

>CulexPipiens-TTLK-CPIJ013746

MTRYQRTTEIRKVT PFDLESLTEILEDWRTL FYLIPRRIGDVDQPPGAY
LTKYNGNQERDLDKHASQERRCALQLLEEWGSSGKLQDRPTLEHLLKLLV
KGNMFRAADEVAVNLLKEDPPARPQSGPAARIDIEGLLNGEIERGLDQVS
YPNSTILLNGMESSTVNNNLDRAEPEKRDDVKDFPDLLRNSMLDGTLSQI
SLSDNNEQMGEPIVDRPNISALLRSEEPVAGPSGMSQIPVILLGSAISST
SDSVSNNESSASSVMSQSAEPPPSGLGTISEEGESGDGDQGLPNLSIFGDR
VPDNVSSSNGIPDLSGLMNGPVSSSHRSEHDSADIPRLSVLGSTQQYSTN
SNNSDDINSTLASDLIKFSITDSATAEPVHFSYQNLQVATANFNADPFNN
GDLRKPNGHFLGKGGFGQVCLAVNLT SNIAAAVKRLLPTNENYRQKFDR
ERQILSQCHHPNIVKLFYSENDQLCLVYEYLPDGT LERALKANREGQTL
PPTSRLSYLLGIASAIEYLHALPDPVIHRDVTPANILLRGT TAKLADFG
VKRVESTTATVVAGTAAAYLPVEALRGIVTPALDIYSFGVVIAEVVSGEDA
IGGVSGGSANVDQDDLLE RVSARDADFIGLVDSRVDGEERWVEGGRRLLE
LSRRCLRDRTKRPGAKEVRELIEDVANL

>CulexPipiens-Pelle-CPIJ015474

MGTPSASSSFRSNFVYIYDIPWTEQKRLTCLLDQDGKWPPLALKRMGYGA
VEVEDIQRCCAQSGRSPAEQLLKKWGNLNHTITDLFVVM SQEGLFSAMEI
IKRFVDPQLHYLIKQESLVAESRKELNGPPAPSAPALEH SKDGNSDSVVP
PAAFQOKEPAVAPPVVPVAPQPPQVLFSPASIPGGLPQFSYEELRSATD
NWSKENELGRGGFGIVYKGFKLTHVAIKKIKGINTESARTELRQSFNEL
KYLNSCRHENVVPLLGCLEQNEPCLVYQLMPGGSLDNRLF PKTTNTRPL
SMLDRIKIAKGTAKGLQYLHTFTAKPIIHGDIKPGNILLDNNNEPKIGDF
GLTREL SVSDSSMKVSRVYGT RPYPHEFFTYRQLSTKVDSFSYGLVLYE
MITGQRVYDDKRPIKHLKDVVDNAIASKYDIRVLM DRALLVVNADDVATV
QACKVLLTCGVHCTMNDPDRRLEMVEVYKFLMTQFGA

(Misannotated as interleukin-1 receptor-associated kinase 4)

>AedesAegypti-TTLK-AAEL007642

MTPYTRSTEV RKVFELDELASVLEDDWRTL FYLIPRKIADVERPAGSYPI
RYNGTHESELDDYGRIQNTARARILLEEWGTSGRKGERPTLGHLYTLV DK
GGMIRAVRHIEKLLKVPESAQPDSGPAAPIDVDLELNRLIEKQLEGIAYP
SSTALQNGDISITQVNNLDYNLPKRDDVVNPPNTVPDSIEGSLPLLSR
SDNNDQSIGAVPMLSDLLNADGQDTEASTSDNDSTPRQTIEGNTLSSTSD
STSESSSNSTPTESLSRILPMVLP TIPEAGEVPNLSIFGPAASEASMDVG
IPAISALMASSDSQQIVNDVSRSTETTFQSEEHSSSESSSSDSTEQQSSNNE
PVCASNLMFSSSTNVATVEPLINF SFDLTTATGNFDIKRFSNGNPLQPD
GRVLGIGGFGEVFLALNLTPTYPVSAVKRLFPTNYKYKEKFDRE RELLSK
YNHSNIVELIGFSENVTLCLVYEYLPDGT LGAALDKSRKGQLHLTVTRRI
SYLFGIAAALEYLHSPLVQVVHRDVTLANILLHG DVAKLCDFGLVKRIDS
ITATEVSGTGPIYSPEAMRGTVTPALDVYSYGVVLAEMVTGEEVLCEVLP
EGVGDLIERVTARGADLES MVDRKVSQHELSEWLTYGKELLKLSNWCLRE
RFKRPSAAAVRECVQKMKQGIC

