLAVLRENIPKDYKIPVHFVPKEEAGMCWATLNVYYLEDSLKELSHTFGNISSNRKDISIFIQMLQEVRLKMGSVEMTMYDFECHYRKEKWPTARYFNFVKDFLMEAQFPDDSADCDPPPCPSAAHLPEAVERSLLSLLFIPLAAIVFLIVWKVRSRKKRDDVEQNNEDGGLFTGTQETAQRLDGEIAEKGKLNVIET |
| ENSGMOP00000011599 | Gadus morhua | ENSGMOT00000011915.1 | VSELYMWICKTPCLLFFLLTSLHHCSGKFGTPITDDVNKLLLLQQNIPVDYEIPVHYIPKEVSGVCWVVLNIYPLEQSLCKLATMFGALSSNKENIIVFIAMLKSLRFTFDHEELESAMQVFQCHYRERNLLSGLYFDYIKEILHAAAQGVGGFPCKPPPCVPHQETPETQLTLNTLLSYQHSSQKRGRTIP |
| kit-ligand a | Spotted gar | ENSLOCG00000016368.1 | MKKAKIWITAFICYLFLCITFVERACGLGSPITDDVNVIPLLKQNIPKDYKIHVRYIPRPEAVNDMCWVQLNIYYLEKSLSNLTKQFGNISSNKENISLLTHMMQNMRLEYTDKVFLEFKMREFDCHYKEDKLLTENYFDYVTDIFDTYRQHENEHLSDTCDSPPCPTTTREPTTVTTGSTIITGTIRTTACTAAANCTPDKQTSDESGVKDKMQFLYLLITIPLCGLVLLAMWKVRSRRRRSFPGNISNGRLQREEEVDSTSEEIEKLKTIQV |