

Sensory genes identification with head transcriptome of the migratory armyworm, *Mythimna separata*

Zhenxing Liu, Xiaoyun Wang, Chaoliang Lei, Fen Zhu

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* submitted as separate excel file.

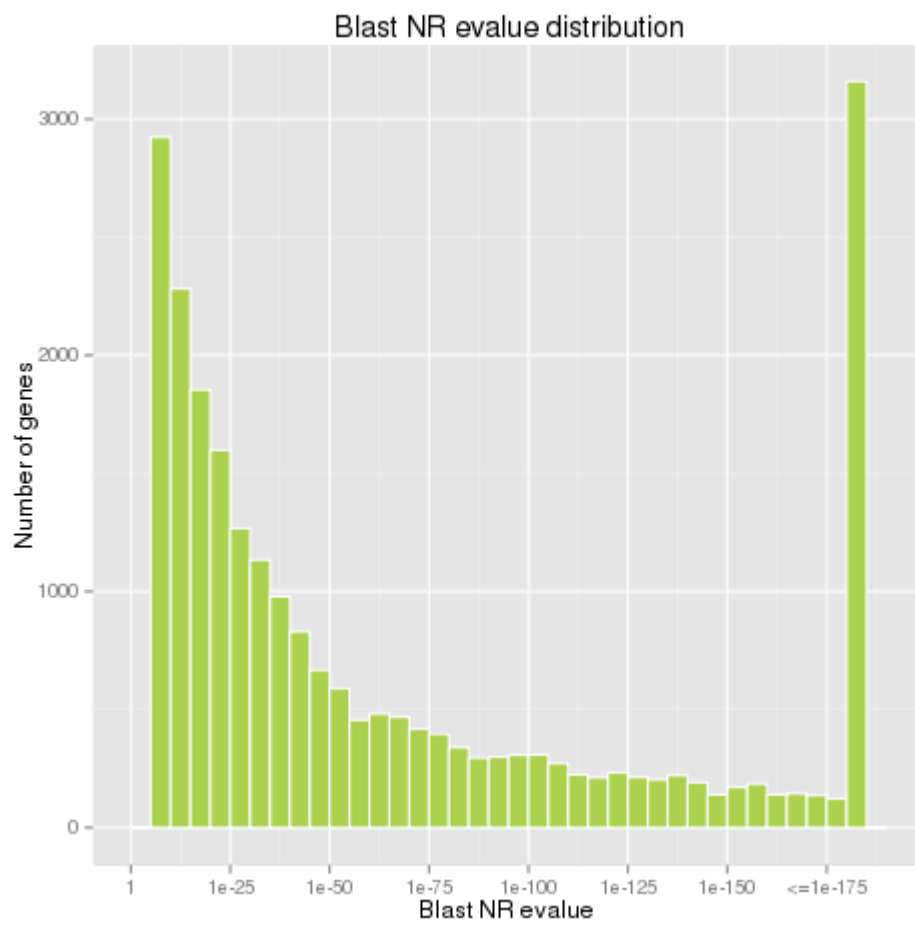


Figure S1. Blast NR evalule distribution of the *M. separata* transcriptome.

Species classification

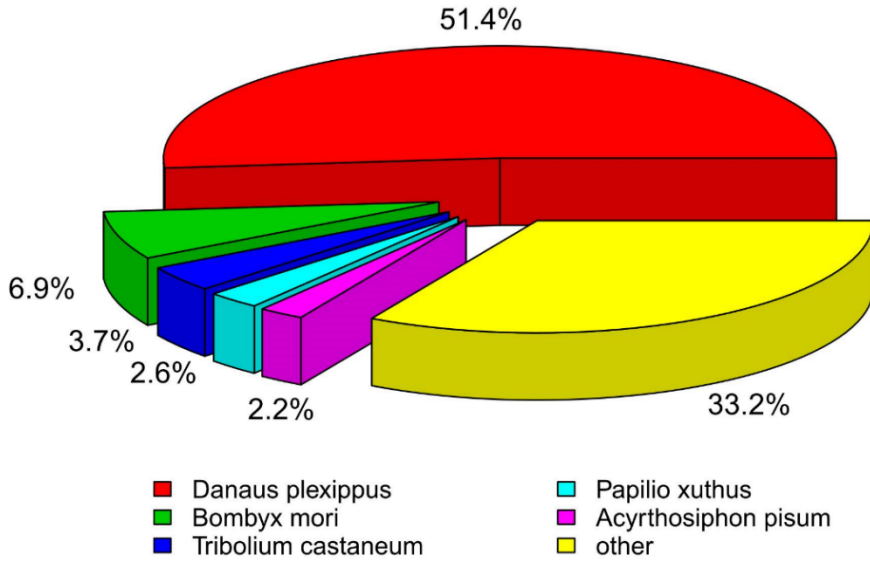


Figure S2. The BLASTx annotations of *M. separata* transcriptome species distribution.

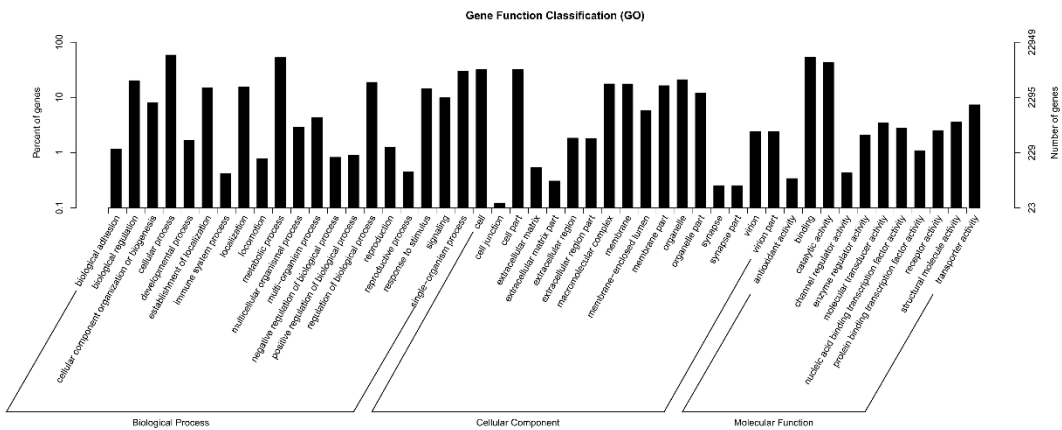


Figure S3. Gene Ontology (GO) results. GO analysis of 22,949 genes in *M. separata*, according to their involvement in biological processes, molecular function, or role as a cellular component.

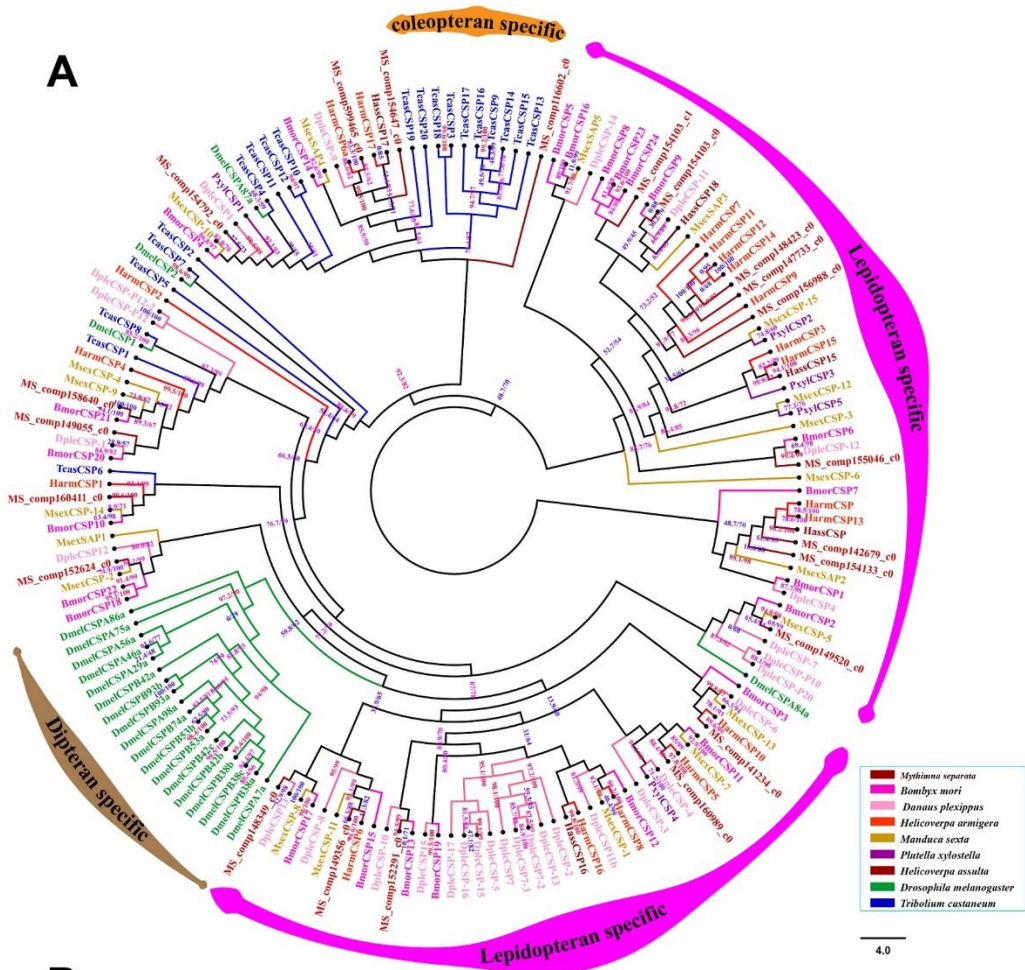


Figure S4. ML CSPs and Alignment of the CSP sequences of *M. separata*.

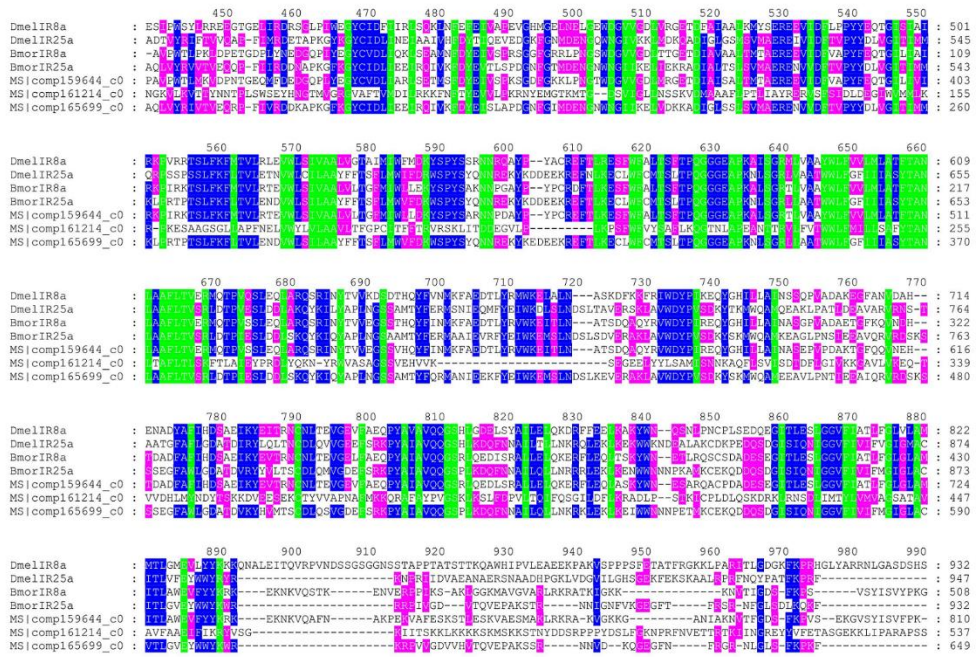


Figure S5. Alignment of the IR sequences of *M. separate*.

Table S1. Component of mixed heads from *M. separata* in different life stages

Stages	Duratio n (d)	Frequency	Sample- day counts	12:00 AM	12:00 PM	Number of heads
1st instar larva	6	Every 2 days	2	5	5	30 *
2nd instar larva	3	Every 2 days	2	6	6	24 *
3rd instar larva	3	Every 2 days	2	6	6	24 *
4th instar larva	3	Every 2 days	2	5	5	20 *
5th instar larva	3	Every 2 days	2	4	4	16 *
6th instar larva	6	Every 2 days	3	2	2	12 *
Female pupa	10	Every 3 days	3	2	2	12 *
Male pupa	10	Every 3 days	3	2	2	12 *
Female adult	5	Every 2 days	3	2	2	12 *
Male adult	5	Every 2 days	6	2	2	12 *
Total	-	-	-	-	-	174 *

* indicates Sampling procedure in the table were repeated for three times.

Supplementary Data S6. The Sensory Protein Fasta Sequences of *M. separate*.

1. Opsin protein fasta sequences of *M. separate*

Complete ORF:

>MS|comp149511_c0

MSLSLDPGGIAALQAWGGQVAAYGASNQTVVDKVPDMLHMVDPHWYQFPPMNPLW
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CYNETWVWGPLACELYACAGSLFGCASIWTMTMIAFDRYNVIVKGIAAKPMTNNGALLR
ILGIWVFLAWTLAPFFGWNRYVPEGNMTACGTDYLSKDWFSRSYILIYSVFVYFMPLLLI
IYSYFFIVQAVAAHEKGMREQAKKMNVASLRSEEAANTSAECKLAKVALMTISLWFWMAW
TPYLVINYTGVFESAPISPLATIWGSLFAKANAVYNPIVYGISHPKYRAALYQRFPSLSCQAS
PDESGSVASGATAVSEEKPA-

>MS|comp158503_c0

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YNETWVFGPFACELYGCAGSLFGCTSIWTMTMIAFDRYNVIVKGIAAKPMTKTGALQRIL
GIWLFSLAWTLAPFFGWNRYVPEGNMTACGTDYLSKDWLSRSYIIVYSVFVYFPLLLLIY
SYYFIVQAVTAHEKAMRDQAKKMNVASLRSEEAANTSAECKLAKVALMTISLWFWMAWTP
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DEAGSIATNATVVADEKSEKPA-

>MS|comp163867_c0

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RMVGYQLGCDIYAVLGSLSGIGGAITNAVIAFDRYKTISCPLDGRINRVQAFILIAFTWFWA
LPFTILPALKVWGRFVPEGFLTTCSEFDYFTDDQDTKVFVVCIFVWSYAIPMTLICFYFSQLF
GAVRMHERMLSDQAKKMNVKSLAANKEDASRSVEIRIAKVAFTIFFLVCAWTPYAFVT
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DSVSTTTSVATAQSTAQPAAEA-

>MS|comp164210_c1

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LYIFFTAAALVGNGLVIFIFSTTKSLRTSSNLLILQLAILDFIMMAKAPIFYNSAMRGFASGT
FGCQLFALMGAYSIGAGMTNACIAYDRHSTITRPLDGRLSRGKVLLMIAFVWIYSTPWA
LLPLFKIWGRYVPEGYLTCTFDYLTNTFTDKL FVACIFACSYVFPMSMIIFYSGIVKQVFA
HEAALREQAKKMNVESLRANQNASAESA EIRIAKAALTVCFVAVSWTPYGV MALIGAF
GNQQLLTPGVTMIPAVACKAVACVDPWVY AISHPKYRQELQRRMPWLQIQEPDDSVSTAT
SNTVSSAPPAAPA-

>MS|comp165164_c0

MQTLFEDLEDECPWYYFDGSYKLLLGACLFIFGVFGVLLNGWLFATFIHSHLLVFRSHILV
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LANYYRRERTLYTRFYWSLVGLSWFNSVIFSTPPLFGYGKYSCDSTGTTCTFLWPSTHSGA

KHIGFSIPYILVCGVIPVIAVFYYMGKAVRLERIFYKGEVQKEQTRLTQTIHAVCVATLALWI
PAAILVGWQWLPLLIYGYRPHVPPALAVIAPIASEAATSVPVLCFIAGDERLRAALLGRMR
KHYALLQPERAKRYNRA-

Incomplete ORF:

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GNVLVLLMYIRCSLRTPGNILVANLALSDFLMLAKTPIFIFNSFNLGPALGKTGCVIYG
GGLTGTTSIATLSAIALDRYWAVVRPLEPLRALTAIRARLLAIGAWLYACIFAIIPALNIGYGS
YVPEGYLTSCSFDYLTEDFSRPFIFVFFCAAWLAPFCTITFCYISIFRVVFNRSMSYGNQD
QRLSSRHVKERTKRKAEIKLAFLVMAVIALFFISWTPYAVVALLGITGRKDLVTPITSMIPAL
FCKTAACINPFYIITHPKFRKEFKKMLYRDKSKRMRGTLRTTDYCTDTRMHRPSKDLSD
TDVEIVEMKDIPYQTDEKRDVKIKTISSKVAERQDSQTSMTIKSLQDSVSPPSWYMKPQ
FKKRSFHRRSTRTNSSQTSTSDPII-

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VESLRANQNAGAESAERIKAALTVCFVSWTPYGVMLIGAFGNQQLTPGVTMIPA
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>MS|comp44349_c0

ENSYDAHFAAYKSGGAGDTEMLGAGLTGEDLAMVPEHWLSFPAPPASAHTALALLYIFF
TAAALVGNGLVIFISTTKSLRTSSNLLILQLAILDFIMMAKAPIFIYNSAMRGFATGTGFCQ
LFALMGAY

2. CSP protein fasta sequences of *M. separata*

Complete ORF:

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MKTLFILCALVVAVCARPEEQYTTEYDNIDIDEILNNDRLFKSYFECLVGEGKCTPAGKELK
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KEVSQ-

>MS|comp141234_c0

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SR-

>MS|comp148349_c0

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GQ-

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ED-

>MS|comp149520_c0

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FLKE-

>MS|comp152291_c0

MKLLIVLALVAAALARPDDSHYDEKYDNFNIDEVITNERLLKNYAHCLIGDGKCTPEGNE
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KYAP-

>MS|comp152624_c0

MNALLIAIFALAVPTALAYDEKYDKIDVDKILGDDAMFTAYINCMLDKGECTQEHSADFR
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TD-

>MS|comp154133_c0

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RARAAGIVIPAE-

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KTQIESAKQ-

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MKYLSSKKTEDSKETNVTKSDEETKNSSKE-

>MS|comp155046_c0

MNFLVLSVVVTLAAFATADLTYTD RYDHVNVDEILDNRKLLVPYIKCTLDQGRCTPDGKE
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AFLASPDESK-

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MKSYIALLVLSVAAMALARPEEAKYTDRYDNVDLDEILSNRLLVPYVKCILDQGKCAPD
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KELKEIKQ-

>MS|comp158640_c0
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>MS|comp160411_c0
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WDPTGDFTRYFEEFLAKESFNTIPGSGSAIPTSSPLAPPRPIPTMPPTIASPAPGPTEPTPPRPA
ILNRFGEDELMQGSPPSSGVMTPRPMTQATPRPTTMRSTVNSRPVPPRPTMMTWAGAAS
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>MS|comp160989_c0
MKTILVLCVLIAAVCARPEATYDTRYDNFDVESLVENVRLKSYGHCFLGTGPCTAEGSAF
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ASD-

Incomplete ORF:

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DAKELKEHI

>MS|comp148423_c0
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LEEVQH-

>MS|comp154103_c0
DGKELKTHIREALEQDCAKCTKAQRDGTQVMGHNLINHEVDYWNETAKYDPKNLYST
KHEQELRKLKQ-

>MS|comp154103_c1
MNSFTVLCLFALVALAVARPDGKYTDYDSVNLQILSNRLLVPYIKCMLDQGKCTPDG
KELKTH

>MS|comp599465_c0
MKLIVAVALLCLVAESWAASTYTDKWDNINVEILESQRLLKAYVDCLLDGRGCTPDGKA

LKETLPDALENECSKCTDKQKSGSDKVIRH

3. OBP protein fasta sequences of *M. separata*

Complete ORF:

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VSDGEAGCERGALLTACFLENRADIL-

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MIFRFLLSFYLIEFYGAQARTDQEIKAWFFQEGMECNKEHSISPKEILMLKENKIPDTENAK
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DGEKGCERSVLLHKCFVETAPQLGIKLP-

>MS|comp129850_c0

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DETVADGEAGCERGTLFAVCFVKNDDGDFI-

>MS|comp141177_c0

MIKFSVVCLYFVVVAVHFWNVKCMTKDQEQEIIKAMKPLAEECASYCGLKDEDLKKYQ
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ANADNNGDDEEAIKKRVDVMFNCKIKELKE-

>MS|comp141270_c0

MTMWFRALAMLVAGLAAAQAIEMDEDMAELARMVRESCAAETGADVALVEQVNAGA
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DHCDTAWKTQKCWQAANKADYFLI-

>MS|comp141612_c0

MKLFVVLIVLVEIYAAVPLPSNHTDSNLEECRKTSEFTDETLNKMKTNPVEDGGEIF
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SDYSECFRQGVSNYIWNAAKQEGFEPFTYEWQK-

>MS|comp141702_c0

MSKFSLAFCVVVSVLSVLAEDGPANEGDVLDIVFECAKENEVKASEILAVMTRSVDVTL
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SECELGALLAACILEQMMKM-

>MS|comp142589_c0

MLKSSVFLCCLFCALTPYLALAMTDEQKAQIHQHFETIGKACNTGSNVITADDITNLRA
RKIPSGPNAPCFLACMMKQIGIMDDSGMLQKETLLELAKSIFKEPEEMKLIEDYLHSCAPV
NNESVSDGAAGCERAMLAYKCMYENASQFGIEI-

>MS|comp148301_c0

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CYMACIMKMANTIKNGKLNFDAAIKQADLLLPEVKEPAKEAILACKKAADGHKDICDA
SFHVTKCIYNQNPGIFYFP-

>MS|comp150111_c0

MDRKGLCLLIVAMFLATGSDAMSRQQLKNSGKVLKKNMKNQVTEQIGTIDKGNFV
EDKKVMCYIACIFEMTNVIKNGKLNFDASIRQIDLMYPPDLKEGAKAAVDKCKDVQKKY
KDICEASFYVAKCMYEFNPADFIFA-

>MS|comp150160_c0

MTKVLLTTVLIVITFALTRAASTQMKDAMPKEAMTTTTMANQDSSIDSTDIDVIAVMNAC
NESFRIEMSYIQAMNESGSFLDETDKTPKCFIRCVFTNVGIVSEDGKQFNPARAAFIFAGER
NGKTMDDIGDMTVACAADRQETPCERSYQFLRCLMSMEIEKEYEKS-

>MS|comp150353_c0

MFKSGIVYFVVAVFLGNALGISDELRSQIQSKLLTVGAECIKEHPLSIDDLAAFKSRVFPE
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EVTDGEKGCRAKLAYDCFIKNYEKLGFDFDF-