>AedesAegypti-Pelle-AAEL006571

MSAEPSQGRGNTGNPQNVTSDFSSNFKYIYDIPQMEKKRLADLLDQDARW
VGLALRQMGYSADDVEGIRRCNRSRSPAESLLVKWGNLNHTIVELFVV
FYRENMTPEMEVIKRYVEPKYHILLKTPVSNTSVKVMNGPPAANGNPVEG
YTTTDENSENSAQQKVEFAQKVLPPPIAPPVVVPIAPIPLAAPAQFPALMRS
PSDQIAATVGGGLPQFSGEELREATKNWHPDNELGKGGFGVVYRGYFKQTY
VAIKKIKGANMESARTELROSLNELKYLNACRHENVVPLLGYSLDCLYQQ
QHHCASRAKSKSESEFVELTSLNKKPVIHGDIKPGNILLGANNEPKIGD
FGLTREMAVSDSSMKVSRVYGTRPYIPPEFISQRQLSTKVDSYSYGLVLY
EIFTGQRVYDDKRVPKHLKAVILAAVQSNADIRNLMDPVLLHTANVRTFP
SCVMLLRTGLSCTADEPEKRKEMADEVYKSLVEVFGE

>AnophelesGambiae-TTLK

MHRNMEIRHMAFHLETLAHILDTSEGWRDFLYLIPRNLDLLKEDPYYPL
KYTGLNERPLFDSSILETESQKRNLSPSKLLLEEWGISGQVRPTVDHLLK
LLVRANQIRAAEYLTLLKEQPPARPKDGPAPIDVTLPEHDHOTESLLNG
ISYPSSTILLHHVESITIGNNRDYDYLKGPTRVEIKDKSSVNVVDGELPV
FSSSNNTKSGSDSSDIRNPAMMDRYPDQLPGPSRPSKAAAKAPPAEATP
DGPLSSNGLPMISALGITSGOPESSKLQNNRNYDCASKEINGPQIPDLSI
FGREESERKEVNGPQVPELSIFGREESERKEVNGPQVPELSIFGRQSDS
KEDNGAPVEHREDIPALSALLGDSSDVHQTQSNSTNNTHDSIPMLSMGGS
DGSTSDTLGSESSSSAIVPQVDESVSDFIKFSTSPVVAVYAYDHLREVD
GFNVAPYTNNGNLAAPNGRSLGAGGFGAVFLALNLAPSIPVAAVKRLDPDK
YKREKHFHLELDILSKHSHTNVVSLGSSSDGPQLCLVYEYLDKGNLEAA
LSLVRAGQROMGATVRLQYLKDIANAVAFHERAKIIHRDVKSANILLDG
PVAKLCDGFLIKRTSSRTTTSIIGTNAYMAPEAVRGDVSPALDIFAFGIV
VAETVTGEPVLAEKESRSEIDLAGYVCRQRAEGRDLGLLVDRRAAVGRDG
EARWCEAGRKLEIAIKCMGEKWSRPNNGALADAVAGIQLVPL

(Misannotated as Tube - AGAP003062-PA; see Materials and Methods)

>AnophelesGambiae-Pelle-AGAP002966

MLCPIMSKPNGQHTEMEGKPSGLSAATTVAPLSNFVYIYDIPRMEKKRLA
ALLEVNNKWEYELGEKQMGYSTVELDSTQRCCQRNNRSPAQQLDKWGNYN
HTITELFVVLRSREKLYNCMELIKRYVDSRYHVLIKESASDGRNAVANMAT
FSGANNANVPNGHRAAHLKDGAAQKVNGGGGDGAAAAAAAAATNDKSN
PTNSKENSFPANELADLTSLIPKISYEELTAATDNWSEARNILGKGGFGTV
YRGNFKHTFMIAIKKIDYKVKSSSEAERIQLOQSFNELRFLNSCRHDNIVP
LFGYICIEKEPCLVYQFMPGGSLDKSLFARRPASPLTWRERMNIAIGTARG
LQYLHTFGDKPFIHGDIKPGNILLNEYKQPRIGDFGLTRQGAVQDSATVV
SRVYGTRPYIPKEFYDRRELSTKVDTYSFGVVLYEIGTGLRAWDERRTEK
HLKDYIARAVQEQMHVTQLADQSLPMDAEALMCCFKLLQVGRVCTADDPK
QRPDVMVGMWQLSAA

>NasoniaVitripennis-Tube-LOC100122761

MATLDTEIRKLQPIELCTLAHILNQADAWKTLMAAIPSPDNPNHSLFNHE
HFKMIEQAIRQQRSQAEIFLSEWSTLKGQRPTCRSMLDLLVKAELFRAA
DYLAVDILKGNPPVRPNFGPAATIDVSENAIEEILKQQAALVKTSAQSTQ
DQEP LSWSMHFAEKPVHDVTATFHSEKAEDKQEELSDFIKFSETVKSGLL
KFS DSEVKVQDWIAKDQTEVSEDYVLQEARSEDIPLCVRENVFQEI NSRM
MSTTTQETETATTIDSSDFSESTIASEEVQLPNISQNVIPVVMEYNEKE
KGETD

>NasoniaVitripennis-Pelle-LOC100115010

MASSTKSIKFIYQLPYLVERVELCKILNQNNKWEELAGVWGMGFNNLEIQNL
RKEQNPTTELLAIWEKHNHTVLEL FMLLARMHHYQAMLPKISFVDSKYHT
LLYNGEGNLQKLLRNGELRKDTKDLKIGAQNFNQKQKQENAAKILVNNS
LKDESSKILNQPMPHDQONETPSNSNNLLASLPAIFSTLLPRI PYSELAA
ATDNWKREHLLGKGGFGTVFKGIWKNTTEVAIKKIEPRGSDYDESYALQLE
QSFREIKILNSLPHENILPLYAYSIGGEAPCLVYQCMKNGSLEDRLHLKH
GSYPLNWIQRREIAKGIARGLQYLHTIHEKPLIHGDIKSANILLDKNFEP
KIGDFGLAREGSSDDSLKVSQIQTTRPYLPEEYIFKGNLSTKIDTYSYGI
VLFELATGLSAYDKSRPTNKKLKEYVDSFEDKDLHLLRDKKAGDKYIEVY
KYL LLLGKWCSNKLAEHRPQMSTVYDKFKN

(Annotated as similar to ENSANGP00000010886, which is the *A. gambiae* Pelle)

>ApisMellifera-Tube-LOC725368

MMSQSTIYLDIELRKL RPAELYILSQILNISDSWKKLMAIIPNDMPNLP
KFNSEHFSMIEQAANHQRSAAEIFLSEWATMGKKRPTLSVLLNFLVKAEL
FRAADYVAKDLLNVKVPERPKYGPATPVDISEEMKLL EEEKEKFENLNFNE
SLIFKLSSENVDNKTINSVMNDSFLERNIQLTKLISSKEEHSNEQLENK
KTLNTQMFDLMKFSLEESKECSKQEQMFKEMLSHHELPVFLNEFKQTV EQT
KLYQEVSS EELPIFVKNAIAINQNL SNYHVDDSLNLSNLNINNEIITTEL
PQC VVEFHVNNEFNSNNRNN