>MS|comp152336_c0

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MPKNSVTEQVKNIEQGDFNEDPNIMCYVACVYKSLQVVKNDKLDVGLISKQIDALYPP
ELKEPTKKAVALCINSQDNYNDLCSR VFHGAKCLYEKDPACFIFP-

>MS|comp152359_c0

MSKFTCLVFFIVAASISKAYASEEEKA AFREAVKPIIECSKEHGVSIDELKAAKAAASAD
GIDNCF LGCVFKKAEVINAKGEFDLDNALTKLKG FVS NEDHFAKFEDIGKKCASVNEKPV
SDGDAGCERAAMLTACFLEHKGEMPLNF-

>MS|comp152974_c0

MFNVYFCVFCVGLSLNIKASSLDDLKLYVEVIIIECSNDYPITVADMTELRRKIMPDPSEP
IKCLFACVYKKTGMMNEKGELSVDGVNEMSRKYLADDPKIKKSEEFTEACKSVNDVA
VNDGERGCERAALIFKCTVEKAPDFDLI-

>MS|comp153447_c0

MFGFGFLSLAAVLLCLGSTSALTPEEESSLKEALHPFVLECADEYGIPEEKFEEAKAKGSA
DDIDPCFISCF LKKA EFFDGDGKLDVEKTNEFVKAHLTSEHVIKFFEAVGGECAKVNDDEE
VTDGDKGCDRAKLLFDCIQELKSKIGD-

>MS|comp156324_c0

MTSKCGLLAVMAAVAGSVMGTAEVMSHVTAHFGKALEECREESGLSAEILEEFQHFV
REDFEVVHRELGAIIICMSNKFSLQDDSRMHVNMHDYVKSFPNGEILSGKLVELIHNC

EKKFDSMTDDCDRVVKVAACFKVDAKAAGIAPEVAMIEAVMEKY-

>MS|comp156380_c0

MMFFCSTVFFYPFLQMTREQVKSSGKMIKKTCSVKNNLSEDQVKDVKGNFIEDKNFMC
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AAWWTAKCTYEFDPANFMFP-

>MS|comp156923_c0

MFKWLIIIVALVAASYGDIPIESRDNKSATLKPLSVCCDIPELGDPKHLAKCSNPKLPGPCN
DIQCVFEESGFLTDVNTLNKEAYKNHLKQWEENHAGWSVAVDKAIKDCVSDSPRQHLN
YPCKAYDVFTCTGIAMLKKCPAAAWKC-

>MS|comp158230_c0

MFGSKTVFYLLTVFSACFGAVDIKKYLKVCDRNAIDVNDMADAVQKGIAMVIHGIPEL
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SPMVAVKAQYYGEGQFNLSKIVAYGDFNTTMTDLVYTWKLSGVTEKNGTETYVRIKDF
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LFLKVPYDQLFPSSS-

>MS|comp158329_c0

MKTFLVLAACILLAQGLTDEQKEKLKHNTECLTETKVDEALVNKLKTGDYKTESEPLK
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NYVKCYHEKDPKHAIFV-

>MS|comp158921_c0

MFKFCVFLAFCVAASYAAPGGTYCGETPSVIYQCLNSPKVISA VPAKCAKYDDECEKLT
CVFRESKWLDGTAVDKAKVLAHLDQYERDHAEWGPAVQFAKTACLGP ELKAQGVFLN
CPAYDVTHCILSSFIKHATPTQWSSSASCSYPHAYAAACPVCP SDCFSPQVPY GSCNACYL
QPRTP-

>MS|comp159796_c1

MYRLVILSIVAVSALADEMGMRECGRMFHPSVRCCKKTSELKDKFM LSEDLKECFQMR
GNPVTCENEVCI AKKKGFATDDDKLDYTKLEEVM TKEIDDKDLLADM IKNVCVNGDLEK
YGP PDFCEFMKMRHCISMQMLNHCPDWDDAGECSKLKGAV ADCVKLFA-

>MS|comp160581_c0

MIRSCLVLA AVFQVLFQESGPDPRDGFRQVP PHYCLSPPPGTDLHKCCPIPKLFPDGDME
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EAILEAKKACAKDGGPSGPPVCEQDRIFYCLTSNVLWNCKLRDFEDCRVLKAHMDECRP
YYWKKREEDANAQTS-

>MS|comp161605_c0

MRAGGLCGQYSQELYKMKSFVVFLV LVVGVYANVTLPPTQQEKAQKLAAECVKESGV
STEVLA EAKKGHIVEDENLKKFTFCFFKAGIVDS DGKLNVEVATAKLPPGV DKEDAKK

VLEGCKSKTGKDTADTVFEIFKCYHKGTKTHILLAGL-

>MS|comp162075_c0

MVLHRSATMSVRLALVVIASLLIAVECSQEIMKNLAINFAKPLEDCRKEMDLPDSVLTFD
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DMLHSCMQTTPDDANDPCLKTLKVVTFCFKTKIHELKWAPSMDLIVGEVLAEV-

>MS|comp163093_c1

MFHGGIWTKLQGFYKWYVLGLVSIYILGELGHYLIGTTSKVTAEDLHYGDKSCMLNLS
HVSLSDLPVVCEKVNSSDICATLTLNGTRYCEWGYNGLGIDYQVLAGPAFMAVFTVVG
ILGVVADKYNRARILSFCTLIFVIALIMGSVKEYWHLVLRMIMAAGESGCNPLATGILT
DLFPEKQRALALSIFNWGIYGGYGIAFPVGRYIPDVNAWGLSWRVCYYGAGIVGLVITLL
TFLTLREPSRTTIGEEGTGNKAGDSTLESKMPQVTIWHVIAQPRIILLCLAASIRHCGGM
CFAYNADLYYRDYFPDVDLGWWLFAVTVGIGSVGVVAGGIISKYVEKMGVRSRVLVL
ALSQLIATLPAFGSVVFGPLWAMITLAISYFFAEMWFGIVFAILVEIVPLSVRSTTVGVFLF
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>MS|comp167844_c0

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>MS|comp173090_c0

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SVSDGEAGCERAKLVLACFLEHKADIPF-

>MS|comp60723_c0

MFTGTLPVVLCLVAAA YGGKEKPVFSDEIKEIIQTVHDECVGKTGVAEEDITNCENGIFKE
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QRAFEVHRCSYGKDPDLYFLF-

Incomplete ORF:

>MS|comp108141_c0

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KNVDEI-

>MS|comp124490_c0
VRLALVVAAWLFIRVDASQDVIKNLSMNFAPLEDCKKEMDLPDSVTTDFYNFWKEGYE
FTNRQTGCAILCL-

>MS|comp131182_c0
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YSAYTTLRTTMK-

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LCHKAWWFHQCWKKADPVHYFLP-

>MS|comp141404_c0
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FIENRNVMCYVACIYTMTQVVKNN

KLSYEAVIKQVDIMFPAEMRDAVKAAATFCKDTTKKYKDLCEASYWTAKCMYD-

>MS|comp143661_c0
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DKALEKLLKFFVSNDEAYAKFAEVGKKCVSVNDKAVSDGDAGCERGALLTACFLEHKAIEV
PL-

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YKIAEQMKNNGDEKRLNNAKKMADLCVKVNEERS-

>MS|comp145826_c0

MSKFSGLVLCVAATFISVASGESLSSESLKPVIEKCSKEHGVTDADIQAACKAGSSDGINPC
FLFCVFQNAGIFDAKGEYDAAT

GLKNLRQIVKDNDQYKNLEHAFNDCSKIKDKPVSDAAGCEKGLHL-

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GIHELDWQPKVEVIVTEVLTDM-

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HELKWAPSMEVVMEEIMTAA-

>MS|comp161014_c0

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IMEAEAR-

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WGDTEDEILKLVKDEL-

>MS|comp427468_c0

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DREEN-

>MS|comp502645_c0

MKSFVVCV LVAGAFANVSLPPKQNEKANQIATECMKESGLKPEVLAEAKKGHISDDEH
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VALAKLPP-

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LEKIGVVKSNKY SKLGFMTAVTPLVFTNRKKLDHMKTVSENC DREVNHKQETPCQLGNE
VTTCIFKYAPELHFKS-

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4. OR protein fasta sequences of *M. separata*

Complete ORF:

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SLLCDFVEAMNPLGLALARNPVIMKDRDLGELKDVLAVQNKREKGMNQDVMYKV
YDIDGIGEDNMNEDDNNQMKQGGSPNRGSGDKKPKVSSKQILLNAGQKSEFDSGMNNC
QINQSHLNRDNKTGNTPTDITYCTPVYGVIVSTRENHNQINDIQKFASNEIKPSSSFRKDW
NPMHGGTTEGWDEFKRNISTIKNDEKKRCIKDKSKISNGKSHYDFPYFDNKTVNETDV
PEEEDSMNKEQNSNEENSKIIDPMQKLVLHSTDKNICDNNTSALSSISS-

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LGLIKNFVKGMDRSGSGVLYLKEKFPKISDAKIKEGIFVGPQIRELIKDSTFEEKLSGLEKC
AWNAFKNVVANLLGNHKGDSYRELSELLLSYQALGCNMSLKIHFLLDHLDFPDNLGA
VSDEHGERFHQDISSMEKRYQGKWSPNMLADYCWITIKRDQPEAKHSRKS-

>MS|comp157094_c0
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YSYQTHILVHKISHFFMYLLMMCLGILLFNLTPMYNNYTDGMYREVKPPNATFDHSVF
YSLPFDYTTNLRGYLALFTFNWYMSCTCSSYFCVVDLTISLLVFHLWGHMRILQYNLQNF
PKPASLLVESKDGEIKDHKYNEQEIQDIHNRLRENLYHSVIIDFQRRMSDSFGAVLLIYFL
FHQVSECLLMLECSQMDKKALLRYGPLTVVIFQQLIQLSIFELLGSSNDKLIDAAYCVPWE
YMETKDSKMVLVMLIQSQVSMNLKAMSMLTVGVQTMIAILKTSFSYFVMLQTVAEIEEE-

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ARYHQIALTKMRRLLYFICGMTCLSVVTWITLTFGGESVRMITSKETNETLTEVVPRLPLKA
WYPFNAMSGTMYIVAFQVYWLLFSMAIANLMDVMFCSWLIFACEQLQHLKAIMKPL
MELSASLDTYRPNTAELFRASSTEKSEKIPDAVDMDIRGIYSTQQDFGMTLRGAGGRLQNF
GQQNANPNGLTPKQEMLARS AIKYWVERHKHVRLVASIGDITYGTALLFHMLVSTITLTL
LAYQATKINGINVYAFSTIGYLSYTLGQVFHFCIFGNRLIESSSVMEAAAYSCQWYDGSEEA
KTFVQIVCQQCQKAMSISGAKFFTVSLDLFASVVGAVVTFYFVMLVQLK-

Incomplete ORF:

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>MS|comp111125_c0
EEEQLFIDITVKKIEFLFRCAGFNIKCSPKTHMDTIKSRTIFIVNFIWMNIDFVGCVVWFITGI
VNSKSFVELTFIAPCVMP

>MS|comp143892_c0
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>MS|comp1530192_c0
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RFSAVNDALALTA

>MS|comp1754988_c0
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IFYWMVLMVNGTIYVFMP LAIP

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NFARN-

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VSSQITCGMWALKPLFDDADRKFPFDMWMLNPEKTVQYYIGYTFQLVTICISAYMYFGV
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KFLGVWVPGENGSLHTGYRAFMMTLQYLFLIFQIYIIQVWGDLDVAVSQASYLLFTQACL
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MLRRIAEQLSKIFGVVIFIHMV SASLVICFFGFLAVVYSGLADTVANLMTVFNAMTTIFFLT
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>MS|comp116394_c0

LRNVKKRAMLYWVVVAGNGVLYVMKPVAMRGRNLPENYFIIYGLEPMFDTPNYQIAYF
MMIAGVFFICYVPATVTAFLIVITGYAEAQMLALTEE

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>MS|comp124817_c0

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>MS|comp133273_c0

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EELLHLWEDAEEHYKTEQAISIFDSNKTDLKD KAMNEYVAKHLKDIIRSHGRNINL

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LTQKQEK

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GGNRFVHLVQR YEAVTWYTKAVSEVFNGSMSFEFFSCSAIVCVITYRMSFVSFLFLLVSY-

>MS|comp142810_c0

LWRFFAMLT LREIEHEIRKFGLEYCDLPTMLENVSILLRVLT VNIDSNYHKGIKIYSYILTAV
TAVCFYYVFLFSMSWV FYRCRITGELVGAMVVLSLGISSEIGPFKLFYMCFHMDKTQKI

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LKALSVETSNRFYSSGWEQIDDQVR RMILFMVARAQAPIAITAFNMLAFDMELFTSILQS
SYSMFTLLRS-

>MS|comp150812_c0

SSVIICLDGFNVMAINNIATITCLSFLFTSLLQIFFLCFFGDLLMTSSIEVSDAVYNCRWYLA
DTRLGKDLLMQTR

>MS|comp150812_c1

VISVLNVFYFVLAVMVALSPLSLMALNYYTTNELELLLPLLAVYFPDHYNIRYWPWVYLR
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CYLVDNKIFQAFEVGDAGWTCGW HETPLGLMIRDDIIIIIRAQQPVTIKFTGLPHVQLETFS
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DKIQMTRLNKSLKH YE VILTFCDTVQDILSVTLFFQYGVSTLIICVVM TGLALPSSIEFRAFL
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ASIKNSQIY SERGWVITVSTCVMTFPVIAIVLNIYNFTFKSEPEKYMIHDLVIPMSESEMRFE
SPYFE

>MS|comp152487_c0

DLKNRTYEQAINCLYPWNFETSLSGYIVANLSGWYGTFLCGSSVSMFDLFLCLMIYNLWG
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FTNNMSDAFGMALFLYYSFHQVTGCLLLLECSTMTAAALTRYGPLTIIMFGELILLSIIFETI
GTMSEKLDKAVYDVPWEYMDTKNRRTVLIFLIKVQEPVHVKAGGLLDVGVTTMASILKT
SFSYFA

>MS|comp1998815_c0

FVFLTLTYTVVMTLQVMVPCWFGSRLIEKSSQITFSVYDCDWTTPRCRRFKSNLRLLLVERAN
RPITIRGGKMFLLSLATFTAV

>MS|comp2023556_c0

IVMVASFTAFLVFGLMQIFLYCYYGDTIMRSSMQISSAIYNSNWYNVGVVAERKSFLIVLIRA
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>MS|comp33920_c0

KKDFEYICSEGEKYRAQYFEEQLLTWKICIVMCTFNAGIGIAMNIFAYLSLFYFMATHDAD
TEESRPLLFPFWIPNVDLT

>MS|comp35555_c0

SFCIATTHLRLKLLTLKVEKAFKNSRSRHELRMKMNEAIRDHQDAYDFYVQLQNVYGP
WLFVAVLLTSFMISFNLYQIYLLQRIDPKYTSFGVVGV

>MS|comp360965_c0

AIVYKLLLIFEQIICGPVVCLTAYCIAEVFFFTIMNLLVFCCHFFSYF-
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>MS|comp3974_c0

LMSYLCSVSFCMLDLFLSLMVFNWGHFKILLHDLATFPLPAKNMSSNNYG

>MS|comp447468_c0

LEISDAVYNCKWYFATPRVSKQLLLVQTRAQEPCKLTAAGFADVNLNAFMRVLSSAWSYF
ALLQTVYSGK-

>MS|comp50905_c0

EKWNEVAYKSFLVTALTQTWLLCWYGQKLIDSSKRLADALYDCGWYNGSKRAKSAILIM
LHRAQKGIYVTTHGFSIISLASYSTIIKTAWSYFTLLL NFFKD

>MS|comp55130_c0

LTFILLHMNELVLEMTGIQDHRWRVYCTVVLSQCVDHYVKIKSFSNRLNVICRPFYLALIL
VAIMLVCMCSVKIAISNK

>MS|comp611033_c0

KSKESVMKINKCILHFDEVGKFCDLVEDVFSATLFVQFGMASCICVCLMRFTMPAPMSYF
VFLGTYMCMILQILVPCYYGTRITDKSSLLAFSIYNCDWTPGSRQFKS

>MS|comp633077_c0
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GCLLLECSQMTAAALIRYLPL

>MS|comp638207_c0
AYVVGWDTLVVVSIMIFFAGQLKITCYICRMMIDAAKLKD KSHRNIADCHRFYTTLVEYTHL
FNSLISPVMFVYLVVISVNLGVNIIQIVEIQDDIPTLVSSVLFVVAQLIQLLLFYWFANEVTIE
STFVSYS

>MS|comp79584_c0
QFKSNMRIFVERANKPLSITGGKMFCLSLPAFTSIMNSAYSFFTLQMKD-

>MS|comp80641_c0
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>MS|comp813906_c0
GSISDRLKFAVYGLPWESMDKKNRRTVAFFLMNVQEPVHV KALGLADVGVTSMTAILKT
SLSYFTFLKSM-

>MS|comp892037_c0
MELWHQIRKFGLEYCDLPTMLWNVSVFLKLLTLNIYGKNKSGIP

>MS|comp90072_c0
LSLMVFHLWGHFKILINLLNDFPRPSSGSNFTTEDGFLIRA EKYSKEELQQVSERLAECIY
HREIVNFTNTMSDVFGPMLFVYYVFHQ TSGCLLLECSQMTTQALIRYVPLTLTL

>MS|comp904167_c0
LMQVGMDCFTGQRVMDANVKFERAVYDSKWENYSLSNMKIVL TMLQSAQKTMKLSAG
GMIMLSFSCLMQVIRSIYS

>MS|comp926109_c0
MRLKIIRD FLLKESFDFDRPDIDLYNFHPQLRIFLAVKGVFFSNRNSRLRYIWP AICIQLSVV
A

>MS|comp94306_c0
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AAYESPWYKCSLRVRRSLIVMVRTRRALRLTAGGFTTSLASFM AIIKASYSLFTLLQQV
DE

>MS|comp94444_c0
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KTSYSALTVLLRFRHD-

>MS|comp948927_c0

RSRQFKSNMRLFVERTNKPLSITGGKMFCLSLPAFTSIMNSAYSFFFTLLQQMND-

5. GR protein fasta sequences of *M. separata*

Complete ORF:

>MS|comp134624_c0

GTASRGLAMNLHKALEAEHPALKVAQYRHLWVDLSHMMQQLGRAYSNMYGIYCMVIF
TTTISLYGALSEILEHGLSYKEMGLFVIVGYCMTLLFIICNEAYHASRKVGFLEFQVRL
LNVLN LGAVDRSTQREVEMFLVAISKNPPIMNLDGFTNINRELFTANVSFMSTYLIVLMQ
FKLTLLR QSARKTIKSVIKAVFNTSTTMLDDDDISEDEEEA-

Incomplete ORF:

>MS|comp636901_c0

MRACGLFCVDVCLILHLAELLRTYSIVLLQFAFL-

>MS|comp19407_c0

CANELPKKLLMVELSWMNTDAQTEVNMFLRATMNPQSISLGGFFNVNRTLFKSLLATM
VTYLVVLLQFQISIPDESQ

>MS|comp121176_c0

AILFVIFLVPFWIPFVGVGVAHQVAIYKTNWVKFQVRYRVTGENLKFPNLKTTIVISV
G CLLLAVCFLLSLCILMDGFLLKHTTA

>MS|comp1194584_c0

MGVESAKVEEVTASPVPTESGTRPTRPTHCVVGGAHAFILKISSFFGLAPLRFESRSNGFTV
S

>MS|comp82756_c0

QLLHTLAGGIKATQKCRPDSSDHRLMGGYVHSIYFVFSFAFLVVRSLAVSLTAAKVHAAS
LEPAHSLYDVSSANYCVEVERFLAQIHGDTVALTGLQFFQVKRGLVLTIACTIVTYELVLM
QFTGVSPASTEVS

>MS|comp1687776_c0

IYSEERVSSNMVDKDVQSMLLPLNLSHTMFCPKYRIKDNIISPNSLISKFVSMIAALLSIFT
F

>MS|comp109140_c0

LSLHKVQILRTAEGKFEEAVIEYLFTVYLFPIIAPILWYETRKIANVLNGWVDFEMVYNQL
SGRTLTPVKLYKKALAIIVIP

6. IR protein fasta sequences of *M. separata*

Complete ORF:

>MS|comp159644_c0

MIIDLSWSPWRMAEDLASETGLPLVRTLLGSQQLVKALDDYLESRNATDAAIILESESDVD
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RRSYRWNLILTDPDVTQLVLPVTLQADQVECKLMKREDCTCPSDFQRKQYILNGL
IQYISETYSKLERDLPLTTTSDCEDPQPVMNSTRDRLYRQFAEDSEISNETLFYWEAERSG
LFLRSRILSTYSLEAGQQTATWSADDKYKLLPGVELEPLKMFFRIGTAPAVPWTLMKVD
PNTGEQMFDEDGQPLYEGYCVDLIARLSETMSFDYEIVSPKSGDFGKKLPNGTWDGVVG
DLMRGETDIAISALTMTAEREEVIDFVAPYFEQTGILVIRKPIRKTSLFKFMVLRTEVWLS
IVAALVLTGFMIWLLDKYSPYSARNNPDAYPYPCREFTLKESFWFALTSFTPQGGGEAPKA
LSGRTLVAAYWLFVVLMLATFTANLAAFLTVERMQTPVSSLEQLARQSRINYTVVEGSSV
HQYFINMKFAEDTLYRVWKEITLNATSDQAQYRVWDYPIREQYGHILLAINASEPVPDAK
TGFQQVNEHTDADFAFIHDSAEIKYEVTRNCNLTEVGEVFAEQPYAIAVQQGSRLQEDLSR
ALLELQKERFLEQLASKYWNESARQACPDADSEGITLES LGGVFIATLFLGLAMITLAW
EVFYYKRKEKNKVQAFNAKPEKVAFESKSTLESKVAESMAKLRKRAKVGKKGANIAKN
VTFGDSFKPVSEKGVSYISVFPKEYRP-

>MS|comp161214_c0

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PLSWSEYHNGTMVGRGVAFTVMDILRKKFNFTYEVVLPKRNYEMGTKMTGDSVIGLLNS
SKVDMAAFLPTLIAYRERSFSIDLDEGIWVMMLKRPKESAAGSGLLAPFNELVWYLVL
AAVLTFGPCITFFTRVRSKLITDDEGVLPKPSFWFVYSAFLKQGTNLAPEANTTRVLFVT
WWLFMILLSAFYTANLTAFLTLKFTLAI EYPRDLYQKNYRWVASAGSSVEHVVKSEGEEL
YYLSAMISNKAQFLS VISDTDFLGIVKKGAVLVKEQTVVDHLMYNDYTSKKDVEESEK
CTYVVAPNAFMKKQRAFAYPVGSKLKSFLDPVLTQIFQSGILDFLKRADLPSTKICPLDLQS
KDRKLRNSDLIMTYLVMVAGSATAVAVFAAEIFIKRYVSGKIITSKKLKKKSKMSKKSTN
YDDSRPPPYDSLFGKNPRFNVETTRTKIINGREYYVFETASGEKKLIPARAPSSFLYRSDK-