(this sequence differs from the Genbank record – the Genbank record shows a gap between a.a. 113 and 248; see Materials and Methods)

>ApisMellifera-Pelle-LOC551608

MTSSSCRDKIEYIYQLPFLTRSELCKILNQNDKWEELAGIYMKYDVLTIQ
TLRKEKNPTDELTLWGHHNHTILEL FVLLSRMQHYQSMLPLIPFVEEKF
HKLFYNAIHIGVSPSNSNNLLVTS LANPLPVTLSCVPTNKKKDDNVLKPE
ATIPCVIYNELNIATNEWNKNNILGRGGFGTVYRGTWKNTNVAIKKIEKR
GTNSDES FVLQQLQTLREIKILNFCRHENILPLYAYSIDKIPCLIIYQLMK
NGSLEDRLRMRRKSQPLSWIQRHEIAKGTACGLQYLHTIGEKPLIHGDIK
SANILLDKNFEPRI GDFGLAREGLEND SMKVSQIHTTRPYLPEEFLHERK
LSTKVD TYSYGIVL FELATGLPVYDESRL ENKFLKDLIGTLENENLVSLM
DKKADHFLIANAL

(the C-terminus appears to be incomplete)

>TriboliumCasteneum-TTLK-LOC663280

MDPSVEIRKLPLDVRSHLISLLELQDSWKKLMAIIPQTLSSLNEYKCDINF
NMPAKYRSEHFHIIEDNSVKKRIFCSEILLREWGTSGRVVRPAVGHLKYLL
QKAELFRAADYVAVDILKEEPPRPAPKGAAPVVFNPDELDPETKRIEK
ILDEINYPSSAIENINKLNSFNNTLNYSKGKETTQVIPKIIISESPDVEET
PPFRLPVVQVKVSES DLIKFSQESVSNSDNNANVPHLSLLTDEASNN
NIPAVISDLVSQSSSETTTENADSAVNRPELSSLLNQSSDDSEPNFNVPA
ISELSLASSSDSSSNFPALSQ LIDSEKNSRSCSSPLPNLSLNTPLPHFSY
CDLATATNNFDETPVAQGG RFLGSGAFGKVYLG VGLVSKPVAVKKVILEN
VDVVRVDDMVTKQFRNEVEILSKYEHENLVALRGYSCDGDYCLLYEYVP
GGALKDRLQLIWTERLYVAMGTARAIAYLHTAYASPLIHRDVKSANILLD
SNNKPKVDFGLIKRALNQNTNTATTIFGTSAYMAPEAFRGDVSVKLDTFS
FGVLLLELLTSMPPMDESREGVDLVTHVQETCQDGIKPLLDTTVGSWMA
NSINFGEKLYEAIATSCLKEKKERPTMTSICGILGDLVQKFL

(a.a. 1-248 verified through EST sequences, the rest is a prediction from whole genome sequencing reads)

>TriboliumCasteneum-Pelle-LOC654877

MFIYDMPFLERKKLCSILDRNNCFEELA AVHMQFDSETVQKIS
REFFRGISPTEKLLDLWSHHNHTVFELFILLYRMKHYQAMTILKPLVDSK
YHHLIKQSTCLPELMADLKLEQEPITSEKILNAPSCENNETKPQKPNGIS
LISCVTESVGAVPQIPYDDL RQSTNDWNTGSILGRGGFGTVFKGVWKCTQ
VAIKRIEKKADDNSDQIFQSYTELHCLNAYRHDNILPLYGYSIDGPQHCL
VYQYMSGGSLEHRLHIRDASRVLSWPTRLTIAIGTARGLQFLHTIRDKPL
IHGDIKSANILLDLNEIPRIGDFGLAREGPPQTDYVKVSRIHGTRPYLPD
EFMKYKKFSTKVDYTSFGVVL FELATAGAAYS NKRVNKF LRDHVVFWE GD
VLQLKDSRAEGGEDFFKGLVEVGKCVRTGAKDRPEMVTVLLQLEAVMNQ