>MS|comp165699_c0

RPTPDANSRDLGKIKTTYSMNGEPEITSAFYFDLSLRTFLTIKSLLDSGKWPNDMKYITCD
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SHSLGSWKAGLSSNLTLDPNNMSNYSAQLVYRIVTVEQRPFIVRDDKAPKGFKGYCIDLI
EEIRQIVKFDYEISLAPDGNFGIMDENGWNWNGI IKELVDKKADIGLSSLSVMAERENVVDF
TVPYDLVGITIMMKLPRTPTS LFKFLT VLENDVWLSILAAFFTSFLMWVFDKWSPYSYQ
NNREKYKEDEEKREFTLKECLWFCMTSLTPQGGGEAPKNLSGRLLAATWWLFGFIIIASY
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LNDSLKEVERAKLAVWDYPVSDKYSKMWQAMEEAVLPNTIEEAIQRVRDSKSSSEGF
LGDATDVKYHVMTSCDLQSVGDEF SRKPYAIAVQQGSPLKDQFNAILQLLNKRKLEKLV
EIWWNNNPETMKCEKQDDQSDGISIQNIGGVFIVIFMGIGLACVTLGVEYWWYKWRKRP
VVGDVVHVTQVEPAKSSRNNVDKQGEFNFGRNLGLSFKPKF-

Incomplete ORF:

>MS|comp100717_c0

PAVSSVRVVMFSTLLAALFVFTAYS AKIVAILQTPSDALRSIADLTRSPMVVGVQETTYKKV

YFQESPDEATQQLYRRKIEPQGERAYLSVVDGIARVRTGFFAFQVEQSAGYDIKQTFTERE
KCSLKEIEAFKLPLVAVPMRKHSYRELFA SRLRWQREVGLMDRERRIWLVS RPRCEASSG
GFVSGIHDVLPALQVLALGAFLSVVLLASEVG

>MS|comp104026_c0

LLDVDTAIEPKGRDGVEIRIVEELCRWMNCTVEIVREDVEQWGDYIPNETGGIGVLGSVV
EDRADVAISE-

>MS|comp119947_c0

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>MS|comp1203294_c0

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>MS|comp124776_c0

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>MS|comp129582_c0

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KITTRLLI

>MS|comp131374_c0

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>MS|comp135198_c0

FVGKYFNEGEKCGLREIQYLQVIDPWLA VRKNTPFREMFKIGTKRIQEHGLQYRENLLMY
EKRPKCS

>MS|comp136712_c0

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VCRREE

>MS|comp138392_c0

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>MS|comp1872421_c0
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>MS|comp50464_c0
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>MS|comp71302_c0
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>MS|comp82009_c0
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ACGGVA

>MS|comp849777_c0
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YAFLGSKAELEYIVQANFT

>MS|comp88910_c0
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KHMVQKKGLVVHMINSTFFEVMTSKKS-

>MS|comp99629_c0
VTKWEWKKTSHLIESRKR DAGVLRANGVDVIVLIFGAACQQGSPELKGSLGRVVMLVL
FLTLMFLYTSYSANIVALLQSSSHIKTLDDLHSHRIKFGVHDTVFNRYFSTATEPVRK

7. SNMP protein fasta sequences of *M. separata*

Complete ORF:

>MS|comp162080_c0

MLGKHSKLIFAVSIGFLVVAIIMASWGFQKVVDKQIQKSVQLENDSLMFDKWLKLPMLD
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ASGGLTEDDEVTVIHFSYLAALLTVHDMMPSLVGVINKALEQFFPSLEDAFLRVKVRDLFF
DGIYLSCDGDNAALGLVCGKIKGDLPTMRMAEGSNGFYFSMFHMRNRSETGPYEMNRG
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VDLVEKRELFNISAYYYEISESALAAKSANHDNKCFCRKNWSANHDGCLLMGLLNLMPC
QGAPAIASLPHFYLGSEELLEFFQSGIAPQREKHNSHVYIDPTTGVVLSGVKRLQFNIELRK
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VAVARANALLSWPRNSNSVSFILGPSVT

>MS|comp162251_c0

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ELSAPGLTGEEIVVMPIHIFMLGMALTVNRDKPAMLMVGMKAMNGIFDNPPDIFMRVKAL
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NVMDVGQVVAVDVGKPEQTIWKGACNEYQGTDTGTVFPPFLTENDRIQSFSSTDLCRSFKPW
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YLESDPALLNNVKGLNPDINQHIEIDFEPISGTPMVAKQRIQFNLQLLKTDKIDLFKDLG
DIVPLFWIEEGLALNKTFVNMLKHQLFIPKRVVGVLRWWMVVSFGSLGAVIGIVYHFRDHI
MRLAVSGDTKVSKVTPEEGQEQLDISVIGAQAQEPAKINI-

Supplemental data S7. Amino acid sequence of Opsins, CSPs, OBPs, ORs, GRs, IRs and SNMPs from organisms other and *M. separata* used in phylogenetic analyses.

1.opsins

>BmorCeropsin

MSISMDAGPGFAALQSWSSQVAAFGNSNQTVVDRVSPPEMLHLIDAYWYQFPPMNPLWHA
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YNETWVFGPFACELYGCAGSLFGCASIWTMTMIAFDRYNVIVKGIAAKPMTNNGALLRIL
GIWAFSLAWTVAPFFGWNRYVPEGNMTACGTDYLTQDWFSRSYIVVYSVFVYFAPLLLIV
YSYYYIVQAVSAHEKAMREQAKKMNVASLRSSEAANTSTECKLAKVALMTISLWFMWAW
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TTDEASSVASGTTVMEEKPTA-

>Bmoropsin2

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SAAKVTPARPQTLPRPIPRRGPPCTAPARLDQLGVYRLPHVLPPLHALPLAPLPPFRHRPSS
HTRNAADERGKGRKARFGSAPDLRIGSTRAALPVSALRRPLRRYALSVDPEPPQSAVSASAA
DSECGSQSSLALDLHGSGACAGVTLRVRDNTRRRPLARQQRLRDDTIQPTPVD SMNNINV
IQECTSGTSWEDTGDNTTIEMTHLSVDNEIRACSAPPANSPSTPHPADTCVTIFQEDDKDI
THEPPSSQQSVSEVWHQRTTELRTHRNYGAHFAAFKSSGAGAVEMLGDLGDDLAAMP
EHWLTFPAPPASAHTALALLYIFFTAAALLGNGLVIFVFSTTKSLRTSSNLLILQLAILDFIMM
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VFPMSMIIYFYSIVKQVFAHEAALREQAKKMNVESLRANQSGASQSAEIRIAKAALTVCF
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>Bmoropsin1

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CYNETWVFGPFACELYACAGSLFGCASIWTMTMIAFDRYNVIVKGIAAKPMTNNGALLRI
LGIWAFSLAWTLAPFFGWNRYVPEGNMTACGTDYLSKDWFSRSYILIYSVFVYFAPLLLII
YSYFFIVQAVAAHEKAMREQAKKMNVASLRSSEAANTSAECKLAKVALMTISLWFMWAWT
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PDDGGSVASGATAVSEEKPA-

>Bmoropsin-Rh3-like

MDTVPKGINNLTYLKRDDHALFSSKYDDETLTKGDIKLWKRRRRMSEILDRRSNVSGEVK
ETRLPIKYSKYEVNELVSSEANNEVLIKKFKELWPVNLWRRFGLFTDDYLHLVNPYWLSF
APPHPLLHYGLGAFYIMMTTVGSTGNALVMFMYFSLPICLVNFRCSRSLRTPGNILVANLAL
SDFMMLAKTPIFIFNSFNLGPALGKTGCVIYGFVGGTLGTTSAILTAISLDRYWAVRPLEP
LRALTAIRARLMAIAAWIYATLFAIIPALDIGYGRYVPEGFLTSCSFDYLTEELPPRYFIFVFFC
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FFISWTPYAIVALLGIFGKKDLIKPLTSMIPALFCKTAACINPFYIITHPKFRKEFKRMLSRDK
TERSGTIKTIGYYTEASKFHRPSKDFSDTEVEIVEMKDIPIYRNEDTTNTVEEKINTVSAKLA

KREGSQKSQSSISMKSFEENVVSPPSWYCKPKFAKKKSFHRRSTHSMVVSQNTDPTV-

>Bmoropsin-Rh-like

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TFGALLGVASGLQLLFIAIVETAACLNMWLVDVFKASDVGGSAIHTFGAYFGIGVSMAL
LKSKNKDTPTTNGNTTPSVDLNAPSYISDVTAMIGSIFLWIYWPSFNSGLTNTDAEYQRA
VVNTYLSLAAATVTTFLVSSALNEHKGKFDMVHIQNSTLAGGVAVGSVNCMQIGAGGAV
AIGIGAGILSVLGYRYLTPKLTGKIGILDTCGVNHLHGMPGIYSGVLSVLFAGLATSDAYGAE
LGTVFSGIGQNGRTIGQQALNQFLALVVTLVLSLNGRTIGQQALNQFLALVVTLVLSLVSG
FLTGKKQFVSTSEVPKRL-

>Bmoropsin5-like

MGVFGALLNGWLFATFIHSHLLIFKSHILVFNLC AASLGRNLLGFPFSGSSAVAKRWLFGPS
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LFGYGLYSCDTTGTSTFLWPSMSSGAKQLGYAVPYILICGLPIVAMFYVMGKALRLEKIF
YKGEQQREQKCLTQSAHAVCVGTLALWIPAAVLAGWQWVPLLIKGYRPHVPPTLALIASI
ASEAATTVPVLCYLAVDERLRAALLGRMRKQYALLQPERAKIYKRV-

>Bm_Pteropsin

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FERYLMVTRPLTSRHLSSKGAVLSIMFIWTYSLALTPPLLGWGNYVNEAANISCSVNWHE
QSTNTLYIMFLFAMGQILPLSVITFSYVNIIRTLKRNSQRLGRVSRAEARATAMVFIMIIAF
TVAWTPYSLFALMEQFATEGIVSPGASVIPALVAKSSICYDPLIYVGMNTQFRQSIKRIFGIH
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>Bmorparapinopsin-like

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SERLLFSKVPCKRDETEASSSNVYGNTAFEEHATDDTMNDNSNAENDYKNYVRHKMIR
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GTGNDEL-

>Dpleopsin-LW

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CYNETWVFGPLACQLYACAGSLFGCGSIWTMTMIAFDRYNVIVKGLAAKPMTINGALLR
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IYSYFFIIQAVAAHEKAMREQAKKMNVASLRSSDQANTSAECKLAKVALMTISLWFWMAWT
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DDNVSAASAATACTEEKPSA-

>Dpleopsin-BL

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>Dpleopsin-UV

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QVFAHEAALREQAKKMNVESLRSNQNASAEIRIAKAALTVCFVSWTPYGVMAI
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>Dmelopsin1

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ASEAESKA-

>Dmelopsin2

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FIIAAVAHEKAMREQAKKMNVKSLRSEDCDKSAEGKLAKVALTTISLWFMWTPYLV
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>Dmelopsin3

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WVVACYTETWGRFVPEGYLTSCTFDYLDNFDFRLFVACIFFFSFVCPTTMITYYYSQIVG
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>Dmelopsin4

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NTWCQIFASIGSYSGIGAGMTNAAIGYDRYNVITKPMNRNMTFTKAVIMNIIWLYCTPWV
VLPLTQFWDRFVPEGYLTSCTFDYLSNDFDFRLFVGTIFFFSFVCPTLMILYYSQIVGHV
SHEKALREQAKKMNVESLRSNVDKSKETAIRIAKAAITICFLFFVSWTPYGVMSLIGAFG

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>Dmelopsin5

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GCDIYALNGGISGMGASITNAFIAFDYKTIKSNPIDGRLSYGQIVLLILFTWLWATPFSVLPL
FQIWGRYQPEGFLTTCSEFDYLTNTDENRFLVVRTIFVWSYVIPMTMILVSYYKLFTHVRVHE
KMLAEQAQKMNKSLSANANADNMSVELRIAKAALIYMLFILAWTPYSVVALIGCFGE
QQLITPFVSMPLCLACKSVSCLDPWVYATSHPKYRLELERLPWLGIREKHATSGTSGGQE
SVASVSGDTLALS VQN-

>Dmelopsin6

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ELYGMFGSLFGCVSIWSMTLIAYDRYCVIVKGMARKPLTATAAVLRLMVVWTCGAWAL
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>Dmelopsin7

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>Hmelopsin-BL

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SGATAQTQNPTAEA-

>Hmelopsin-LW

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>Hmelopsin-UV

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NSAAPAATA-

>Harmopsin-BL

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>Harmopsin-LW1

MPLTLDPGGIAALQAWGGQVAAYGASNQTVVDKVPDMLHMVDPHWYQFPPMNPLW
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>Harmopsin-LW2

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>Ceraopsin-UV

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>Ceraopsin-BL

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>Pglaoopsin1

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>Pglaopsin2

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>Pglaopsin4

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>Pglaopsin5

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>Pglaopsin6

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SVTTTQSHTPNAET-

>Pxutopsin-UV

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>Pxutopsin-BL

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>Pxutopsin-LW1

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>Pxutopsin-LW2

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>Pxutopsin-LW3

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>PxutopsinRh3

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>Pglaopsin-LW1

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>Pglaopsin-LW2

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>Pglaopsin-LW3

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>Pglaopsin-Rh4

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>Pglaopsin-BL

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>Pglaoopsin-UV

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VSNTTNTANSAAPA-

>Aipsopsin-UV

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NTVSSAPAATPA-

>Aipsopsin-BL

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>Aipsopsin-LW1

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>Aipsopsin-LW2

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>Atraopsin-UV

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>Atraopsin-LW1

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>Atraopsin-LW2

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>Csupopsin-UV

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>Csupopsin-BL

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>Csupopsin-LW

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>Heraopsin-UV1

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>Heraopsin-UV2

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SAAPAATA-

>Heraopsin-BL

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>Heraopsin-LW

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>Lrubopsin-UV

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>Lrubopsin-BL1

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>Lrubopsin-BL2

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TSSTATSQAPADA-

>Lrubopsin-LW

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>Msteopsin-UV

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>Msteopsin-BL

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VSNTTTSVATTQSAPTEA-

>Msteopsin-LW

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>Mbraopsin-UV

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>Mbraopsin-BL

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TTTSVATAQSTAQPAAEA-

>Mbraopsin-LW

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>Msexopsin1

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>Msexopsin2

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>Msexopsin3

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VSTTTSVATAGFQPPAAEA-

>Picaopsin-UV

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>Picaopsin-BL1

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TATSQVPQEA-

>Picaopsin-BL2

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>Picaopsin-LW

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>Sexiopsin-UV

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>Sexiopsin-LW

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>Sexiopsin-BL

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TSTSVGTAQSTAQPTAEA-

>Slitopsin-UV

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STTTSVATAQSTAQPTAEA-

>Slitopsin-LW1

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2.CSPs

>BmorCSP1

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>BmorCSP2

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>BmorCSP4

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>BmorCSP5

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>BmorCSP6

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AGQN-

>BmorCSP7

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>BmorCSP9

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>BmorCSP11

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>BmorCSP12

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>BmorCSP13

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>BmorCSP14

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>BmorCSP15

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>BmorCSP17

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L-

>BmorCSP18

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D-

>BmorCSP19

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>BmorCSP22

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>BmorCSP23

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>BmorCSP24

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>DpleCSP-1

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>DpleCSP-2

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>DpleCSP-3

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D-

>DpleCSP-4

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>DpleCSP-5

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>DpleCSP-6

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>DpleCSP-7

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>DpleCSP-8

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>DpleCSP-9

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>DpleCSP-10

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>DpleCSP-11

MAVCYCRPDTYTDYDSIDLDEILRNRRLLVPYIKCILEEGRCSADGKELKSHIKEALEND
CAKCTKAQQDGTKKVIGHLINKENDYWQQLVEKYDPEHKYVEKYEKELRA-

>DpleCSP-12

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PKDEYKEKYEAFLEGKF-

>DpleCSP-13

MKSIFLVFLLAFVLNCAIADEQYYVLQKVNLSSESDIIGVMKNLMNCFLESPCSEAFESY
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KFI-

>DpleCSP-14

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DV-

>DpleCSP-15

MVIIIILAALVINAVVAEQEKYNSSLFDLEEVVNLAPESIRESFRKWTPALKIFAYVFFSTLKT
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>DpleCSP-16

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>DpleCSP-17

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LK-

>DpleCSP-P10

MGIWLSSNNYVILRDLYKSLIMSTQYSFLLFEIFYVFWVWGDIDEMSEASYLLFTQTSVCY
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QLEIVIDKIKQLKNASSKHNERKERRKLICENKLLDECIKQHQS VIRFIETLENTYHANIFFQL
TATVGIIICIGLRISIVEPRSVQFFSMLNYMVTMLSQFLYCWCGSHLTTKSEELREWLYQCP
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>DpleCSP-P12

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TANNRCKVEEELKNIVIRHKALIRVVILIDHFQSTGVGEALYNSAWYVSSNSIKKSILIMIH
RSQRRVHITTFGFSTVSMECYATVSVNITAVTLH-

>DpleCSP-P12-2

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FLSNITTQFSL LAVRIKMFYAPIDGQLPESYPLGCSNEGILLNLSQDTSTNRSKVKEEELK
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>DpleCSP-P20

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FSVCLLHVSLKLIYQENLRNLFNEKDIQKIKYNI GLFVKNHCGVLRRIAQTCFEVWLV
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>DpleCSP1

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HDTEMENH-

>DpleCSP4

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>DpleCSP7

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KVHESYRVKTLEAVQEACKKCNPHTKHMFWEYLQALKADLPKEYIEFRHKYDPDNKYF
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>DpleCSP7-2

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>DpleCSP7-3

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>DpleCSP11b

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>DpleCSP12

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>DpleCSP13

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LITGDERNF-

>DpleCSP15

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>DmelCSP1

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>DmelCSP2

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HEGH-

>DmelCSPA7a

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>DmelCSPA29a

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>DmelCSPB38a

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>DmelCSPB38b

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>DmelCSPB38c

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>DmelCSPB42a

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>DmelCSPB42c

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>DmelCSPA75a

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>DmelCSPA87a

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>DmelCSPA98a

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>HarmCSP

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RANGIQIPE-

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FGDEGELMMGSPSSAGITPRPMTQATTRPTTMRPVNTRPVPPRPTMMTWAGAASNTQPT
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>HarmCSP2

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>HarmCSP3

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LEEYQH-

>HarmCSP4

MQTRYAVVLCCVVAACVAQTQRPPVSDSALEDALQDKRFIQRQLKCALGEAPCDPIGKRL
KTLAPLVLRGACPQCTPQETKQIQRTLSYVQRNFPQQWAKIVRQYAG-

>HarmCSP5

MKSLLLLCLVIAAVWARPETYDTRYDDFDAETLVENVRLKAYGHCFLGTGPCTPEGSDF
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GSD-

>HarmCSP6a

MKLIVAVALLCLVAESWAASTYTDKWDNINVDEILESQRLLKAYVDCLLDRGRCTPDGKA
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IEAVKGQ-

>HarmCSP6

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D-

>HarmCSP7

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YEKELEEVQH-

>HarmCSP8

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PA-

>HarmCSP9

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EKELKEVEA-

>HarmCSP10

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SR-

>HarmCSP11

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YEKELEEVQH-

>HarmCSP12

MNSAIVLCVVALAGMVLARPDGDGDKYTSKWDNIDLDEILGNDRLLVPYIKCALDEGKC
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>HarmCSP13

MKVLLVLCVFAAAALADDKYTDKYDNINLDEILENKRLLLAYVNCVMERGGKCSPEGKEL
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RANGIQIPE-

>HarmCSP14

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>HarmCSP15

RPESQYTNKYDNVNLDEILVNKRLLVPYIKCALDQGKCSPDGRELKSHIREALENYCAKC
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>HarmCSP16

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F-

>HarmCSP17

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>HassCSP

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RANGIQIPE-

>HassCSP15

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>HassCSP16

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F-

>HassCSP17

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RANGIVIPE-

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LREIKA-

>MsexSAP4

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>MsexSAP5

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KGA-

>MsexCSP-1

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KF*-

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AVD-

>MsexCSP-3

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>MsexCSP-4

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>MsexCSP-6

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>MsexCSP-7

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>MsexCSP-8

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>MsexCSP-9

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>MsexCSP-10

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>MsexCSP-11

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>MsexCSP-12

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>MsexCSP-13

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>MsexCSP-14

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>PxyI CSP5

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>Pxy|OBP32
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KYAHCMMIKSELMTKDGKFRKDALAKVPNPADKPMVEKLDITCLANKGDTPQQTAWN
YVKCYHEKDPKHAIFLKLG-

>Pxy|OBP23
MFRAHSDQCLASSGATAADVDSLSSGALVDTPALRRHVYCILLRCKAIGKDGKLQKAAVL
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>Pxy|OBP13
MTDEKAKLQFTKIAMNCTKKYPLEVHEILDQLKLVPTKKTAKCLLACAYRLEGSMNEK
GLLDYEHMMKTADLLADGDEKRLKNAKAVADICIKVNDETVNDGEADCRAALLFKCA
TETAPKYGFKV-

>Pxy|OBP12
MKDEERLKFHKTIQTCVQRHPISPEDQGSLVNWQISDTQEVKCFIACIFQGIGMIDEKGRF
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>Pxy|OBP6
MTRAQLKKTLSMPKKQCMTKHGVTEDMVGGIEGGKFVEDRKVMCIYACIYQTIQVMKN
DRLNKDLVIKQVDLLYPPELKAPTAAVKQCMVPQDKYPMCEGVFWSVKCLYEQDPAS
FVFP-

>Pxy|OBP31
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PDGKCLKCYIKCVMETAGMMSEGEVDVEAVLALLPEDFKAKNEKSLRACGTQKGADDCD
TAFQTQACWQKANKADYFLV-

>PxyGOBP71-like2

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VSSGSTQYGRSESGSSRDSMNNMRTSTNNMRNNMNSRDSRMGGGRDDYADNDYYESYTH
GYNNRQQQSRMRKRERSGHRSQYNPNTSRSGSGSGSGHDDSYRNNDKNSENSSSR
DSDHKACALHCFLEEMTGDNMMPDRYLVTQVITKDVKNEDLRDFLQESIEECFQILYN
ENMQDKCDFSKNMLCLSEKGRANCDDWKDDIKI-

>PxyGOBP56d-like2

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DSAFEVFKCYHKATPTHVSF-

>PxyGOBP28a-like

MANYIRAICFLTFFVLFSKGSALTNAQNSAVLSTLLSGAIQCFGEHPLSAAEMDAIKNKKTP
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HVNDGAKGCDRAKLAFPCFVNNAQKYGVSLNF-

>PxyGOBP56a-like

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CASVNDESVDGDKGCERAKHLYECLIKQAEKFGLELPTSAV-

>PxyGOBP72-like4

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TPPLESQKPYKTKTKDNSGLNPVLDY-

>PxyGOBPlush-like

MFLKNHWLIVMVVATGICVVSITRKQMKNTSKIMKKSMPKNNVTEQVGNIEQGEFL
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DSCEAAYWVAKCMYEGPEQFFFP-

>PxyGOBP72-like3

MERREFGLLIIVILTSGAEAMTRAQLKNSAKMMKKSCLGKVDVPEENIVDIEKGFIEEK
NVMCYIACIYQMSQIVKNNKLSYEASIKQVDLMYPSDIKDAVKKISIEQCKDVSKKYKDL
EASYWTAKCIYDHPKIFIFA-

>PxyGOBP72-like2

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KETMCYIACIMKMANAIKNGKLNIEAAMKQADLLLPEEIKEPAKAAITSCRKVADQYKDI
CEACFYSTKCIYTQNPDIFFFP-

>PxyGOBP72-like1

MARSLPVLHPEHSCFNGLAVMTMKQLKNTGKMMRKSCQPKVNAEDAQIDGLKDGVL
EEKETMCYIACIMKMANAIKNGKLNIEAAMKQADLLLPEEIKEPAKAAITSCRKVADQY
KDICEACFYSTKCIYTQNPDIFFFP-

>PxyGOBP70

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GVNERGYFMAVLEASRGCLMRHHDRFSRTVPMDNGRNCVDFDIFECISDRIGEYCGNSG
L-

>PxylGOBP56d-like1

MIAGCHAHLTKDQSARVHEYGMECMKKTGVNAELVAKAKKGEFTDDEALKKFTLCFFQ
KTGILTSDGKLNEEVALSKLPAEVDKAAVKKVLDECKKKTGKDMADSAFEVFKCYHKAT
PTHVSF-

>PxylGOBP83a-like

MLIAAVFGGKSKPEFSEEIKEI IQHVHNECVGKTGVAEDDITNCENGVFKDDQKLKCYMF
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SYEKDPDLYFLF-

>PxylGOBP71-like1

MIYMNCLKSQDGKNSSNSRDYSDDYSSREKRKHSKGSNFGRRENAFGGREESYGSRDEW
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NSRDSRMGGGREDYADNDYESDTHGYNHRQQSRRMKRERSSGHRSQYNPNTSRSGSG
SGSGSGHEDSYRNNDKNSSENNSSRSDSHKACALHCFLEELEM TGDNGMPDRYLVTQVI
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-

>PxylGOBP1-like2

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SCEKQHEAVSDDCQRALEVAKCFRSSVHELGWAPTIDVIIIEVLTDM-

>PxylGOBP1-like1

MADSTVSRWRRFALLVAIQVKKSESSADIMQKLTIGFTEALEHCKKDLQISNEVMQD
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>PxylOBPPA10-3

MKFLILSVVVAALARPEDLYDDSNIQLDVDELISNERLMKAYAACFLSKGPCTTEGSKV
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ALNE-

>PxylOBPPA10-2

WVARPGDLYDDSKSNLDIDELVSNERLLKGYAHCFLGTGPCTPEGNNIKKIPEALENVCK
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>PxylOBPPA10-1

MKVAVIIVSMLVVAACAQEKYKSDLEGDFDVTELLNNERLLLSYTRCLIDKGPCTPEVKAV
KDKLPEALATKCAKCTDKQKELGKKLAVELKRTHPAVWAQLVAKYDPQGQHQAQAFQEF
TKQ-

>PxylOBP-2

CGLMVAALPAARGTAEVMSHVTAHFGKTL EECREESGLS GEIMEEFHFWREDFEVVHR
ELGCAIICMSNKFQLMQDDARMHHENMHDYIKSFPKGDLLSETMVRLIHNCEKKYDDID
DERSRVVKTAAAC-

>PxylOBP-1

VTLGFGEALEHCREQSQTGEMMEEFYHFWREDFKFEARAVGCAIHCMSRYFNLLGGQQ
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LAPSMEMMLMA-

>PxylGOBP2

MASVLSLVVCGLMMAALPAVRGTAEVMSHVTAHFGKTLLEECREESGLSGEIMEEFHHFW
REDFEVVHRELGCAIICMSNKFQLMQDDARMHHENMHDYIKSFPKGDLLSETMVRLIHN
CEKKYDDIDDECSRNVKTAACFKKDAQAEGIAPELTMIEAVLKKY-

>PxylGOBP1-2

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>PxylOBP36

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>PxylOBP24

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DLSRDVCKKAKVFNECTQLFAVSLKDSGR-

>PxylOBP18

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>PxylOBP35

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>PxylOBP28

MSECLKEVQASDTRTVKRLSPSIHSPHGECLACVLKRNGVIENGKVNKGNLIALVKNFY
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>TcasOBP02

MKAFIVLVAVAVCAQALTDEQKEKIKNYHKECSAVSGVSQDVITKARKGEFIEDPKFKEHL
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YENTPTHVSLA-

>TcasOBP03

MKFLVVISTVLMANIVQGLTDEQKSKLEEYSKECLKESKVDESVLKEAEKGVYLDLDPKL
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CEVSS-

>TcasOBP04

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YQNAFPRNYK-

>TcasOBP05

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>TcasOBP06

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>TcasOBP07

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LHANKPNFVVD-

>TcasOBP08

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>TcasOBP09

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>TcasOBP10

MNIYTCLVLVIAASAQHLTEEQKNNWRKWSNECKVLIGVSQEAINKIRNNEFDSVDDKI
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>TcasOBP11

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>TcasOBP12

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EMICCLIRNKNSVDE-

>TcasOBP13

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CLVDKVKVHSH-

>TcasOBP14

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PAKPK-

>TcasOBP15

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FETVDCWYRYKKN-

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>TcasOBP17

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EDPEVSLQLN-

>TcasOBP18

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>TcasOBP19

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AYNFMCLFNADPENWFFI-

>TcasOBP20

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AEPEDWVLIQ-

>TcasOBP21

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MNRAEPEV-

>TcasOBP22

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CATEENALTDTSQEQ-

>TcasOBP23

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>TcasOBP24

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SVQKYVV-

>TcasOBP25

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>TcasOBP26

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>TcasOBP27

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>TcasOBP28

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>TcasOBP29

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PCVYSVNLQCFMKEAKAVRK-

>TcasOBP30

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>TcasOBP31

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KKQMSDDHCVSAASMAGCVKTEAIAV-

>TcasOBP32

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>TcasOBP33

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>TcasOBP34

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CFMGEL-

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>TcasOBP37

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NS-

>TcasOBP38

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>TcasOBP39

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DFGKQRDCIHKYV-

>TcasOBP40

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RKIEQCYQNITM-

>TcasOBP41

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FI-

>TcasOBP42

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NDSK-

>TcasOBP43

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WDKMAEQQPSQFFYNIQEDKK-

>TcasOBP44

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IYNRLSNMTVVGN-

>TcasOBP45

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>TcasOBP46

MLWRRGRFLYGENLDMFDPAGLQACMKKLSVGETELAKALEDKSKDPPEKIMCLFKCAL
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4. ORs

>BmorOR1

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LINFPRPKASHVITTPNGPTNVETYTEESKEVFARLRECIKHGTVDVDFANDMSETFGVIL
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-
>BmorOR2ORco

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LSAALDTPNTAELFRVSSDKTEKVPDAVDMDIRGIYSTQQDFGMTLRGAGGKLQNFN
AENPNGLTAKQEMLARS AIKYWVERHKHVRLVASIGDTYGTALLFHMLVSTITLTLA
YQATKINGINVYAFSTIGYLVYTLGQVFHFCIFGNRLIESSSVMEAAYSCQWYDGSEEAK
TFVQIVCQQCQKAMTISGAKFFNVSLDLFASVLGAVVTYFMVLIQLK-

>BmorOR3

MIFVDDAVIGIKDPREYRHLRVLRTSLRLLGAWPGHYLGEETGSKYECAPMFLLMFIKIAC
LYLTIVYLRNNADVLFGLFELGHVYLTIFMTFVTLRSGFSLTWNPNYHKVVKKFIEMHLLY
FKDNSEYAMKTHRRVHKISHFYTVFLKVQMIAGLTLFNVIPMYNNYRQGNYSRDRPANIT
YDLSIYYETFDILNTPNGYIFICVFNWFASYICCSFFCSFDLILSLMISTVSGHFRIHNLTF
PLPEAITASKKFVDKHCNGNRSEFVLEEA KLYSPAEMWQVTDRLRQCIDYHRKLVLEFTG
DISEAFGPMLFVYYLFHQVSGCLLLLECSQLNTAALVRYGVLTVVLYQQLIQLSVIVESVG
TVTGRLLKDAVYEVPEYMDTSNRKTVAIFLMNVQEPLHVNALGLAKVGVQSMAILKT
SFSYFTFLRTVSE-

>BmorOR4

MFKIIKNIIVENDALKQVEKPQEFQYMKWVQYHLKYIDGWPNMDMNKKNVSKIRFHKR
HLLVVEQTITFLSQMFYIVKNYGKLSFFEIGHSYITALMTIVIFSRSVV TALGRYRKIARYFV
SSLHLYHYKDISEYALQTHLLVHRLSHYYTVYLISLVVTGMLLFNITPLYNNISSGVFNSPR
PENMTFQHAVYLGPFDYTTDIKGYFVVFILNWHLSHIAASYFCTFDLFLSLLILHLWGH
RIILNNLKTFFPKPYTNNSMYTEENQVLLKLQECIRYHNFIISFTVMMSNVYDVVIVYYL
FHQVTGCLLLQCSTLDWESLSRYGPLTLIIFQQLIQVSMIFEILGFLSDKLPNAVYSIPWEA
MNVNTRKLVQVLLQKSQKPIQFKAMNMMSVGVQTMASIIKTSISYFIMLRTIARD-

>BmorOR5

MLLYYPNTQVKEKVNNVEEFTYIKFLKSFCIMDFWPEREEKNSKTRIFRLRYILVLQFCF
TLVAGVLYLTNSVGKQTFYDLGHTIITVLMNVVSLRILRCFKKYDVVGQQFINKIHLYH
YRNDSEYAMKIHTVVKISHNMTYIFSFCIFGTVTFNLTPIFNNIGSDAYKNRPPDNVTLQ
QCVYYALPFDYTG NFKWYLLVAIFNVQKTFCTSLFILFELSLSLMIICLWGHRLRIFIHNLNH
IPAPRNSFEYTKERQEVDDTLKKCIQHHTLIIGFVRIMSETYGLAVLIYYAFQVVGCLLL
LQCSQMELKTVTRFGFLT VLNQQLIQISVIFELGYMSDKLQDAVYCVPEYMDTSHRK
MVYMMFRQSQIPLQLKAMNMLSIGVKTMSVILKTSVTYYLILKTVTTD-

>BmorOR6

MKEEYLYLQHPRTQLFYKVLAVHSTIESTIDLTWWGYTFPKYVGWVYHLQCNVVRVFGKC
VVVSQILFIILNYQTIDKSVFIIAITITPLGALVGIKAESA KAECYVNLMMKNFMDKVHIHSY
RKNENNEFVKKKVIQIERVSRFTAYFLVILIAINCLSWMLKPTLHNIKHFEEIMNKSMEFQY
YIYFWTPLDYKYNLRDYIIHTLCIYLGATAVTVIVTFDIFNFIAVFHVVAHIQILKNNVKS
NSWDDFNESEKKG YLVSILEYHAYIIRIFGEVQS AFGLNVA SNYLQNLIEDGLFLYQIMNGEK
ENVLMYGLMIILYLGGLIFLSIVLEEIRRQNYDLCEYVYALPWEGMSLENQKIFVVFLQRT
QPDLEFETVCGMKAGVKPAFSIVKSMFSYVVMINSRF-

>BmorOR7

MLLYHPNTQVEEKVNNVEEFTYMKFLKSFCIMDFWPEREEKNSKTRIFRLRYILVLQFCF
TLVAGVLYLKNNFGKKTfyDLGHTIITVVMNVVSVSRLILRCFKKYDVVGGQFINKIHL
FRNDSEYSMKTYKAVHKISNNMTYIFSFSIFVCVVTFNLPVFNIGSGAYKNRPDNL
QQCVYALPFDYTGDFKWyMLVAIFNVQKTFCTSLFILFDLLSMMIHLWGHIRIFIHNL
NHIPAPRNSLEYTREERQEVNNTLKKCIQHHTLIIGFVRIMSETYGLAVLIYYAFQVVGCL
LLLQCSRLDLKTITRFGFLTMMVNQQLIQISVIFELLYGMMNDKLQEAVYCVPWYEMDTS
RKMVYMMFRQSQIPLQLKAMNMLSIGVKTMASILKTSVTYYLMLKTITANEA-

>BmorOR8

MSLSTRCLLKDFCKYVYYAGAGNFWYEDIYKETVPYKMYVVISFFTYTVMIFLENLAALF
GKLPEVEKNSAVMFAAIHNIVLTKMFLLYHKRSISKLNCEMA AVGENLEEASIMRRQFRK
MRLGTALYFISVYLSLVAYGVESARRTIVEGAPFYTVVTYLPDYDNTTVLASFLRIFFYITW
LYMMLPMMSADCMPIAHLITMTYKFVTLCRHFDQIREKFQINVKIMAKTEATEILKLGFI
GIKMHQKLMYLADEIHRVFGIIMALQVCESSAVAVLLLLRLALSPHLDLTNAFMTYTFVCS
LFLLLALNLWNAGELTYQASLLSNAMFYSGWYFCDFEKDWCRDIRRLVLIGCAQAQKPLI
LKAFGVLDLSYETFVSVARMTYSVFAVYKRGD-

>BmorOR9

MLALDDPLQNVNVEDFKYVKWLRNHLKTVDAWPVYKSKRRIQKRYVLPFSAACFIS
QTVYLKNGIGTSLFVVLVHSYICFLINGSCLCRGILIATERCKRLATCYLKTVHLFHHKRS
EHAMKIHVIVHRLSHYYTIYLSLVFVGMVLFNFMPYNNINSGAFKSPRPESVTFQHAMY
LALPFDYTTNIKYFVVFILNWYISLVTTSHFCTFDLFI SLMIHLWGHILMCSLEDIEGFV
LGGSFKFTIEQNRKINSILQECIRHHQFTIDFTNEMSSTFGLVILFYFFYQVSGCLLLLACS
QMDIESLSRFGPMTFILFQQLIQLSIVFELISSLENLNAVYNVPWESMDKNNRKMIVLL
LQSQKLTRFKATSMNVGVQAMATILKTSVSYFIMLRMTMYQEH-

>BmorOR10

MRTNAKSFLFVPSKVLTLGVPVEKTSIFSLIYRSIMLSSQFCFLVFNGIYIGLMWGD LKA
VSDALYMMFTQTTCCSKAIGFYFNFMKIKRIVASMDDVLF TAMSIEDQATIFSHSRTVNKLY
KGVLGFTGFTLVQWTVLSLIGSGRTL PFMEMWVPTDISKSPNYEITFVVELWMMVISAALF
MSVDTITVATMMFSCAQLDIIMKKTQQIQEIPLSPDLSSRNSELHEKNNGILIDCIKQHQAI
VRFSELCEGTFQVHSFFHLGGIVFMICVIGFRMAGESPVS AQFWAALS YLVILGQLYLCW
CANELTTKSEQLRDKLYLTPWYDQDVKFRNL CIAMECMAKALTRAGSYIPLSRAMFVS
ILRSSYSYFAFLNQANEQ-

>BmorOR11

MDEHSHFETSLNKIKVLFKYSGMNLNTVTNTYEFLNHRWVYILNHAWTLAAVTFICIGIS
NGQNFIEMTCIAPCVAMTVLAVSKSFFHYINENAVKS LLENLIELERTDFERTKSVQRTEIVA
TEKQLLN MVINVLVNLCSMILVFDMTPLIIIAIKYWTTNKFVRLLPYLDIFVFPYKFEYW
VMAYILQIWAECIVLLFIGAADCLFFTCTYIRIHFRLLYDFERLTSSRRES DGLRDEDFR
ETYTNLVKRHQGLIESSILEMIYSKSTLSNFVLSLVICLSAFNVTVVNDVTIVMTYLIFLA
MSLMQVYFLCFFDMLMSASEEVGNVYNC SWYTEKASTGKDLLFTITRAQKPCELTAAH
FAYVNLKAFMRVSFTSASITTLPTI-

>BmorOR14

MSNYIFKPFHETYRIITFTMIAAMIYPNPATEKRRLIYIGLMLLSVIPLAFMIVTEMYEFFMA
SDLNNTIRHSTVIGPFIGGFVKVALMYKRRQANELVSEINRDHLAYNGLKGEDREIAASSI
RNCQIYCELGWTLIVMSCGLSFPVIAILLKIHSFTFKLDSTKHM IHDINNPFDDPEDRFESP
FFEIMFVYTFSSFIYIINYGYDGGFGLCINHACLKMKLYCRALEDAMRSDSRRHEKIVAV

IEEQRRTYEYIALIQDTFNIWLGLIYVATMIQMCTCMYHIVQSFNIDVRYIIFVISIIHIYLPCR
YAANLKCMAAETPTLIYCCGWESVSDLRIKRMMPFMVARSQVIVEITA FNMFAFDMELFV
WIMKTSYSMFTLMRS-

>BmorOR15

MMTLVYQTDIFKPNVFFWKMFQIWAADRKSSKTYKYYSFVFLFITLIMYNSLLAINLLYTPL
KIELLIREVIFCFTEITVSTKVLMLFKRNKILDAFDLLNKNEFRGNSEESSAIIQKNSAYKT
YWKLYAILS NFAYSSQVLGPLIVKLIWTKLELPICNYYFLNEELRHDFSGWYIYQSFGM
YGHMMYNVNIDTFISGLLMMAVTQLKIIQTKLLSLKLNPRERKMDRGLMNITEVLKLNEL
LKHYELVLKYCSTVQSILDVAMFVQFGVASAII CVAMCGLIMVRSSTETLLFMV TYLFAMT
LQIFVPAWMGTQLHFQS QELVFAAYNSEWIPRCQSFKRSIIIFVERAKIPITITGLKMFPLSLA
TFTSIMKTAYSFFTLIRNMQALQEE-

>BmorOR16

MSFNSEDLYLNRAKFVMKYLG VVPPENENFARKFYKIFMMSLQHLFLFFQIIYIVEVWG
DLEAVSQASYLLFTQACLCKITVFQINMNKLKELLKQMNGYVFQPKNINQQNIIKVQATR
IKRLLFAFMISQLTCGMWALKPLFDDVGSRKFPFDMWMPVSPERSPHYHLGYSFQLVTIC
MSAYMYFGVDSVAFSSVIFGCAQIGVIKDKIMSIPKLG IYRNHKTYTKISRYNRKTLIECVK
HHQAVISFTELVEDTYNSYLLFQLVGSVGIICMSALRILVDWRSVQFFSILCYLSVMISQLF
VCCWCGHEL SATSEELHTILYNCAWYDQDVKFKRDLNFMMARARRPILLRAGYYISLSR
QSFVSILRMSYSYFAVLDQTNK-

>BmorOR17

MREDKMEINNSQKFYTKMIFRYLYSVGLGDWWYQHEDRSDSHRKLYCLWAVISNAYIFL
NICNELLANFRKDLTDVEKNDAIQFSFAHPLIFAKIASFFFNRKKIREVFGRLLEENRSVYSC
GELEKESMKQIKRYSLAFIGVSYMTLVMSTIDGLRAHFKEGIPIRTEVTYYPSPSNSGVIVNI
LRFLVEFHWWYIVSVMVAIDSLAVASFVFTFKFKLLQRYFKDMGLTVRRDQSNMTDEAL
ADKFRRDFIVGVKLHENALWCAENVQKAFGWVYSVQVFETVALLVMCLV KLVTTNHNM
IFLLANFAFMLCVIILNGSYMMPAGDVTYEASEVPTSIFLCGWELVRQTDLRFLVVVAIQRS
QVPVIMKAFGIMTLSYSNFI AVSLFKFYVQFQINLF-

>BmorOR18

MGDRMVTRGHFFDFNIKYL FYVGLWPSNEAKRIEKIAYKIYEYQLHVLSLIFLVTTGIGTY
KNHKDIIALLTNLDKTLVAYNFVFKVIVFVYKREELRKLIEQIVQSGDQITEDRKALMAKL
VIVLTGISTVIITAFSCLALFEGEMTIDAWMPFDPMKSKMNLFAASQILAATFV VPCGYRAF
AMLGIVCSLILYLRDQLVDLQNKIRD LRFATGNVEKLRDDFKLIVKKHVRLLGYSKVIEMI
FKEYFFIQNMAVTAELCLNAMMVS VVGLEQKTLAASFLAFLSVALLNAYIYCYLGNELIV
QSEGIAMAAYESSWILWPVDMQKDLLIVITAAQKPMKLSAGGMAVLSVQTYSQTLYNGY
SIFAVLNDIVN-

>BmorOR19

MHEFVINVQNETTKLYDQLNIILYILGLQGIWVDEIKLSRRFHVFFKVVTFILHIMCGMFAG
LQFFAIFTQNSLNSQKSDVIVIGISNPMAYIFCINFIRNRNEIKDLFYHLAVVLKIYYNDVEI
EKSMVNKIKSYLSTYVFASITILVSNIIAFFQTINSDEPFLGIITAWPKD TDTSKTASYARIGF
YLFWCIIHFFRISTVFAVIVCILISIKYQYKILCSYFESLNKIFDDETS SHEVKEAEFENAFNGI
KIHTQIIWCVRRQCIMCRTVFSANIMLDTFVLVILMLAMVNSENDFYGLCSQMSSVLVTV
VLMAFFMWTAGDINVQASQLPDAIYGSGWYNCRGKSSARIRSLVTISMNKAQQPILMWA
LGFVELSHKNFVAIIKSAYSVFSVFY-

>BmorOR20

MIQASKYPNSKTKELFRKIAHIAYICGLPNFWIEELNLPKSFIRVYDKIVRIFNVATYFFLGIE
IAAHFTQHHLTNKQKFDLLYSISHPILNGYGVIVSRQVGNVKKVLLDLIVNLKVKYNDPV
IEEAMIKISMTYSVSFITNCVLSMLTYTFDALLMVYKKGVTFNVIITAWPDVEDTTTEASIG
RIGFHIFWWLWVTRPFAVYVLVINLTTCLSHQYMNLSYFFHLEDIFKENLSQNEKEAKYE
AEYKIGVMLHANTLRCTRCHMVWNGVMSGQIIFNISLIVIIAQMMSDRTLVNTFGTV
LTASAILISTGFFMWNAGDVTVQASRLATAMYCSGWQNCRCGKSSVSIRNMVMNTIAVAQR
PLVLRGLGVIDLSYQSYLSIVKASYTVFVSVIY-