>DaphniaPulex-TTLK

MNSDMEIRKMPITVRLRLSSMLDTNNSWKIVMGAIPELNGDVETKKFSSE
HVGLIEEEEAKRQKSAFDILIDEWGTSGKQRPTVCELVKLLAELELYQAA
DYLSTDLLGEGPVERPANGPSANVPSSTEDINFLQTTSHSIQAAILEATN
EHINPRFFEKKMPFSPPEVDKFDTTLP HLSYADLEYLTNDFDLNPVSQGR
KLGAGAFGTVFLGILKENPQLDDRGIEIYKKMKLSLQHKVAVKRLHNQKV
DVDIDTNRLFRTETVETMSQYVHENLLALLAFSADGPDCCLVYSFIPNGSL
EARLACEGGSPPLQWNQRLDVAHGVSKALIH LHTGGAQPLVHRDVKSANV
LLDHNMKAKLGD FGLIRIGASGRGSKSVAFTSNVLGTSAYMAPEGAFRGD
ISVKLDTFSFGV IILELLTGLPPYDEERDGN DLISHVDSALDEIEFIQLL
DPKISPLPEDMASALHSIALSCIQEKKRRPLMTQV

(assembled from whole genome sequencing reads; a.a. 1-217 and 281-485 verified through EST sequences)

>DaphniaPulex-Pelle

MASASPKPKYIYELPYIPQRDLANILDDNNQWKELGTVHKKINCDFMQYN
VTRLNEFRNTQSPTMAMFSDWGQKNHTIVELFVLLSKMQHYRALEILMP
YVDERYHVLVVRNGELNLSKLLKTELGAAAAPGNYSSELSTATLRSPSGAKG
SVDSCNFNSPPCERAFPSKLAFFELGQNNPSVSKPISINQSDVTRSENIQ
ASWNTPSPAQPPNPSPQHGPINGILPRRDSESSGIFRDKVLFFALHISIYN
YSSPAFSEASSASAMSNIPPIDEQELS IATNNWNTVVSILGKGGFGTVYKG
TWKNTQVAIKRMENKGLAGANLIPMQQSMGELRILNAVRHDNIPLYGYS
LGGNFPCLVYQFMPNGSLEDRLLCROGTYP LNWEQRFNIARGTARGLQFL
HTMGDKPLIHGDIKSANILLDKNFEPKIGDFGLAREGPQTQYTHIKVSRV
LGTRPYLPDEYLRGKKISTKVDYTSFGIVLFELGTGLRAYDSHREHPYLR
DQIENSGQTDLRDVKAGQVCVALYQPLMHLGWLCSTKAKDRPEMVKV

(assembled from whole genome sequencing reads)

>LottiaGigantea_TTLK

MGKVTLTQDSYIRKLPFSAYRKLINLLDPGREWEKMAVLVPREINMTADNFEPYDFDQI
ANFAERGRKHNGSATESILRDWGTQNP TIQHLINVFMEAELFAAADYLSVQILGGSPVPR
PHTDFMSVENNLGRPHRKVVEDDEDLMLDGVNLPKPNSSKASDNEEMKNSVLRDHNI VLR
HVSYSTLKSITNNFNEEEEAIKGNLLGKGGFGLVFLGKFQSNFSVAVKQLKKDSQDIDVE
KQFNTERHYLTKYRQDNLVQLLGF SHDGPYNCL IYQLMTNGSLEDRLMCKDGTSP L TSSQ
RVIIIVKGTAEGIAFLNNHGLVHRDIKSANVLLDEKFLPKIADFATRSAPQGSGLSKVQQ
TSCVIGTSAYLAPEAFQYDVSTKLDSFSFGVVL YEILTGLPAYDDQREEKDLKTHMDENC
EQIVDMLDISGGEWDEKAVNVIYDVAVQCVQNKRRRPVVS D LLEDLRKL