>BmorOR21

MNKNMNKNHYILKTYCDKIFLVGSGNFWYQKTESRNDKTLTYKIYSCVLFFTYGFMTVL
EIMAAMMGDFPEDEKRDSVTFATSHTVVMIKFISIKNKELLKTLNRKMMMICEAHEEQT
LMDEMYRTVKINVVAYCVAVYGSATFYVFEGLRKFYNGSHFVTIVTYPSNDDDTLAATI
VRIATTLVLLMMLLTMIIISVDTYTMAYLIMYKYKFITLRHYFKRLRENVDELVAAGKARL
AAEKLAQGLVEGIKMHNELLSLSKDIDKAFGTVMALQLCQSSGSASVLLLQIAVTMYLLL
ALFLCNAGEITYQASLLSDEIFYCGWHKCNSPVLSTQRNIRDIVLIAILRAQSPLVMKAFK
MVRSTYSVFALFYAQNK-

>BmorOR22

MNKNHYILKTYCDKIFLVGSGNFWHQKTESRNDKTLTYKIYSCVLFFTYGFMTVLEIMAA
TMGDFPEDEKRDSVTFATSHTVVMIKFISIKNKELLKTLNRKMMMICEAHEEQTLMDM
YRTVKINVVAYCVAVYGSATFYVFEGLRKFYNGSHFVTIVTYPSNDDDTMLASIVRIAT
LVLLMMLLSMIIISVDTYTMAYLIMYKYKFITLRHYFKRLRENVDELVAAGKARLAAEKLA
QGLVEGIKMHNELLSLSKDIHKAFTVMALQLCQSSGSASVLLLQIALSDQLTFTMGKIF
FFLAAMYLLLALFLCNAGEITYQASLLSDEIFYCGWHKCNSPVLSTQRNIRDIVLIAILRAQ
SPLVMKAFKMVELTYATFILVVRSTYSVFALFYAQNK-

>BmorOR23

MRAKTEFEKTIKLTKTALFLSGINIFLGEWNHWTRTFVDSIAYYLNIVGLYFVLIGEMYWLI
DGTITGKSFVELSLIVPCLTISVLATAKVHYLYHNKESLLDVVDKLRREIYPDEIETANDND
QCLNDKKETVYDNDVTEVGIVNEANELLKFNFLSTVSFVVTMTFCTMPLFGMAGEFM
ETGKFVVLYPFAVKYPFDVYNTSFWVIVYVNFQWATIIVCTNIFGVDTLIFYALCSYIGMNF
RLLSYKFEHLEIKRNDRIINEIIVLIKRHQELIELVNKTQSLYSLSTLFNIVTSSLLICLSGFNIT
ILSRWSYFALLKTIYS-

>BmorOR24

MPEELFLDRSIKKIESYFRWMGINIRSGDNNKDVFKIRCIYFINVLLNTDVLGAIFWFR
SGLEQGKTFTEVTYNAPCLTFSFLANFKMLSLIFYEKTVHELIAALQKLEIKHFLRQNCAEE
LKMLKDEKNFLHAVFKGSKIVNYASILTFGCSPLVLIASNYKYKTGRMDYLLPLIVLYPFDV
DNITVWPIIYVRQIWSVITAVIGVCATDYLFYTFVYISTQFRLLGHSIERVVPNGLSVRTR
LNGNLRMKFVENLKWQELIRAASLLEQIYTKSTLYNFVTSSVIICTGFNVAVVEDFAVIL
SFLFFLFMSLLQIILLCFFGDKLMKSSTNISDAVYNSKWYLTEKNVGKVLMLMVQIRSQRAC
RLTAYGFAEVNLRFAFMKILSTAWSYFALLQSLYSSHE-

>BmorOR25

MFEKALRSANFYMRVIGIPTDIRDGNRTLMEERLRNRWFYCNFLWLNTDVAGEITWFVKG
LLNGSSTLIENTYLIPCLTLCILGNVKTFFTIKYANHIIDLVAIKDLEIKNNAARKNETEIVK
ERLKFLTTSNKFLLFVIGTGIIAFGIGPLMLTASIYFSSGDMKLLPFLIWYFPDSSDIRYWP
VYVHQVWSACIACCAVYGPDCFYFTSCTFIHIFHILQNDITNVIVESSRARKNGLYRGCH
QAFLELTNRHKDLIRCVNLEIISKSTLVNVVSSLLICVTGFNVMTFCWFAAPFASFLA

LGLVQTYLLCYYGDTIMCSSTEVS DAVYNSTWYGTNISQMRDYLFV MKRAQKPC KLTAY
GFSDVNLRTFSRILSTAWSYFALLITIYRGN GQQ-

>BmorOR27

MPSSFFLPNLENPDYPSLGPTLKGLKYWGMWQSGGIKRILYNSIHAFATFFVITQYVELWII
RNNVELALRNLSVTMLSTVCVVKAGTFVCWQKYWSGIIGFVSNLEKEQLSKNDAATQAA
IVKYIKYSRRVTYFYWSLV TATVFTVILAPLVGFLSSPERELIANGTLPYPEIMSSWVPFDRS
RGGFYWVTALVHTLICFYGGGVVANYDSNAVVLM SFFAGQMKLLSINCSRLFDDGNEVIS
NNEAMKRIKECHYHHVFSTIFNSLMSPVLF LYVIICSLMLCASAVQLTTDGTSNMQRIWISE
YLMALIAQLFLYCWHSNQVLYMALEDRLGGLFEACLESGRFPSKWKTGRLVLLRKDGRP
ADSPAGYRPVILLDEAGKMLERIVAARIVRHLTETAPDLSAE-

>BmorOR29

MFDLQNLNEDSERPLLGNFWLINKTG LLLPKTNFGKLAYILVHEIVTFFVVTQYVELYVIR
SDLDLVLTNLKISMLSIVCIVKVN TFWFQTSWREVLEYVNEADKFERNQTDETRGMIE
TYTKYCRRLTYFYWSLVFTTFLTTNTPLMRYWSSPIFRENLRNGTEDFP HIFSSWMPFDK
NHSPGSYCTIVWHVLLCAYGAAIMAAYDTCIVVIMVFFGEKLNLLRERCKKMLANDLYN
HAFVIGQLHDIHVQLIKQSRLFN SLLSPVMFLYILMCSLMLCASAYQLTSATSTAQKLLMA
EYLIFGIAQLFVFCWHGNDVLFKNANVSLGPYESNWWSSSPRVRADVLLLCGQLRVRHV
FTAGPFADLTLSTFIKILKGAYSYYTLLRK-

>BmorOR33

MIYYRKCKMELNFDKIFKIAIISQKFSGTYPYTKRD KKWATHFILMHGELTIICMLFIYNIIE
FDLKAADYSQMCRNMCLSFVYMVITLLYINMLYYQSKLKMLIETMKA EYELAKTMSEEE
QNVILEYAKKGRWLCRAWAILTTCGMAQFFLKSIVCTIYSAIQGNFRIVQY YEVICPEVIER
HRNNPVIFITLYFCTFFYSLYTSALYTSVLP LGGPIFLLHGCAKLEIVRLNIKNLFDNDDYV VQ
ERLKKTVLQMQDIYCY SHEINECFQILYEFLLKATSLVLPITIFAVIQALGRGQFIPEFFAFIFG
AFMVGTTPCYYSNMLMEKSEDVRMTLYSCGWETRFDLNTRKCIILMLCRALRPVSIRTIF
RSVSLTTLTDVVFQQA YALFNLLNAVWN-

>BmorOR34

MIYYRKSKMELNFDKIFRIAIISQKFSGTYPYTKRD KKWATHFILMHGELTIICMLFIYNIIEF
DLKAADYSQMCRNMCLSFVYLVITLLYINMLYYQSKLKMLIETMKA EYIEIAKTMSSEEEQ
NVILEYAKKGRWLCRAWAILTTCGMAQFFLKSII VCTIYSAIQGNFRIVQY YEVITYPEVIERH
RNNPVIFITMYFCTFFYSLYTSALYTSVLP LGGPIFLLHGCAKLEIVRLNIKNLFDNDDYV VQ
ERLKKTVLQMQEICY SNEINECFQVIYEFLLKSSSLVLPITIFAVIQALGRGQFIPEFFAFIFG
AFVVGTTPCYYSNMLMEKSEDVCMTLYSCGWETRFDLNTRKCIILMLCRALRPVSIRTIFR
SVSLTTLTG VVFQQA YALFNLLNAVWN-

>BmorOR35

MKLWQSIREFGLEYCDLPTTLQNVASLLRAITLNIDSRHTARIPFICYVMTVVITLSYFYVFL
VSMAWFVFRSAETRDYLAAMVVLSLGISSEIGTLKFFYTFIYIKKVQRIVREYLECDH MV
VPESRFADNVLKTMRNVKKRAILYWVVVIGNGVVVYTKPLFMSGRHHMEDRYIVYGLEP
MFESPNEYEVAYFLMMFGLCFICYPPANVTVFLIVVVGYTEAQMIALGEEMLRIWEDAVAH
YNNKYHTVGALTNSSSEKNKIINQYVKFRLTEI IKMHTTNIQLLRQVEFVFRSAIAMGYVFL
VLGLIAELLGGLENTYLQIPFALIQVLVDCYTGQKVM DASSLFEQAVYDCKWENFDKSNM
KTVLLILQNSQKSMRLSVGGITVLGFSCMMSVMKSIYSAYATLRTTMS-

>BmorOR36

MVFNSKKNIIISLFSLLEDSRHPSVGPLRLLSLTGIWYPNSKTNITLLKRACFYVIVLFFVSQ

YLKCIKFKIDSLQLILEYAPFHMGIKTCFFQKDYNVWQDLVSFISKTERDQIAKKDPKSI
KTIQSYISRNRKITYSFWALAFIANIGVFSKPYQNNQSDVNGTVTYNHLFDGYTPFSEPPG
YYFSMGIIETILGHVVSFYVLGWDTLVVSIMIFFAGQMMSRLQCSRMIINGSPERTHKNIK
CHKFHTDLIKYQKQFNLSLSPVMFVYLFVSSINLSVCIVQIAEIEDDFATVLSFFIFLLACLIQ
LLLFWHSNEVTVQSELVSYSTFESNWTSTQNKLQKEVALLGLTTSKTLVFTAGSFNHMT
LATFISIIRASYSFYALLNSTKY-

>BmorOR37

MELGCSRHLKLPCLSHPIGISKHGNTLSELLIYFPAIPKITYAILAVLLTVYYYIYLCSITWV
FVRCPTGDLAAASIVFSLGVSSEIGAIKLFIIAKLRDITGEYLQCEADMAPGRLRARVGRS
LRTVRRRAFVYWLVLVNAFAYDLMFAFLPGRHLSDEVFVIYGFEPMFESPNEFIASITLMG
VSVVFICYTAGSISAFIVIVGYSEATMLALSDEISCVWDDACASECQPNDFIRARLGKIV
AIHTKQIRLIREVEVVFRGALAGGFACVAFGLIAALLGGLTFLQLPFCVIQISVDCFVGQ
RLRDANVAFETAVYNCKWEYFDKSNMKTVLLILQNSQKTMGLTAGGVAALDFTSLMTIF
KSVYSGVHHSQTDD-

>BmorOR38

MNLSQSVNEQANEYVKMRLERISKIHSPMLPFEDIQDFRELCCIPLAVYAVTGSITASYVYA
FLISLLWFLFARCTDPEDFQVAMVVFSLGISSEIGSTKFFNSIYIKELRKLKFDYLLYDATCP
AQGRLRLHLLTTLRYVKRRAIYWLVIIGNGFIFAIKPLLVEGRHLAQDDLVLIGLEPMRQSP
NYEIAIYAIMTMGVCFICYPPAHVTMFLIIVGYTEAQLALSEELKHLWDAIEHYEKHSR
TEREADAAMKSKILNSFVNFRLVQIIKSHSTNVNLIGRVENVFRGSLAVGYVFLIVGLIAEL
LGGLENTYLQVPFALIQVAIDCFIQRVNDANIDFEKAVYDCKWENFDKRNMKIVLLLLQ
NAQKTVSLSAGGIKLNFSCLMVIKSIYSAYTTLRRTMK-

>BmorOR39

MLWSVFSYFTRADDVLAGIVIFSLGVSSEIGLVKLCFMYANIDKIQKITEGYLKS DAASAR
NSRFSKNILHTMQSVKRGVIFWLVIISNGVVYLVKPIVTPGRHFMEDQFIILGLEPKYETP
NYEIGFFMMAVGVCVTCYLPANITAYLITVAGYSEAQFLALGHELANLWPDAQLHCRAM
NLSQSVNEQANEYVKMRLRELVKIHSTNVNLLRDIEGAFRGAIAVEFLLLIVGLIAELLGG
LENTYMQVPFALIQVSDCLTGQRVMDANLALERAVYDCRWEEFDASNRRRVLLLLQNA
QKVATLSAGGIATLNFSCLMVAVIKSIYSAYTTLRRTMK-

>BmorOR40

MTGAGAGTFRGTGAGPGRGDGVARRGESGETTTLGRDAFAALGCFGAADGSTARARFFPR
VTVLNPSEVPGSGLAADSNSISDSESEPELDAQAIDAGAGVGGDIGESRARTVFGIQGH
DASDSALRMHNNVAIYAKTTMSGNSQLTFATAATIFLKNASGPNVVAIGTDYAICVVSLSLF
FCYRFTELVEDTYSYLLFQLVGSVGIICMSALRILVVDWRSVQFFSILCYLSVMISQLFVC
CWCGHELSTSEELHTILYNCAWYDKDKVKFKRDLIFMMARARRPILLRAGYYIGLSRQSF
VSVSIPRIRFNAILVI-

>BmorOR41

MMGNSTDLFLDRTKRILNFFAMWRSFEKPIPLKVYMAFIMTTQYLFLIFEIIVNVWGDM
AEVSEASILLFTQASVCYKMTAFISKTNFVILLGLIESEIFSAQTELHEKILILKARKIKRLC
MFFLVNAVTTCSLWAVIPLDISKMLPFKIWMPVSTGESPHYELGYLYQMITYISAXLFIS
VDSVPLSMIMFGCAQLEIIMDKIGKVKVSWSLDQQPMQKQEVLSNYELLVECVRRYQSV
VRFIELTEKTYHANIFFQLSGSVFIICNIGFRIAIVDSNSLQFYSMILTYLVTMLSQLFYCWC
GHELTIRGEELRETLYQSPWHEQDIRFRKVLITMERMKRPIIFKAGHYIPLSRPTFVAILRCS
YSYFAVLNRVRNE-

>BmorOR42

MDIPKFEELLKQIKMNFWMGIPFDNPKIQIRYYVLLLPLSLMLIEEIAFFGSRMSSENFLEL
TQLAPCICIGVLSVLKILALTAKRQKIYELTQNLECLHKKILNDTRKTELVRKNLVLKIFITKY
FFVLNAVLFVYNFSSPVIIAYNYIVSNEVQFVLPYAVLLPFKTDSPWIPWLIVYVYSIFCGFTC
VLYYATVDVLYCVMTSLVCNNFSLISFKLQKVNRTAHLLEKEVVKEQQYVLKLAEDLENI
FTAPNLFNVLIGSVEICALGFNLMIGDLTQIPGCILFLSSVLLQILIMSVFGENLISESSRIAEA
AFLCKWYEMDQKSKKTILTIMIRSHKPKKLTAYKFSVISYGSFSKIISTSWSYFTILRTMYTP
PGTKFQDDL-

>BmorOR44

MYTYFKVLVFWLNKDKVISLQKILHCKEFKPKPEHKEIIRKSIRKARFVMTSYATMCVGA
VSVGILPLTENFDILPTNVEYPPFDVYKNPTYAYLYLHHIYYKPATCIIDGVMdTILAAFVA
SAIGQIEILAFNLRNFDVLAERRRKRAISGNKYIGKYTNLYFTKRILKECILLHNSIIRYVSVI
ESAFSLASALQFMLSVMVLCLIGIQFLSIENPTSHPMQMVWMAIYLTCMLIEVFILCWFGN
ELIWKSNDLRQAAFDGPWRNLNRKTCMFIIIFMERCKRPMRLSAGKIFTLSLDTYTVLINW
AYKAFVAVMRNMKK-

>BmorOR45

MKVLDNVNHAVKVTMNCRLYGLFVSDDLTKRQLIIMRAFSLMLYLFFVGGFFITQSAII
TMWGDNLMTNVGLVLGTHLTLAKVFTLHYKEKEITNVIYKNEVRLRAETREQGKYIIS
EMNRETTLMRLFIPFGMGTVTAWLLCTPKGELYTPAWYPCNTTKSPAHEIILAHQGIIVL
TATLEIAIVLLMTSIVAVCRCLKLVGLSFETICDDLPSNIMNKLTADEQVIVAKRVRENVIE
HQAVLECIINDIQDCFSSAMLVHIAISTMIICATAYQLAVEKSLDLTQRMTMASFLGGMSTEI
FLFCYQGGHLSIDSMEVATAVYSCPWYTFPTSLKRSLLVIMIRAQQPALLTAGGFAPLLD
FVSIMKASYSFFTVLQNASE-

>BmorOR46

MAFFIRNKMLGLTITLNTLSWAGLIMRDQYTKTQRIVRVYGWLVFLYLFVAATYVQIADL
IDIWGDLDLMAETSLLLFMELAVISKILTIFKYDKIMEIINGTEDILCSENRELEGQKIIASIDK
ETTRFFQYYTSSVIFTFFWFLGEHSSTFFIRAKYPFNEKSPGYEFALIHQCMVMVFTGYF
EFNINIFFASVVGCRCLKLVALSLRNICINIPVNKKNLITPEEEKLITERLHCAISQHKYAL
DAAEDVKHCLSKVLLVQLTVSIVIICTTAYQMAVNKSTDITIQKLSMAGYLLGASFEVFLFC
FQGQSLNASEDIADAVYECPWYTLTQPLKRTLLIIMMRAQSPAILTAGGFVTLTDITEYMAV
LTGHGGGDFLHRTGAEPMAECHHCGLDLDTVQHTLLVCPAWKGWRRDLVVKIGNDLSS
VLWHRCSAATSRRRCLTSASAPSRRRRRGA-

>BmorOR47

MKLVFDNFIFALKVTLNWCYRFGIFIPDELGTGRRQKLLVQAYSVFMFMLFIGFFIITQIILFIL
VWGDLSLMTDVGVLGTNLALSAKIAVFFFKREELASILKKNDDTLRFETREEGKKIISEID
RETNAFMKVFFCFGVGTVIAWFLSTPKGELHIATWYPCDTKRSPAYEIIIMHQLAITADLLM
LSMIAVCRCRVCLVGLYLQTCDDLPCNVKNKLTSDVEEVIVAKRIREYVIEHQAILDCISELQ
NHFSPLLQLLTSVVIICVTAYQLAVEKSSDLLRKFTMASFLFAMSTEMFTFGYQGGHLS
HDSMEVATAAYSCPWYTFPTSLKRSLLVIMIRAQQPALLTAGGFTTSLLETFTVIMKASYSF
FTVLQEATD-

>BmorOR53

MALKKMLALTKGLEDPHPLLGP TLKALS VFGLWQTGSQKSTVIYNTFHFLTFLFVITEYI
DLYTVRKELSKMLNLSVTVLSTICMIKTL SYVCRQSHLKV LVREISELELELMKT TDKNI
VKRLRQYTVYTRAVTYVYWFLVVGINVVLLTSPLLKYASSEIYRSEIKNGTEPPPLILCSWF

PFDSARMPGYFWATMVHIIMSIQCGVVATYDMNAVAVMSYLKGQTSILKDKCKAIFDET
ASSRDVLNRIRDCHRHHNILLRHYMFNSLLSPIMFVYMLICSFTICCSIIQLDSSETTISQRI
WIIQYSIGQISQLFLYCWHSNEFAAKVKKKHFPLFPINLF-

>BmorOR54

MGLNTIKEFFVNVKRRFQDVSIDSLLWIVNIVPSLAGFSIRS DRVSAPFWIVHWSLLVYVYA
VGNAVYQWKFANEADYITSFINVSLILIGNNSWWFLANRLLKSVLHKIEVNDELSRRS
EQSRLKHKLLKIIKRIVLVFYMSNYVNASFIYLPNRVDVLNNYAMTPCVGMEPLTVSPNR
ELCLTILCMQEFSIMTVVLNFQALLLCFIAHTAVMFQILADEIMALNNYENLEEHQAYVKE
MLPIFVKRHSLSAVDNYKSLYSVPLGVNFGSNALTILLILYLPVLEWFKFIPIFVFCFMLFF
LYCFLCQKLVNASEAFETAIYCCGWENFALREMKMIYVMLHQAQKPVELLAADIVPVNM
NTFATTLQAMYKFVTVVKF-

>BmorOR56

MKLEKLEDPDRPLLGPVVKALKFWGLLLPESRSKKYFYLFMHFAVTVFTATEYIDVWFV
KSDLALLNLKITMLATVSVLKVTTFLWQNAWRDLIGYVSRADLEQRATSDSRKLALI
NGFTGYCRKITYYYWFLMYTTVAIVTVQPIFKFFSSAAYRLDVQSGNGTYLQVSSWIPW
DKNTLPGYLLASIQTYAAIYGGGWITSFDTNAIVIMVFFRAELELLRIDCAALFDDEKSFG
DMAFMRLKECHRRHTELVKHSRFLDSCLSPIMLLYMFVCSVMLCVTAYQITIETNPMER
FLMTEYLVFGVAQLFMYCWHSNDVLYASQDLRGPYESAWWSRDVKYRKNLYILVAQFN
KVIVFSAGPFTKLTVAIFIRILKGAYSYYTLLSQSQMNKT-

>BmorOR57

MPSLLKTESLALTLNLTLNLSWAGLILRDDYTKTQRIIMKVYGGVFLYLFVFTAYVQIADLV
VIWGNIDFMTETSLILFMQLAVSAKVLTMLKSKKIMEVTNEADAILNSEKKVEGQRIIASI
DKNTTLFLKYYGFFVAFTIICWFMGENTSTFFIRSKYPFNEKSPGREFAFVHQCIVVIFTGS
FDENVDIISLVAVCRCLKLVALSLRNLCLDIPMKNRNLITSDEEKVITERLRNIISQHKRA
LDAEAEIKHYLSGALLVQLMVSIVVICTTAYQLAVKKSTTMQSLTMAGYLFGTSLEVFLFC
YQGEFLRESSEEIADAAYECPWYTLTRPLKKTLLIIMTRAQRPATLTAGGFVTLDDITEYMAI
MKASYSFFTFLQVSE-

>BmorOR58

MKLVFDNFIFALKVTLNWCYRFGIFIPDELGTGRRQKLLVQAYSVFMFMLFIGFFIITQIILFIL
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PCDTKRSPAYEIIIMIHQTIAVAVIASLAITADLLMLSMAIACRRCRVKLVGLYLQ TICDDLPCN
VKNKLTSDDEEVIVAKRIREYVIEHQAVLDCISELQNHFSPLLQVLLTSVVIICVTAYQLAVE
KSSDMLRKFTMASFLFGMSTEMFMFGYQGGHLSHDSMEVATAAYSCPWYTFPTSLKRSL
LVIMIRAQQPALLTAGGFTTLSLETFTVS-

>BmorOR59

MDTNPSAAGDSVAPHLRRLRQVGFCQLDPTSQSRRPILALMHRVYHRLVLAATVLYIFEQL
TYAYQARNDMERLSRVFLMLCHLTACIAKQFVHSDADKINQLVVGDDALCNQPVETH
RLLLLETSRRAARLLMLYSGCAVSTCILWAVPLLDQLRGRTVEFAFWIPIDYRHNAFQFAV
VLAYAFYSTSLVAVANTTMDAFIATVLYQCTTQLRILRMNFESLPERAYALS RKTRQDYHT
VTHELLVDCLLHYKKITETCNLLEQIFGKAILVQFGVGGWILCMAAYQIVDMEILSIEFAST
ALFMGCILTEFLYCYGNEVTVQSGLVSESVYAMSWLSLCPRERRALVVVLERARRPLR
PAAGRVVPLTLNTYKILKSSYSFYAVLRQTK-

>BmorOR60

MVRPCRYFAIHILLRFLGLGWVHHPHENETRNYPGLYLYYSILTQLVWVVGVLVLETIDP

FVGEKMDRFRMFSLSFVITHDLTLIKLYIFYFRNVEIQDIVRTIEIDLRYRYQNDKIRATIRI
SRIFTAAFLFFGWVTIGNANIYGIVQDLRWKDIVKNLNETTSKPLRTLQPFIPIWPYQEDK
HYILTFILETMGLLWTGHIVMTIDTFIASVILHMSTQFAILREAVTAYDRTMIALSEALQS
GVLCEENNGNEENNQIFLESFYKHEIESVLESTLLSCIRQHQLLIGCVEKFSKYSGFMT
QLLSSMAGICVVMVQVSQGASSFKSVRLVTSLAFFFAMVIQLAIQCFTGNELTIQAERAD
AVMESKWEKMPVRLRLLLVTMMRAQRPLHLTAAGFAYIDNTCFLSILKAAYSYYAVLSQ
KQG-

>BmorOR61

MARITDVFRLNFIFWKFLGIWGKSAPSKYNMAYTALYLSASLFVYDIFLTLNLIHTPRKLET
LLRETMFYFNHLVAMTKILKMFIRRKILVIFDLLDCEEFKPSDEDSQEIMKRKNEFYIY
WRIVAVTSNLSCFMQVVGPLIKMLIWKSELGLPVCKYFMSDEFNRKYFVIWYIYQSFYIY
NQMVNNLNLDTFNCGMLWMAVGQLQILKTKFVNFKLNDIENSLDLKTRDDMQTERLRK
YLTHYEILKYCATVQDILNITIFVQLGMSSIVICVGLCGFVAMPSTETAIFMSSYLITMTM
QIFVPSWMGTQISFECGELMSAAYCCEWIPRSKLFKRSLLIFVERAKTPVRITGLKIFTLSD
TFTSIMKTTYSFFTLIRQLQVDEVN-

>BmorOR63

MKLWIRNANFTISLSLTLRCLGFWSPLDGLAGNKRLLYNCYSFVFFMFLGIIYLIQVVDMI
KIWGDPLMTGTAFLLFTNFAHATKVINIVIRKNRIQRVIQQANAVLMGVQSEEARIVKS
CDFETSIQLCLYFLLTFVTTVGWATSAEKHQLPLRAWYPYDTSKSPAYELTYIHQVAALLIA
AYINVAKDSLVSLLIAQCRCRLRLVGLALASLGQDLKIDYQSQLSPAQENILNRLKTCVLE
HQTVLAAVTELQACFSKPTFAQFTVSLIICVTAFLVLSQTGNLVRLLSMGTYLMNMFQVF
IYCYQGNKLSVESSEIAGSVYFSPWYLGSVKLRALLIVMVRSSRVAKLTAGGFTTSLAS
FMAIKASYSLFTLLQQVKQKK-

>BmorOR64

MGVSNRGTVPFLYPLVDELVDYLNIVGVHLPFEYKTPSRYPPLAYITVVIAYIYVSYFVMV
TDLIMQAHLHLLCQFNVLADCFENMLNDCVKGFEGLVSLHEYIHLIDEFEYNLMVGL
RLPFSFDTPRLYLFTYVIVLIAFNHTAHYVMVTDLIMQSYLIPLICQYAVLADCFENILDCS
NDYGDHARRNDIVYSRSMELRAILSRPMLGQLASSGLLFCVGYQATTSISVNIKCLMSL
FYLGYNMFTLFVVCRWCEEITNKSLNIGNAVYCSGWESGMTVVPTVRSTILLVILRANKPI
VFTAGGMYNLSLTSYTSLVKGSYSALTFLRIQHE-

>BmorOR65

MRLGFEVSISEYLYRNIFYIYTLFHILLHFYIILHMIKLDLEAIFDDIDESVALLPHRDTRRIE
VQKILNGRMKRVVTWHISVFKAVEAVSSYGPPLAYQVMFTSIAICLIAIQTQKLENGILDI
RFTMLGVAACLQMWIPCYLGTLLRNKAFGVGEACWNSGWHQTPLGRMIRQDIIIIVLLRA
QQPVTIKFPGLQSIQLETFSSVIFNLYGYYYFLLLRWVDELTAHLVLSGYWSP-

>DplePOR85d

MIPVYLILVQGIIKATVVCTKKTEIESIVEGLGAIWRTDEMLTKNQIEKKHYRLKKFNFYLT
VFYWGSMVASYQNLFTTICTILFKRLVLQDPELEFAFGNAYPYEFTKNWFTYLSVAQETT
EFLKNFSAVLALMGPIYILCYAEQLQEESVGIANAAYETLWYEGDKTFQKNIFLIILRSQR
ACCLTSLNYAPISLNSFTKVIQHDTEMKKYT-

>DpleOR3

MVFEDRVFDIPLVKSIFIRKPGHGKLELEKLVVNSQEKLFKLTRVLLKTYVGSVWLCVTL
YLCGPIYQMCVTKDKSLRLLAFDMWFPYGLEDFRVYVATFIFHAYAGYLCCIAYPGLQSTI
ILFVGQIIRQLQILTILNLDLDEIAKELVGRGELWQETCIQIFSQCVDHYIQTKRFSNKLNVI

CQPFYLALIVVATMLVCVCSVKIAISCEKLEAAVTEKWYLFNSSHKTNIRIFMMAMCQKM
PIIYIGSITLSLQTFTWFIRTGMSFFTFLLMSVLED-

>DpleOR12

MGKSIDLLSRVAPCSALCILSTAKTLPMVTNNDILKDAVLKLRRRLHQGVDLRNSFECDELM
KTSTILKNIITVLVGVFVCAVVLFTSMGFLMAYDFFTTGTYYQLQLPFFTKYFVDVADARI
YTFVYLHQFVSTVLVGLNIFAADTLFFAFCSYVKMHFRILGHYYENIVGQSESETRNLR
CVRTHQVLIKLVNQINILYSKSTLVNIMTSSFIICLCGFNITITKSKDMSTYLLFIPFLMNSLTE
IFLMCFFGDQ MIDSSYNITQAVYSSRWYDAGEDLKRSVLLILFRSQSQCKITAAANFSDLHLR
SFTTVCVYIIL-

>DpleOR2ORco

MSAVVYFSLALCMMALYANGSVIKLQDLSLTDGVVLKLVIKEDPEQEGKAVASIKIDMDH
PKPKNVRNLFHKLITTSIPKFEDRILITNNNCP LGQELKKSIMITKSENRLVSDLMPNIK
LMQMAGHFLFNHSDNSGMSSLLRKYSSIIHAFILVMHYLCMAANMAKYSEEVNELTA
NTITVLFFSHSIIKLTFFAITSKNFYRTLAVWNQSNHPLFTESDARYHQLALTKMRRLLYFI
CGMSFFSVICWVTITFFGESVVMLVDKETNETITEPAPRLPLKAWY PFDAMSGTMYIAAFA
FQVYWLLFTIFIANLMDVMFCSWLIFACEQLQHLKAIMKPLMELASLDTYRPNTAELFK
VSPEKSDKTPDPIDMDIRGIYSTQQDFGMTLRGAGGRLQNFQNNNNPNGLTQKQEMLA
RSAIKYWVERHKHIVRLVSSIGDYG TALLFHMLVSTITLTLAYQATKINGLNVYAFSTVG
YLSYTLGQVFHFCIFGNRLIESSSVMEAAAYSCQWYDGSEEAKTFVQIVCQQCQKAM SIS
GAKFFT VSLDLFASVLGAVVTYFMVLVQLK-

>DpleOR44

MYTYFKVAVFWLNKKKILNLLKFLYCDEFRPEEKEHTEILKKSILARFITYITICVCAV
SVAIILPITDEFILPTNVEYPYFDVYKPPYVIAYVHHIYYKPATCIIDGAMDTICAVFITFAI
GQIDILAYNLRNFDVLAFFKKWQRDLKHHKNTSYDCKHYVNYILKKCIVHYNAIIRYVSMI
EDAFSLASALQLMLSVMVLCLVGIQILSIENPREHPMQMAWTAVYLSMCLQE VFILCWFG
NELILKSTELRQA AFDGPWLKMDYRTMMLIVIFLERCQRPLQVSAGKIFILSLNTYTYLIN
WSYKAFALMTNMKK-

>DplePOR8

MLYNINIDSFFIGLLILAIAQIDILDEKLKNIATNIWDADGMVNRDIDEICIRKLNDCILHYN
NISKFCLLVEEVFSVTLFVQFSMSSFVICVCLYRLTQPAPLPYYLFLG SYLFIMIIQIFVPCFFG
ARIMDKSSQLSHAVYSCDWTPRSRRFKSSMRLFVERSLRPHSITGGKIFPLSLVTFTSIMNA
AYSFFTLTNVQSNET-

>DpleOR18

MSFFKRFTDRVCESDLDFNLKYLYYVGLWPREDWPKYKQILYKIYEFKLHLLSITFIVITG
IGTYQQRNNVIMLMTNLDKTLVGYNFVLKIFFVVIKREKLVLINEIKNSGDKVSDDRKTL
MAIHVIFITFISTALVSAFSLLSQYKAEMTVEAWMPFDPFKDRMSLLMAAQILAICFVVPCL
YRAFAMQGIVCSIIMYFCDQLLHLQGNLKKLGNTKHNEMQARKEFKGIVKXHVRLMRYT
KTFTEIFKEFFLIQNLAVTIELCLNALMVTVVGLDEKTL LASFLTFLGLALFNAYIFCYLGDE
LIILSTGISQAAYESEWTSWPIDMQDLLIIKVAQRPLKLSAGGMAIMCIQTYSQALYNAY
SIFAVLNDVVD-

>DpleOR42

MDIPAFNDIFEQIKINFWLIGFVCVLYFATVDALYYILTSHICSQFALLSEEIQSLDENTAYSLT
EIIKXHQHILKLSQDLEIIFRAPNLFNVLIGSLEICALGFNLTMGDWSQIPGVILFLLSVLIQIL
MISVFGENLIRESMRVGQA AFFCKWYTM DRASKKNILMLR-

>DplePOR9

MEVGSSIIYNSRWYKMDAKSVKSLIIHSRSLKPCCKLTAFGFFDVNLKSFMSIMSTSWSYFA
LLKTVATPTKT-

>DpleOR56c

MHISVIVFTATEYIEIWFLKNDMNMVLTNLKITLLATVSVSKITSFLIRQKDWKGILNYVND
TDRARRSEEEESGKKEIITKYTRYSRMITFYLLLMYITVIVICQPIYKYTSEEYRHNVRN
GTEKYDQVVSSWVPFDKNTVLGYIFACLIQSAAIYGGGWITSFDTNAIVTMVFKSEIEM
QIIDGRLIFGTEKEPASVKEAKRRLMRCYDRYSKLIR-

>DpleOR6

MAYTGGPILISFVVDEVKRQVVCILNLLINILINSLTYFFFLKADDLPLDVYGMWENMS
VSNQKTAMLLLQKVQIPMEFEALGGLIAGVRPMSILKTTFSYYVMLESSMESKSA-

>DpleOR35c

MPKIFGKFRPEYCDLPTMVWNVEVLLRRTLIRSYRRLNKPISWIFYILTTLGSLFYIYSYVIS
PVWFLMVKSRETGDFTAAIVELSLMCSLTCVPIFYMKYYSSTVMDLIDEYLRNCLIVK
GTRFEKNFLKNMKTVMKKQATVTWAVSMLNSATYLTVPLLRPGRHFTQDMYVIYGLEPML
ESPNEFIATFMMVLSIIFALKVIVYITLFFVIVIIIGFLESQMLALSVELTNIWEDSKKFYNYIL
QHNEGDEYEVNRNVFVTNRDLKFKHIMNINLRNKVEKELRFIFVIDFIFMMLGLVTELL
GGLDNTLQFSFTLGIVFIDCCIGQRLIDASIAFETAVYDCKWENFNLSNQKTVLFMLQCSQ
KTMTLTAAGIAVLNFIFLMSVLKSTYSAYTTLASFT-

>DpleOR29

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RSNLDLVLTLNLKISMLSIVCIVKANTFVIWQVQWKEVIEYVTRADQYERDNQSVERRKIID
SYTKYCRGIVYFYCVLVFTTFTITVTNTPLMRYLSSAQYREALRNGTELFPHIFSSWMPFDK
YNSPGSWITVIWHVCLCAYGAGIMAAAYDTVIMVIMVFFGGKLELLRERCTHIFENTEIASD
DNQTNEKIRKLHNIHVLLMKHSRLFNSLLSPVMFLYVVMCSLMLCASAQFQTSATNTTQK
LLMAEYLVFGIAQLFMFCWHSNDVLIKSQKVMFGPYESEWWTVNSKQARSILITVTFV
LLSDKQFDMDNQTNQERTVPIQYVRGSRAFRQFKNPPQPHMCIQDTIKDTTEKLYINVLG
WQKIANPKQYSDPIPLYGGMQVHQGCGPNSNKPPLLVFAVMVNPDKANGKNAANPTD
REALVSLLCDFVEAMNPGLLLTRNPIIMKDKDITGELKDVWLAVQNKREKGLNQDVM
YKVYDIDGIGSEDGIEDEQALRNCQQNDTGSNRIQMSDKKNTVKSSKQILKNAGQKSEF
DSGMNNYQLNQSSRDADTTYCTPVYGVYSSRENHNQINDIQQKFASNEITKPPSSFK
KDWQSPHGKSTTGWDEFKRSRPPKTDNKYKRSRSDKSNKPMNSGKSHYDFYPVFDNKA
SIVASPEYLDADKNSVIEQDIKDNSKIIIDPMQKLVHSTDNKICDNKTSALSSFS

>DpleOR56b

MIFFRGELELLRRDCRSLFGTEENPVTKEEAQKRIDHCHQRHNDILKYFRLFDSCSLPIMLL
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YESYWWTRTLSEQKNLHLLAGQLNKQIVLTAGPFSYINLATFINILKGAYSYYTLLN-

>DpleOR60

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NRKTVRITRIFTGLFIFFGWMTIGNGNVYGHQDLRWKAQVQLNDTSLRPFRTLPQPIYIP
WEHQNDLSFIITFLETVGLLWTGHIVMTIDTFIGSVILHMSTQFSIMQEAISTAYDRMDK
LIKGVIECNDPVALNDCEASLGESRRDMIVRTYCTKQEIIEIALENTLKSCFRQHQMILISVD
KFASTYSYGFMTQLLSSMAAICSMVQVSRDASSLKSISLVTSLAFFGAMIIQLALQCFTSS

ELTHQAERVSEAVMCCCKWERMPVRLRRYLVLMIARSQRPLQLTAGGFATMNNDCFLAILK
AAYSYYAVLSQRQG-

>DplePOR20

MYPNPVYDEKRKKLIVMAILSVLPAFTLAGNDIRLRILNNDMANVVRQSILVSITFVIKFI
SIARKDEFRSLLEEIDADYERFNGMSEQYQDLVEDTIRKTRKVEKSWCFVLLVTTASYPVL
AGACTIYSQLFSDYPRRYMVHELKAILISEEQKYQSPYFEIVSLYTMIVIFLFIGFTGFDGM
FSVCLLHVSLKLIYQENLRNLFNEKDIQKIKYNIGLFVKNHCGVLRLIAKIQTCEVWLV
GIFINAVVQIGMAFTQITNQTESDINQMYYLYALATVVHIYLP CYFASDVTYNAAEIANVAY
SSSWERVQDSKIRSSICFIIAKCQTPVRLTALDMLTFNMELFVSVGHQM-

>DpleOR8

MASAMEEIEKENVMKQQKLRVQWGIIFYAVTVYLSLIAYGVESLRKVLVEGTPPFYTVVTYI
PDYYDESIANALRIFFYMTWLYMMLPMMATDCMPIVHLITMAHKFKTLRHYFEDIRVEF
DENLTMGTPEAANLLTARFLNGVTMHHKLMFLAEINRVFGIIMSLQVCESSAVAVLLLLR
LALSSHLNLTNAFMTYTFVGSFLYLLALNLWNAGEITYEASLLSNSMFYSGWHLCQLNK
HRHKDIRRLVLVGCAQAQKPLILKAFGIQDLSYSTFVSVARMTYSIFAVFYQRN-

>DpleOR35b

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ISAMVALSLTMC SITCIPKIFYMKYYQNTVMDLVDNYLHCNELIVSGTRFEKNFFANMRTV
KKQATIAWVILTNGVVFVTLPLRPRGRHFSQDLFALYGLDPMVESPNYEKASILLTLAVYF
SLTVMVHITLFIIVIGFLESQMLALSVELSNIWEDSKKFYNYVVLHHNESITKYELRNLFK
NRLRDIVKFQIMIVSLRNKVEKELRFIFVND FIFMIFALVSELVGGLENTMVQMPFTFGMV
IDCFIQRLIDASKAFERAAYGSKWENFNLSNQKT VLFMLQCSQKTMTLTAGGIAVLDFIY
LMSVLKSTYSAYTTLKSSA-

>DpleOR35a

MTVSKSPVSGYLNKMYQYTENIFPETGDIRRAAVELSLATASGTCVAQFLYMKLCSNRLM
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DLFVLYGLDPMVESPNYEKASILLTLAVYFSLTVMVHITLFIIVIGFLESQMLALSVELSNI
WEDSKKFYNYVVLHHNESITKYELRNLFKNRLRDIVKFQIMIVSLRNKVEKELRFIFVND
FIFMIFALVSELVGGLENTMIQMPFTFGMV FIDCFIQRLIDASKAFERAAYGSKWENFNLS
NQKTKKYEV LGNNTTYLKEDLHLVCYRNVQNSRKN SNEDDRQEGEWENFNLSNQKT VLF
FMLQCSQKTMTLTAAGIAVLNFIFLMSVLKSTYSAYTTLASFT-

>DpleOR27

MAILFVLSQYVELYFIRNDLAMALKNLSVTMLSTVCVVKAGTFIIWQKYWKDIFNYVSKL
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GASSYPEIMSSWVPFDKTQGGCYLVLTLIHVLCIFYGGGIVANYDSNAVVL MCFFAGQLKI
LKINCERLFGNGEEIAGTTSMQQIWIAEYLI ALVAQLFLYCWHSKVLHVMNIFIH-

>DpleOR56a

MILYVLVCSVMMCCSVVQLSLGHLSTSEKLWVIEFTTALITQLFLYCWHSNEITYESNLVD
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MQENQI-

>DplePOR12a

MAKIYKIKRYKPVFINLISELREMPEDNVTDEEQAISSALNRLRLVTKTYFSCNSILGLIF
TLPSIINLIKPLFGIEAPRILPFFYWLPDPYQEVIFEVVVIVQNSHCFLSAAFMLAGDLLFFS
FLSNITTQFSL LAVRIKKMFYAPIDGQLPESYPLGCSNEGILLNLSQDTSTNRSKVKEEELK

EIIKRHRSLIRLSNDVENMYSFLLVNFLNSSIIICFLFCCAUSTKTVKNY-

>DplePOR12b

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AYMLAGDLLFFVFLSHITTQFSL LAVRIQKMFYVPIDGQLPESYPLGYYNKENS LNPNQD
TANNRCKVEEEELKNIVIRHKALIRVVILIDHFQSTGVGEALYNSAWYVSSNSIKKSILIMIH
RSQRRVHITTFGFSTVSMECYATVSVNITAVTLH-

>DpleEOR30

MVIVGITVIFKHSILINCNSIKQLLKILDEYKAAELYGEREKDILKSAMSGVKICRFWL
SATLTCFMFPAKAIEMGNLYMRGEFKLVPMFDFTYPNFIEVHKESTVAYTVLFLMCLSF
DLSLSIYIGFDPLVPIFMLHTCGQLELISNKLNVFSKDASRQDIVDDLKRINSLRNREISLEFI
FFFSGACLHFYMPCYYSNLLMEKSESLRNAIYFSGWESRRDIGIRKTILLMLTRTYVPLGIK
TVFYPLICLDTFAEMVRQAYGIYNIMNAAWG-

>DpleOR1

MRVLKGLKLVIFCYPHIEGELQSKYVILGKIWVTLLSIATLSGQILYLYHKTGKIIFLKL
GHTYITTAMNSVVS DPDALTRYGILTFVVEQLIQVSAFEILETMSSKLEKAVYYLPWECMN
V SQRRVVLIMLMAQRGGTVKALDMVNVGVQTMAAVGLKHKY-

>DpleEOR15

MAIFIVNFIIYNSLLILNLVFTPRKIEYMIREVIFLFTEVAVTGKVLMMFKRKKILSVFDILN
CEVFKGEDDISRRIVESHVSKYKTYWSLYAILS NFAYSSQVFPVPIVYFIFNTNIKLPICKYYF
LDEEYVRRYFVFLYLYQSLGIYGHM QYVNVNIDALISGLLILAI AQVKVLKYELKNIKPDSPL
KDKRETERSQIFKLHKHLKHYEELLYCSGIQDIVGLSMFVQFGIASIIICVVL SGLRFTASV
EALMFMVTYLFTMILQIYVPAWLG TQLNYESQELVFAAYSSQWIRRSEKFKRSLKLFMER
ANTNIVLTGWRIFFPLSLDTFTSVITRNI-