(assembled from whole genome sequencing reads)

>LottiaGigantea-Pelle

MAQIYQGFHFDYISELPYSVTRSIIIVSLDSDKAWECLASEAGYSFDKIKLFELEYQRHH
GSPAKALLWDWGSRNTPVKELYK LKKINRIRELQILENHLVSVGAIEEQENSHNSYNNS
IDIMPSLKTSDLPSQKQKIKSDKVALLENEVNFNQPN SQNFGRKKNPTSLCSIDKDKQ
YDDKVIPGQEQTAAHKPQESEESFESTTSSSFSADLSSSKSSSLTNNSSSQSEDLQSLLT
NSNMSVAVALMGSPVFKFEELKKSTDNFNEQNLLGEGAFGKVYF SCLRECKCAIKKLDAA
TSDILSNNEEKRRKLCSELSLLLKYRHENIVTLYGYAVDGP SLCLVYQH MVNGSLED CIQ
MKNGRLALNWEQRLRILCGAVCGLRYLHYMGNVPLIHGDIKSANILLDKYHEAKIGDLGQ
AQHVNSGAI TGKLTHTTKDAKSKLYG TKAYLSPELLRGNENMSIKTDIYAFGVVILETL
SGQPACDENRTSSKFLADYFFDVIEPLGQDEWVDKFDHDKAGPPPTDLIFDILKLAVSCI
SQIKKRPD TDKVAENLEKNQKFM DVYSSTTSSLGYDHL SHTSVVSGHDGNMAGNMA SV
SKDSVLKENASPGTPPLESIPYRLQMMYDQQQSGDGPHTSIEDLKKQIQTESKTEEPFKE
YVSDPAKMAAIENYDKELKLAQQEQPKFEKESE PASDPNKLALLNLFDRKCTISESENS
NVGSDEHKLKAILFDAQNVGESQSLQNKMVNMFKMYNACIDVEEDDDDDASTLVGDQD
ENNDDETC DQ

(assembled from whole genome sequencing reads; a.a. 1-367
verified through EST sequences)

Supplemental Figure 1. Annotated FastA Sequences of TTLK Proteins and Pelle-like Kinases.

SUPPLEMENTAL FIGURE 2.

***Drosophila melanogaster* Tube**

NVPNLTIL	262-269
NIPDLSIL	286-293
NIPRITLL	319-326
NLPMISAL	356-363
NIPDLSEL	453-460

***Culex pipiens* TTLK**

DRPNISAL	215-222
QIP-VILL	237-243

***Aedes aegypti* TTLK**

EVPNLSIF	281-288
GIPALSAL	300-307

***Anopheles gambiae* TTLK**

GIPMISAL	258-265	
QIPDLSIF	294-301	(RNYDCASKEINGPQIPDLSIF)
QVPELSIF	315-322	(GREESERKEVNGPQVPELSIF)
QVPELSIF	336-343	(GREESERKEVNGPQVPELSIF)
DIPALSAL	363-370	
SIPMLSML	391-398	

***Apis mellifera* Tube**

ELPVFLNE	235-242
ELPIFVKN	260-267
ELPQCVVE	299-306

***Tribolium castaneum* TTLK**

NVPHLSSL	235-242
NIPAVISDL*	251-259
NRPELSSL	277-284
NVPAISEL	297-304
NFPALSQL	315-322
PIPNSLN	335-342

Supplemental Figure 2. Alignment of the Tube Repeats from Insect TTLK Proteins. Numbers indicate the location of each repeat in the amino acid sequence. Repeats 2, 3 and 4 in *A. gambiae* TTLK are each part of a longer (21 amino acid) sequence repeat shown in parentheses. The asterisk indicates a *T. castaneum* Tube repeat that contains a one amino acid insertion.