>DplePOR18

MIYPNRENIQTRFKVIFS VIAINGVMLYWFLYLWKICCNHDMY NVSRNLTIGILVTLFFFK
SFYVTNKTHRFAQLLEKISNDLLKGNMDDSYQEIYEKYIKLGKLGQTCWIFIPILLTSQFP
IYAGVSTIYESLKTDTGQKYM IHEMDLKYLEDKQYDSPIYELTFAYHLITCLT LSPNFAGFD
GSFCIATNHLRLKLLAHKVERAFKDAKNKWELHTMIKETIRDHQEALS FYEDLQEVY
G SWLFTVFAVTSLLISLNIYQIYLSERVDPKYAIFAISGIIHMFAPCYFASNLMKTSEELSLDLY
SVEWEVWAYPAVTKQLIFMIAKSQQTILTGNGIVYFNMQLFISLPPTIAKVS VDRGLPLPR
SAWGVPPPAPPTFARCSAQPM TARPEPAKGFYK-

>DpleOR54

MSLIDRFKTKLV DYEKTFMDYRIESIILLNFIPSMAGFSILNKKNSVIFWIVHFFLVLYVYV
LGSIMYQVNVADGPIDLIKSYVNLTLVILIINNSYWFIVKRATLTKLMENVIENDTQSHQLD
FLKPKHTKLLRTIKIIVYIFYAFNILDVIFVYIPRRIDVTNEYYSNVACVGMKPLTHFPKKQL
CQLVLFATEISICTVVLNYQALIFFLISHTAAMYRLLCEEIFALDDDNMDTATVKKRLVVLIG
RHTLTLTITKTIKDLYSMPIGINFGSNAICILSFALPWEEWVNLSPVYIYCFVFLYCHLCQ
MLINASEQFEYAVYSCGW EKFDLKEQKTAYVMLLQAQKPVTLAADIVPVNIYTFATTMQ
AMFKFITVFKF-

>DpleOR16

MADIKSEDLFLNRAKFVMKLLGVWIIYVQVWGDLEAVSQASYLLFTQASLCFKVTVFQV
NVKSLRELLKRMNDKIFLPQSSKQNRILSLQAKRIKRLLLAFMISSQTTCGLWALKPLFDD
PGSRKFPFDMWMPVTPQSSPHYEFGYAFQLLTICMSAYMYFGVDSVALSMVIFACGQIDII

KDKILKINSIRKESGDEMSRRIVASDNNKKLIECIRQHQAVVLFKELLENTYHTYLLFQLVG
SVGLICMSALRILVVEWRSIQFFSIVTYLSVMISQLFVCCWCGHELTATSEDLHTVFYRSTW
YEQDVRFRQCLCFAMMRLGQPLVLRAGHYIPLSRQTFVSILRMSYSYFAVLNQTK-

>DplePOR10

MGIWLSSNNYVILRDLYKSLIMSTQYSFLLFEIFYVFVWGDIDEMSEASYLLFTQTSVCY
KASVFIINKKNLIVLLVSMKAKIFEPQSSIHYGILYRNARVVKNLCAVFLMSAITTCSLWTIM
PLFDAAETRFFPFKIWMPVDPDRSPQYELGYIQVMSIYISALLFVAVDNITLGMIMFGCA
QLEIVIDKIKQLKNASSKHNKERRKLICENKLLDECIKQHQS VIRFIETLENTYHANIFFQL
TATVGIICIGLRISIVEPRSVQFFSMLNYMVTMLSQFLYCWCGSHLTTKSEELREWLYQCP
WYNQDPRFRKSVFIAMERMKRPIIFKAGHYIPLSRPTFVSVLRLSYSYFAVLNQAKNK-

>DpleOR63

MPFPYSQTFLTSSYSLLFLLPQQLGLPQTSTSLMLQMYLGDGDYFPLSSPYDTSVSPAYE
LTYMHQTLSIMIGAVLNISKDSLVTLLAQTRCRLGLVGLALTTVCSGLLPEKWGRKSLQN
PEISVLMGNVLEEATAKDINKCGKMLDTPAMKKAIVLEQKMLEVQKEKQKPVKYKEDII
MGLIVQNINFSRLRSLTALKIAGLWAPDGMQTRKKALYCYTFVLLMFLGTFIILQ MIDLY
LIWGNLSLMTGTALVFTNISQVTKIINLLARRKHIEFLIKDTNDGLEVMTSSRARELIKSC
DHETRNQQVIFLLVTFVTTVGWATITDKNGLPLPAWYPYDTSVSPAYELTYTHQTLSIMIVA
VLNISKDSLVTLLAQTRCRLGLVGLALTTVCSDLVPEEDNTYSGGYSNKLFTAQQEMIAK
NRLRICVQQHQRALRAAKILQECFSVPTFAQFSVSLIICVTAFAQVLSSEELARRAYEMPWY
MCSVSVRRSIQIMMIRCHRIVKFTAGGFTTSLATFTAVIKLSYSMLTLLQQVNEKI-

>DpleOR64

MCKRCEDLKIQSTKVGEAVYFSSWEEVVVTIPRVRTTVLLILLRAHKPIGLTGGGMYELSL
EAYGNVRVLEKKYIF-

>DpleOR1b

MVAEILKRFTSKLSSTFGPVLLHYYIFHIVTLCILLECSKMDPDALTRYGILTFLVVEQLIQ
VSVAFEILETMSSKLEKAVYYLPWECMNVSQRRVVLIMLMQAQRGGTVKALDMVNVGV
QTMAAVGLKHKY-

>DpleOR58

MSLLFTHIKSSLKFTNVIFTVFGVWPPPGLNDLARRVYSLYSFLLLFLTIGVYIIIQTGDLVQ
VWGDLTLMTASVFMFLTNIAYAIFIALSINA AVNLCCDVLVATLIAQCRCRLRLIAQSLRT
LCDDVDVDKKGRITADSEKVVSSRVGIVMRHQLVLAQVEQLQCFSVPILGQFAVASFII
CVTAYQMAFVTNLYRLISMASFEIAVTIQVYIYCVAGTNLTIDSDEVSRAAYECPWYEFPAS
IRRLLLIVMVRCKRATVITVAGIVEISLDTFMSLTSTRCVKTLTDLHSQI-

>DpleOR1a

MRVLKLGKLVIFCYPHIEGELQSKYVILGKIWVTLLSIATLSGQILYLYHKTGKIIFLKLGH
YITTAMNSVVSDDPDALTRYGILTFLVVEQLIQVSVAFEILETMSSKLEKAVYYLPWECMN
VVSQRRVVLIMLMQAQRGGTVKALDMVNVGVQTMAAVGLKHKY-

>DmelOR

MQDQLDHELERIDKLPKLGLLWVEYSAYALGVNIAPRKRSSKYCRLTRILVLIVNLSIIYSL
VAFIMENY MISFETYVEAVLLTFQLSVGVVKMFHFQNKVESCSQLVFSTETGEVLKSLGLF
QLDLPRKKELLSSVSLILLNNWMIIDRQVMFFFKIVCMPVLYYCVRPYFYIFDCYIKDKD
TCEMTLTYPAIVPYLQLGN YEFPSYVIRFFLLQSGPLWCFFAVFGFNSLFFVLTRYESGLIKV
LRFLVQNSTSDILVPKDQRVKYLQCCVRLFARISSHHNQIENLFKYIILVQCSVSSILICMLLY
KISTVLEVGWVWMMGMIMVYFVTIALEITLYNVSAQKVESQSELLFHDWYNCSWYNESRE

FKFMIKMMLLFSRRTFVLSVGGFTSLSHKFLVQVFRLSANFFLLLRNMNNK-

>DmelOR1a

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NQRGQLMAAIYFMMCAGTSVSFLLMPVALTMLKYHSTGEFAPVSSFRVLLPYDVTQPHV
YAMDCCLMVFLSFFCCSTTGVDTLYGWCALGVSLQYRRLGQQLKRIPSCFNPSRSDFG
SGIFVEHARLLKIVQHFNYSFMEIAFVEVVIICGLYCSVICQYIMPHTNQNF AFLGFFSLVVT
TQLCIYLF GAEQVRLEAERFSRLLYEVIPWQNLPPKHRKLF LFPPIERAQRETVLGAYFFELG
RPLLWIFRTAGSFTTLMNALYAKYETH-

>DmelOR2a

MEKQEDFKLNTHSAVYYHWRVWELTGLMRPPGVSSLLYVVYSITVNLVVTVLFPLSLLAR
LLFTTNMAGLCENLTITDIVANLKFANVYMVRKQLHEIRSLRLMDARARLVGDPEEIS
ALRKEVNIAQGTFRTFASIFVFGTTLSCVRVVVRPDRELLYPAWFGVDWMHSTRNYVLINI
YQLFGLIVQAIQNCASDSYPPAFLCLLTGHMRALELRVRRIGCRTEKSNKGQTYEAWREEV
YQELIECIRDLARVHRLREIIQRVLSVPCMAQFVCSAAVQCTVAMHFLYVADDHDHTAMII
SIVFFSAVTLEVFVICYFGDRMRTQSEALCDAFYDCNWIEQLPKFKRELLFTLARTQRPSLI
YAGNYIALSLETFEQVMRFTYSVFTLLLRK-

>DmelOR7a

MAVSTRVATKQEVPESTRRAFRNLFNCFYALGMQAPDGSRPTTSSTWQRIYACFSVVMYV
WQLLLVPTFFVISYRYMGGMEITQVLTSAQVAIDAVILPAKIVALAWNPLLRRAEHLAA
LDARCREQEEFQLILDVAVRFCNYLVWFYQICYAIYSSSTFVCAFLGQPPYALYLPGLDWQ
RSQMQFCIQAWIEFLIMNWTCLHQASDDVYAVIYLYVVRIQVQLLARRVEKLGTDSDGQV
EIYDPERRQEEHCAELQRCIVDHQTMLQLLDCISPVISRTIFVQFLITAAIMGTTMINIFAN
TNTKIASIYLLAVTLQTAPCCYQATSLMLDNERLALAIQCQWLGQSARFRKMLLYYLHR
AQQPITLTAMKLF PINLATYFSIAKFSFSLYTLIKGMNLGERFNRTN-

>DmelOR9a

MSDKVKGKKQEEKDQSLRVQILVYRCMGIDLWSPTMANDRPWLTFVTMGPLFLFMVPM
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REIIEVENQSDQMLSLTYTRCFGLAGIFAALKPFVGIILSSIRGDEIHLELPHNGVYPYDLQV
VMFYVPTYLWNVMASYSAVTMALCVDSLLFFFTYNVCAIFKIAKHRMIHLPAVGGKEELE
GLVQVLLHQLKGLQIADHIADKYRPLIFLQFFLSALQICFIGFQVADLFPNPQSLYFIAFVGS
LLIALFIYSKCGENIKSASLDFGNGLYETNWTDFSPPTKRALLIAAMRAQRPCQMKGYFFE
ASMATFSTIVRSASVSYIMMLRSFNA-

>DmelOR10a

MSEWLRFLKRDQQLDVYFFAVPRLSLDIMGYWPGKTGDTWPWRSLIHFAILAIGVATELH
AGMCFDRQQITLALETLC PAGTSAVTLLKMFLMLRFRQDLSIMWNRLRGLLFDPNWERP
EQRDIRLKHSAMAARINFWPLSAGFFTCTTYNLKPILIAMILYLQNR YEDFVWFTPFNM TM
PKVLLNYPFFPLTYIFIAYTGYVTIFMFGGCDGFYFEFCAHLSALFEVLQAEIESMFRPYTD
HLELSPVQLYILEQKMRSVIIRHNAIIDLTRFFRDYTIITLAHFVSAAMVIGFSMVNLLTLG
NNGLGAMLYVAYTVAALSQLLVYCYGGTLVAESSTGLCRAMFSCPWQLFKPKQRRVLQ
LILRSQRPVSMVPPFFSPLATFAAILQTSGSIIALVKSFQ-

>DmelOR13a

MFYSYPYKALSFPICVWLKLNKSWPLTESSRPWRSQSLLATAYIVWAWYVIASVGITISY
QTAFLNNSLDIIITENCCTTFMGVLNFVRLIHLRLNQRKFRQLIENFSYEIWIPNSSKNNV

AAECRRRMVTFSIMTSLLACLIIMYCVLPLVEIFFGPAFDAQNKPFPYKMIFPYDAQSSWIR
YVMTYIFTSYAGICVVTTLFAEDTILGFFITYTCGQFHLLHQRIAGLFAGSNAELAESIQLER
LKRIVEKHNNIISFAKREDFFNPIILLANLMISSVLICMVGFQIVTGKNMFIGDYVKFIIYISS
ALSQLYVLCENGDALIKQSTLTAQILYECQWEGSDRIEIQSFTPTTKRIRNQIWFILCSQQP
VRITAFKFSTLSLQSFTAILSTISISYFTLLRSVYFDDEKKLD-

>DmelOR19a

MDISKVDSTRALVNHWRIFRIMGIHPPGKRTFWGRHYTAYSMVWNVTFHICIWVSFSVNL
LQSNSLETFCESLCVTMPHTLYMLKLINVRRMRGQMISSHWLLRLLDKRLGCDDERQIIM
AGIERAEFIFRTIFRGLACTVVLGIIYISASSEPTLMYPTWIPWNWRDSTSAYLATAMLHTTA
LMANATLVNLSSYPGTYLILSVVHTKALALRVSKLGYGAPLPAVRMQAILVGYIHDHQIIL
RLFKSLERSLSMTCFLQFFSTACAQCTICYFLLFGNVGIMRFMNMLFLLVILTETLLLCYT
AELPCKEGESLLTAVYSCNWLSQSVNFRLLLLMLARCQIPMILVSGVIVPISMKTFTVMIK
GAYTMLTLLNEIRKTSLE-

>DmelOR19b

MDISKVDSTRALVNHWRIFRIMGIHPPGKRTFWGRHYTAYSMVWNVTFHICIWVSFSVNL
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AGIERAEFIFRTIFRGLACTVVLGIIYISASSEPTLMYPTWIPWNWKDSTSAYLATAMLHTTA
LMANATLVNLSSYPGTYLILSVVHTKALALRVSKLGYGAPLPAVRMQAILVGYIHDHQIIL
RLFKSLERSLSMTCFLQFFSTACAQCTICYFLLFGNVGIMRFMNMLFLLVILTETLLLCYT
AELPCKEGESLLTAVYSCNWLSQSVNFRLLLLMLARCQIPMILVSGVIVPISMKTFTVMIK
GAYTMLTLLNEIRKTSLE-

>DmelOR22

MLSKFFPHIKEKPLSERVKS RDAFIYLDRLMWSFGWTEPENKRWDLHYKLWSTFVTLIFI
LLPISVSVEYIQRFKTF SAGEFLSSIQIGVDMYGSSFKSYLTMMGYKKRQEAKMSLDELDK
RCVCDEERTIVHRHVALGNFCYIFYHIA YTSFLISNFLSFIMKRIHAWRMYFPYVDPEKQFY
ISSIAEVILMGWAVF MALCTDVCPLISMLIARCHITLLKQRLRNLRSEPGRTEDEYKELAD
CVRDHRLILDYVDALRSVFSGTIFVQFLLIGIVLGLSMINIMFFSTLSTGVAVVLFMSCVSM
QTFPFCYLCNMIMDDCQEMADSLFQSDWTSADRRYKSTLVYFLHNIQQPIILTAGGVFPIS
MQTNLNMVLAFTVVTIVKQFNLAERFQ-

>DmelOR22a

MLSKFFPHIKEKPLSERVKS RDAFIYLD RVMWSFGWTEPENKRWILPYKLWLAFVNIVMLI
LLPISISIEYLHRFKTF SAGEFLSSLEIGVNMYGSSFKCAFTLIGFKKRQEAKVLLDQLDKRC
LSDKERSTVHRYVAMGNFFDILYHIFYSTFVVMNFPYFLLERRHAWRMYFPYIDSDEQFYI
SSIAECFLMTEAIYMDLCTDVCPLISMLMARCHISLLKQRLRNLRSKPGRTEDEYLEELTEC
IRDHRLLLDYVDALRPVFSGTIFVQFLLIGIVLGLSMINLMFFSTFWTG VATCLFMFDVSM
ETFPFCYLCNMIIDDCQEMSNCLFQSDWTSADRRYKSTLVYFLHNLQQPITL TAGGVFPIS
MQTNLAMVLAFTVVTIVKQFNLAERFQ-

>DmelOR22b

MLSQFFPHIKEKPLSERVKS RDAFVYLDRVMWSFGWTVPENKRWDLHYKLWSTFVTLIFI
ILLPISVSVEYIQRFKTF SAGEFLSSIQIGVNMYGSSFKSYLTMMGYKKRQEAKMSLDEL
KRCVCDEERTIVHRHVALGNFCYIFYHIA YTSFLISNFLSFIMKRIHAWRMYFPYVDPEKQF
YISSIAEVILRGWAVFMDLCTDVCPLISMVIARCHITLLKQRLRNLRSEPGRTEDEYKELA
DCVRDHRLILDYVDALRSVFSGTIFVQFLLIGIVLGLSMINIMFFSTLSTGVAVVLFMSCVS
MQTFPFCYLCNMIMDDCQEMADSLFQSDWTSADRRYKSTLVYFLHNLQQPIILTAGGVFP

ISMQTNLNMVKLAFTVVTIVKQFNLAKEFQ-

>DmelOR22c

MTDSGQPAIADHFYRIPRISGLIVGLWPQRIRGGGGRPWHAHLLVFVAFAMVVVGAVGEV
SYGCVHLDNLVVALEAFCPGTTKAVCVLKLWVFFRSNRRWAELVQRLRAILWESRRQEA
QRMLVGLATTANRLSLLLSSGTATNAFTLQPLIMGLYRWIVQLPGQTELPFNILPSFAVQ
PGVFPLYVLLTASGACTVFAFSFVDGFFICSCLYICGAFRLVQQDIRRIFADLHGDSVDVFT
EEMNAEVRHRLAQVVERHNAIIDFCTDLTRQFTVIVLMHFLSAAFVLCSTILDIMLNTSSLS
GLTYICYIIAALTQLFLYCFGGNHVSESSAAVADVLYDMEWYKCDARTRKIVILMILRRSQR
AKTIAVPFFTPSLPALRSILSTAGSYITLLKTFL-

>DmelOR24

MDSFLQVQKSTIALLGFDLFSENREMWKRPYRAMNVFSIAAIFPFILAAVLHNWKNVLLL
ADAMVALLITILGLFKFSMILYLRDFKRLIDKFRLLMSNEAEQGEEYAEILNAANKQDQR
MCTLFRTCFLAWALNSVLPVLRMGLSYWLAGHAPELPPFCLFPWNIHIIRNYVLSFIWS
AFASGTVLPAVSLDTIFCSFTSNLCAFFKIAQYKVVRFKGGSLKESQATLNKVFALYQTSL
DMCNDLNQCYQPIICAQFFISSLQLCMLGYLFSITFAQTEGVYYASFIATIIIQAYIYCYCGE
NLKTESASFEWAIYDSPWHESLGAGGASTSICRSLLISMMRAHRGFRITGYFFEANMEAFS
SIVRTAMSYYTMLRSFS-

>DmelOR24a

MLPRFLTASYPMERHYFMVPKFALSLIGFYPEQKRTVLVKLWSFFNFFILTYGCYAEAYYGI
HYIPINIATALDALCPVASSILSLVKMVAIWVYQDELRS LIERVRFLTEQQKSKRKLGYKKR
FYTLATQLTFLLLCCGFCTSTSYSVRHLIDNLRTHGKDWIYETPFKMMFPDLLRLPLYPI
TYILVHWHGYITVVCVFGADGFFLGFCLYFTVLLLCLQDDVCDLLEVENIEKSPSEAEEAR
IVREMEKLVDRHNEVAELTERLSGVMVEITLAHFVTSSLIIGTSVVDILLFSGLGIIVYVYVY
CAVGVEIFLYCLGGSHIMEACSNLARSTFSSHVYGHVSVRVQKMTLLMVARAQRVLTIKIPF
FSPSLETLSILRFTGSLIALAKSVI-

>DmelOR30a

MELKSM DPVEMPIFGSTLKL MKFWSYLFVHNWRRYVAMTPYIIINCTQYVDIYLS TESLD
FIIRNVYLAVLFTNTVVRGVLLCVQRFSYERFINILKSFYIELLQSDDP IINILVKETTRLSVLI
SRINLLMGCCCTCIGFVTYPIFGSERVLPYGYMLPTIDEYKYASPYEIFFVIQAIMAPMGCC
MYIPYTNMVVFTFLFAILMCRVLQHKLRSLKLEKNEQVRGEIWC IKYQLKLSGFVDSMN
ALNTHLHLVEFLFCFGAMLCVLLFSLIIAQ TIAQTVIVIAYMVMIFANSVLYYVANELYFQS
FDIAIAAYESNWMDFD VDTQKTLKFLIMRSQKPLAILVGGTYPMNLKMLQSLLNAIYSFFT
LLRRVYG-

>DmelOR33a

MDSRRKVRSENLYKTYWLYWRLLGVEGDYPFRRLVDFTITSFITILFPVHLILGMYKKPQI
QVFRSLHFTSECLFCSYKFFCFRWKLKEIKTIEGLLQDLDSRVESEEERNYFNQNPSRVARM
LSKSYLVAAISAITATVAGLFSTGRNLMYLGWFPYDFQATAAIYWISFSYQAIGSSLLILEN
LANDSYPPITFCVVS GHVRLIMRLSRIGHDVKLSSSENTRK LIEGIQDHRKLMKIIRLLRST
LHLSQLGQFLSSGINISITLINILFFAENNFAMILYAVFFAAMLIELFPSCYYGILMTMEFDKL
PYAIFSSNLKMDKRYNRSLIILMQTLV PVNIKAGGIVGIDMSAFFATVRMAYSFYTLALS
FRV-

>DmelOR33b

MDLKPRVIRSEDIYRTYWLYWHLLGLESNFFLNRLLDLVITIFVTIWYPIHLILGLFMERSL
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WKSFIVAYGLSNISAIASVLFGGGHKLLYPAWFPYDVQATELIFWLSVTTYQIAGVSLAILQN
LANDSYPPMTFCVVAGHVRLAMRLSRIGQGPEETIYLTGKQLIESIEDHRKLMKIVELLR
STMNISQLGQFISSGVNISITLVNILFFADNNFAITYYGVYFLSMVLELFPCCYYGTLISVEM
NQLTYAIYSSNWMSMNRSYSRILLIFMQLTLAEVQIKAGGMIGIMNAFFATVRLAYSFFT
LAMSLR-

>DmelOR33c

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TRCLYISFGMIYALFLFGVQVISGNWELLYPAYFPDLESNRFLGAVALGYQVFSMLVEG
FQGLGNDTYTPLTCLLAGHVHLWSIRMGQLGYFDDDETUVNHQRLLDYIEQHKLVRFH
NLVSRITISEVQLVQLGGCGATLCIIVSYMLFFVGDITISLVYYLVFFGVVVCVQLFPSCYFASE
VAEELERLPYAISSRWYDQSRDHRFDLLIFTQLTLGNRGWIIKAGGLIELNLNAFFATLKM
AYSFAVVVRAKGI-

>DmelOR35a

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KEPEMFRKVDGKMIINRLVSAMYGAVISLYLIAPVFSIINQSKDFLYSMIFPDSPLYIFVPL
LLTNVWVGIVIDTMMFGETNLLCELIVHLNGSYMLLKRDLQLAIEKILVARDRPHMAKQL
KVLITKTLRKNVALNQFGQQLAQYTVRVFIMFAFAAGLLCALSFKAYTNP MANYIYAIW
FGAKTVELLSLQIGSDLAFTTDSLSTMYLTHWEQILQYSTNPSENRLKLNLALEMNS
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>DmelOR42a

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RITDPGERLQIHRAVSLSNRIFFFMAVYVMVYATNTFLSAIFIGRPPYQNYYPFLDWRSSTLH
LALQAGLEYFAMAGACFQDVCVDCYPVNFVLVLAHMSIFAERLRLRGTYPYESQEKY
ERLVQCIQDHKVLRFVDCLRPVISGTIFVQFLVVGLVLGFTLINIVLFANLGSAAALSFMA
AVLLETTPFCILCNYLTEDCYKLADALFQSNWIDEEKRYQKTLMYFLQKLQQPITFMAMN
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>DmelOR42b

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AMEEREKIHLVVARSNHAFLIFTFVYCGYAGSTYLSSVLSGRPPWQLYNPFIDWHDGTLKL
WVASTLEYMVMMSGAVLQDQLSDSYPLIYTLILRAHLDMLRERIRRLSDENLSEAESYEEL
VKCVMDHKLILRYCAIIPVIQGTIFTQFLIGLVGLFTLINVFFFSDIWTGIASFVITILLQ
TFPFCYTCNLIMEDCESLTHAIFQSNWVDASRRYKTTLLYFLQNVQQPIVFIAGGIFQISMSS
NISVAKFAFSVITITKQMNIAADKFKTD-

>DmelOR43b

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VSFPINYVIHLAEFPPELLLQSLQLCLNTWCFALKFFTLIVYTHRLELANKHFDELDKYCV
KPAEKRKVRDMVATITRLYLTFFVVVYLYATSTLLDGLLHHRVPYNTYYPFINWRVDRTQ
MYIQSFLEYFTVGYAIYVATATDSYPVIYVAALRTHILLKDRIIYLGDPSSNEGSSDPSYMFK
SLVDCIKAHRTMLNFCDAIQPIISGTIFAQFIICGSILGIIMINMVLFADQSTRFGIVIYVMAVL
LQTFPLCFYCNAIVDDCKELAHALFHSAWVQDKRYQRTVIQFLQKLQQPMTFTAMNIF

NINLATNINVAKFAFTVYAIASGMNLDQKLSIKE-

>DmelOR45a

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ARSFRNAAYGVICASAIAPMLLGLWGYVETGVFTPTTPMEFNFWLDERKPHFYWPIYVW
GVLGVA AAAWLAIATDTLFSWLTHNVVIQFQLLELVLEEKDLN GGDSRLTGFVSRHRIAL
DLAKELSSIFGEIVFVKYMLS YLQLCMLAFRFSRSGWSAQVPFRATFLVAIIIQLSSYCYGG
EYIKQQLAIAQAVYGGINWPMPKRRRLWQMVMIRAQRPAKIFGFMFVVDLPLLLWVI
RTAGSFLAMLRTFER-

>DmelOR45b

MYPRFLSRNYPLAKHLFFVTRYSGLLGLRFGKEQSWLHLLWL VFNFNLAHCCQAEFVF
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RRKVAQRSY YLMVTRCGMLVFTLGSITTGAFVLRSLWEMWVRRHQEFKFDMPFRMLFH
DFAHRMPWFVVFYLYSTWSGQVTVYAFAGTDGFFFFGFTLYMAFLLQALRYDIQDALKPIR
DPSLRESKICQRLADIVDRHNEIEKIVKEFSGIMAAPT FVHFVSASLVIATSVIDILLYSGYN
IIRYVVYTFVSSAIFLYCYGGTEMSTESLSLGEAA YSSAWYTWDRRETRRRVFLIILRAQRPI
TVRVPFFAPSLPVFTSVIKFTGSIVALAKTIL-

>DmelOR46a-A

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RSRKL RDFYGALSFAALSMILIPQFALDWSHLPLKTYNPLGENTGSPAYWLLYCYQCLALS
VSCITNIGFDSLCSLFIKLCQLDILAVRLDKIGRLITTSGGTVEQQLKENIRYHMTIVELSK
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SYFALLKRVNS-

>DmelOR46a-B

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VAVVRMRNSY GIMSLGAASLILVPCFDNFGELPLAMLEVCSIEGWICYWSQYLFHSICLLP
TCVLNITYDSVAYSLLCFLKVQLQMLVLRLEKLGPIEPQDNEKIAMELRECAAYNRIVR
FKDLVELFIKPGSVQLMCSVLVLSNLYDMSTMSIANGDAIFMLKTCIYQLVMLWQIFIC
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GSIVNCSYSYFALLKRVNS-

>DmelOR47b

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LISDFEY YNREL RPHNIDEEVLGWQR LCVIESGLYINCFCLVNFSSAAIFLQPLLGEGLPF
HSVYPFQWHRLDLHPYTFWFLYIWQSLTSQHNLMSILMVD MVGISTFLQTALNLKLLCIEI
RKLGDMEVSDKRFHEEF CRVVRFHQHIIKLVGKANRAFNGAFNAQLMASFSLISISTFETM
AAA AVDPKMAAKFVLLMLVAFIQLSLWCVSGTLVYTQSVEVAQA AFDINDWHTKSPGIQ
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>DmelOR49a

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LEISARGVIIISLDTFKILMTITYRFFAVIRQTVEK-

>DmelOR49b

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KRVYG-

>DmelOR56a

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>DmelOR59a

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VQLRNVLYVFIGIYMP CALFAELSFLFKEERGLMYPAWFPFDWLHSTRNY YIANAYQIVGI
SFQLLQNYVSDCFPAVVLCLISSHIKMLYNRFEEVGLDPARDAEKDLEACITD HKHILELFR
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AYSLFTIIIRMRK-

>DmelOR59b

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NDSDRERIHNMVARCN YAFLIYSFIYCGYAGSTFLSYALSGRPPWSVYNPFIDWRDGMGSL
WIQAIFEYITMSFAVLQDQLSDTYPLMFTIMFRAHMEVLKDHVRS LRMDPERSEADNYQD
LVNCVLDHK TILKCCDMIRPMISRTIFVQFALIGSVLGLTLVNVFFFSNFWKGVASLLFVITI
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>DmelOR59c

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KRCVTTTQRRIFHKMVARVNLIVILFLSTYLGFCFLTLFTSVFAGKAPWQLYNPLVDWRKG
HWQLWIASILEYCVV SIGTMQELMSDTYAIVFISLFRCHLAILRDRIANLRQDPK LSEMEH
YEQM VACIQDHRTIIQCSQIIRPILSITIFAQFMLV GIDLGLAAISILFFPNTIWTIMANVSFIVA
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SVQSNIAVAKFAFTIITIVNQMN LG EKFFSDRSNGDINP-

>DmelOR63a

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LNQMVEQATSELVPPDRRVEYLRCICIYQYQRVANFATEVNNCFRHITFTQFLLSLFNWGLA
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>DmelOR64

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FFTLMADR DGLGS-

>DmelOR65a

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IDALEDIYHWSIKGPATKEVQETKRLHFLLFMALIITWFSFLILFMLIKISTPFWIESQTLPFH
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>DmelOR65b

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DALHPWAQKGNPVEYQTGKRWYFVMAFFLATSWSFFLCILL LLLITSPMWWHQQLPF
HAAFPFQWHEKSLHPISHAIIYLFQSYFAVYCLTWLLCIEGLSICIYAEITFGIEVLCLELRQI
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RKDPKVVAQFAVLMLLALGHLSMWSYCGDQLSQKSLQISEAAYEAYDPTK GSKDVYRDL
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>DmelOR65c

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VEALET FHPWAQKGP GAVDYRTAKRWYFTLAFFLASSWL VFLCIFILL LITSPWVHQQLP
LHAAFPFQWHEKSIHPISHAFIYLFQ TWNVMYFLTWLV CIEGLSVSIYVEITFAIEVLCLELR
HLHQ RCHGYEQLRLETNRLVQFHQKIVHILDHTNKV FHGT LIMQMGVNF FLVSLVLEA
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>DmelOR67a

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AKVQEEYAVKSWLKRCHIYTKGFGGLFMIMYFAHALIPLFIYFIQRVLLHYPDQAKQIMPFY
QLEPWEFRDSWLFYPSYFHQSSAGYTATCGSIAGDLMIFAVVLQVIMHYERLAKVLRFKI
QAHNAPNGAKEDIRKQLQSLVANHIDILRLTDLMNVEVFGIPLLLNFASALLVCLVGVQLTIA
LSPEYFCKQMLFLISVLLLEVYLLCSFSQRLIDASENVGHAAYDMDWLGS DKRFKKILIFIS
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>DmelOR67c

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MEYKLPDFEKTMRVINIFTFLCLAYTTTFSFYPAIKASVKFNFLGYDTFDRNFGFLIWFPP
DATRNNLIYWIMYWDIAHGAYLAGIAFLCADLLL VVVITQICMHFNYSMRLEDHPCNSN
EDKENIEFLIGIIRYHDKCLKLCEHVNDLYSFSLLL NFLMASMQICFIAFQVTESTVEVIIIYC
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>DmelOR67d

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DEYAKCLEKRIRITWTLIGFMLVYIILLGLVITFPIFYLLILHQKVLVMQFLIPFLDHTTDGG
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>DmelOR69

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HKELSILIVHHSRILQLGDQVNNIMNFVFGSSLVGATIAICMSSVSIMLLDLASAFKYASGLV
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KTHFENLLNEFEELFQLIKHRAYRIHHYQEKYTRHIRNTFIFHTSAVVYYNSLPILLMIREHL
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>DmelOR71a-B

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PIACACNV TMDAVNWYMLHLSLCLRMLGQRLSKLQHDDKDLREKFLELIHLHQRLKQ
QALSIEIFISKSTFTQILVSSLIICFTIYSMQMSPVLQDLPGFAAMMQYL VAMIMQVMLPTIY
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>DmelOR74a

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NVAIAYRLNLTHILRRNAALRDFGQRVEKEFTLRIFVMFAFSAGLLCALFFKAFTNPWGNV
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>DmelOR82a

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KLASFLGRAYCVSCGLTGLYFMLGPIVKIGVCRWHGTTCDKELPMPMKFPFNDLESPGYE
VCFLYTVLVTVVVVAYASAVDGLFISFAINLRAHFQTLQRQIENWEFSPSEPDTQIRLKSIVE
YHVLLLSLSRKLRSIYTPTVMGQFVITSLQVGVIIYQLVTNMDSVMDLLLYASFFGSIMLQL
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>DmelOR83a

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DYTQPGVYEVVFLQAMGQIQVAASFASSGLHMLVLCVLISGQYDVLFCSLKNVLASSYV
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QHHRIVAALKKIESFYSPIWFKIGEVTFLMCLVAFVSTKSTAANSFMRMVSLGQYLLLV
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LNVDRFRGTITTAFSFLTLLQKMDARE-

>DmelOR83bORco

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ALLLHMLTSTIKLTLAYQATKINGVNVYAFTVVGYLGYALAQVFHFCIFGNRLIESSSV
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LVQLK-

>DmelOR83c

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>DmelOR85a

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TKMEEKVQVHRAAALCNRV VVIYHCIYFGYLSMALTGALVIGKTPFCLYNPLVNPDDHFY
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VKDHKLIVEYGNLTPMISATMFIQLLSVGLLLGLAAVSMQFYNTVMERVVSGVYTAILS
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>DmelOR85b

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CSRISLIYSLLYSVLIWTFNLFCVMEYWVYDKWLNIRVVGKQLPYLMYIPWKWQDNWSY
YPLLFSQNFAGY TSAAGQISTDVL LCAVATQLVMHFDFLSNSMERHELSDGWKKDSRFLV
DIVRYHERILRLSDAVNDIFGIPLLLNFMVSSFVICFVGFQMTVGVPPDIVVKLFLVSSMS
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>DmelOR85c

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CSRISITYALLYSVLIWTFNLFSIMQFLVYEKLLKIRVVGQTLPYLMYFPWNWHENW TYYV
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VQYHQRILRLMDVLNDIFGIPLLLNFMVSTFVICFVGFQMTVGVPPDIMIKLFLFLSSLSQ
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>DmelOR85d

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MHFIRLSAHIESHVAGIGSFQHDLEFLQATVAYHQSLIHL CQDINEIFGV SLLSNFVSSSFIIC F
VGFQMTIGSKIDNLVMLVLF LFCAMVQVFMIATHAQR LVDASEQIGQAVYNH DWFRADL
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>DmelOR85f

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VDKQVHLVSLQNDLNGIFGKSLLSLLTTAAVICTVAVY TLIQGPTLEGFTYVIFIGTSVMQ
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DTFKQLMSVSYRVITMLMQMIQ-

>DmelOR87

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TMLRGVTGK-

>DmelOR88a

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SQLDMQMDETYRNFWRQYRFIRIYSHLGGPMFCVVPLALFLLTHEGKDTPVAQHEQLLG
GWLPCGVKDPNFYLLVWSFDLMCTTCGVSFVTFDNLFNVMQGHLMHGLHARQFS
AIDPRQSLTDEKRFFVDLRLLVQRQQLNGLCRKYNDIFKVAFLVSNFVGAGSLCFYLFML
SETSDVLIQAQYILPTLVLVGFTFEICLRGTQLEKASEGLESSLRSQEWYLGSRRYRKFYLL
WTQYCQRTQQLGAFGLIQVNMVHFTEIMQLAYRLFTFLKSH-

>DmelOR92a

MLFRKRKPKSDDEVITFDELTRFPMTFYKTIGEDLYSDRDPNVIRRYLLRFYLVLGFLNFN
AYVVGEIAYFIVHIMSTTTLEATAVAPCIGFSFMADFKQFGLTVNRKRLVRLDDLKEIFPL
DLEAQRKYNVSYRKHMRVMTLFTILCMTYTSFSFYPAIKSTIKYYLMGSEIFERNYGF
HILFPYDAETDLTVYWFSYWGLAHCAYVAGVSYVCVDLLLIATITQLTMHFNFANDLEA
YEGGDHTDEENIKYLHNLVYHARALDLSEEVNNIFSFLILWNFIAASLVICFAGFQITASN
VEDIVLYFIFFSASLVQVFCYYGDEMISSSSRIGHSANQNLWPCSTKYKRILQFIIARSQ
KPASIRPPTFPPIFNFMKVISMSYQFFALLRTTYG-

>DmelOR94a

MDKHKDRIESMRLILQVMQLFGLWPWSLKSEEEWTFVGFVKNRYRFLHLPITFTFIGLM
WLEAFISSNLEQAGQVLYMSITEMALVVKILSIWHYRTEAWRLMYELQHAPDYQLHNQE
EVDVFWREQRFFKWWFYIYLISLGVVYSGCTGVLFLEGYELPFAYYVPFEWQNERRYWF
AYGYDMAGMTLTCISNITLDTLGCYFLFHISLLYRLLGLRLRETKNMKNDTIFGQQLRAIFI
MHQRIRSLTLCQRIVSPYILSQILSALICFSGYRLQHVGIKRDNPQGFISMLQFVSVMLQIY
LPCYYGNEITVYANQLTNEVYHTNWLECRPPIRKLLNAYMEHLKKPVTIRAGNFFAVGLPI
FVKTINNAYSFLALLLNVS-

>DmelOR94b

MESTNRLSAIQTLVQRWIGLLKWEENEGEDGVLTLWKRIYPFVHLPLTFTYIALMWYEA
ITSSDFEEAGQVLYMSITELALVTKLLNIWYRRHEAASLIHELQHDPAFNLRNSEEIKFWQQ
NQRNFKRIFYWYIWGSLFVAVMGYISVFFQEDYELPFGYYVPFEWRTRERYFYAWGYNV
VAMTLCCLSNILLDTLGCYFMFHIAASLFRLLGMRLEALKNAAEKARPELRRIFQLHTKVR
RLTRECEVLVSPYVLSQVVFSAFIICFSAYRLVHMGMFKQRPGLFVTTVQFVAVMIVQIFLPC
YYGNELTFHANALTNVFGTNWLEYSVGTRKLLNCYMEFLKRPVKVRAGVFEIGLPIFV
KTINNAYSFFALLLKISK-

>DmelOR98a

MLFNYLKPNPTNLLTSPDSFRYFEYGMFCMGWHTPATHKIIYYITSCLIFAWCAVYLPIGII
ISFKTDINTFTPNELLTVMQLFFNSVGMPPKVLFFNLYISGFYKAKKLLSEMDKRCTTLKER
VEVHQGVVRCNKAYLIYQFIYTAYTISTFLSAALSGLPWRIYNPFVDFRESRSSFWKAAL
NETALMLFAVTQTLMSDIYPLLYGLILRVHLKLLRLRVESLCTDSGKSDAENEQDLIKCIKD
HNLIIDYAAAIRPAVTRTIFVQFLIGICLGLSMINLLFFADIWTGLATVAYINGLMVQTFPFC
FVCDLLKKDCCELLVSAIFHSNWINSRSYKSSRLRYFLKNAQKSAFTAGSIFPISTGSNIKVA
KLAFSVVTFVNQLNIADRLTKN-

>DmelOR104

MASLQFHGNVDADIRYDISLDPARESNLFRLLMGLQLANGTKPSPRLPKWWPKRLEMIGK
VLPKAYCSMVIFTSLHLGVLFTKTTLDVLPTELQAITDALMTIYFFTYGTYWCLRSR

RLLAYMEHMNREYRHSLAGVTFVSSHAAFRMSRNFTVVWIMSCLLGVISWGVSPMLL
GIRMLPLQCWYPFDALGPGTYTAVYATQLFGQIMVGMTFGFGGSLFVTLSSLLLGQFDVL
YCSLKNLDAHTKLLGGESVNLSSLQEELLGDSKRELNQYVLLQEHPTDLLRLSAGRKC
PDQGNAFHNALVEICIRLHRFILHCSQELENLFSPLYCLVKSQITFQLCLLVFVGVSGTREV
RIVNQLQYLGLTIFELLMFTYCGELLSRHSIRSGDAFWRGAWWKHAHFIRQDILIFLVNSR
RAVHVTAGKFYVMDVNRLRSVITQAFSFLTLQKLAACKTESEL-

>HarmOR1

MKILSDGSDLEGVEKVEDIFYINLARKSMWILDSWPKTPNESVTYRYFVLALNVATLVGG
AVYLRNNTGVLSSFELGHTYITVFMNCITCSRCIMILSREYNEVMLSFVNKIHLFHRHKS
EYAYKTHIFIHKISHFYTVYLLGLALNGLLLFNMIPIFYNCYSRGMFRDVIPANATYDHSVYF
SVPFDYTTKFKGYIAMTSFNCFISYTCYSYFCVVDLTVSLVIFHLWGHMRLTYHLANFKK
PASVLESNENTDAIKDHSYTQEELKEVFGKLRERYIRHHNLILNFSAEMSNAFGPALLAYMV
FHQVSGCILLECSQLDMKTLVRYGPLTVVIFQQLIQISVIFELGSSNDKLIDAVYLVPEWY
MDTKNRKLVFVMLRQSQRSIDLKMMSMLTVGVQTMTAILKTSFSYFVMLKTVAEEEQ-

>HarmOR2

MYAGNAVITGITGPMYKYMKVLRFLVRIISGWPGKALGEKTLRIEGMGHAYYNTILSLVY
LALGIAYLKKNFHRFDLELGQLYIVLLMNMLSTSRAFTLCLSQKYREVAKIFIQIKIHLFYF
KEKSDFAMKIHITVHKISFISAVYLSVLLFIAACMFNLIPMYNNYSAGRFASFDNLENTTYE
QAISCLYPWNFETNFNGYLAATLSGWYGTILCGSSVSMFDLFLCLMIFNLWGHFKILIYNL
EHFPRPASEVVDAAEGEERSGRTVGSEMYSQSELEEVAVLLRDCIQYHMLIYNFTNNMSDA
FGMALFIYYSFHQITGCLLLECSQMTAAALTRYLPLTIIMFGELVLLSIIFETIGTMSEKLD
AVYKVPWEYMDTKNRRTVLIFLIKVQEPHVKAGGLVDVGVTTMASILKTSFSYFAFLRTF

-

>HarmCOR3

MGLRQFLFENEAVEGINSASDYLYIKVLRFMILLIVNSWPRKEIGEPESPKFSAFVKYFYLVV
TVSGSAGFILYLVKHNSELTFLETGHMYIVLLMSLIDVSRVATLTMSTTYREVARDFLTKIHL
FYYKDRSKQAMETHRAVHKIAHLFTLWLVSQMLSGLSLFIIPMYSNYAAGRFSGEVSKN
STFEHSMYYPPFNTSTDIRGYSIACIIHWIISYLCSTWFCMFDLFLSLMVFHLWGHFKILN
YTLNDFPRPSSEVEAAKYSDEELVEVAARLKDCILYHREIILFTDRMSNVFGPMLFLYYMF
HQASGCLLLECSQMTAQALIRYVPLTIILTQQLIQLSVIFELVGSSEDKLKHAVYGVPEWEC
MDVKNRRSVVIFLANTQEPVHVKAMGVANVGVTSMAAILKTSMSYFTFLRSL-

>HarmOR29

MGYQQIDCFDIHLKILRILGVWPHDNPSIYYIYFSRIFVFTFTVLYVVIYTMNFYFLPQQLE
VFADELIFYFTNVGALSALAFIFLRDKVKKMLFMLESEIFQSDDP EEIKLIKEGKEKSNFY
WKITAGLSVSANTVNVCLPLLVHIIFSVELEFPVCRYSFIPKEYEAMFAYPAYFYQSIGITTH
MLYNVNIDTFLLGVMFLAMTQLDILDRKLRKVTDV CINPDAARGSVDKFIDDQNAVLEII
KCIKHYDAICEYCKLIQDAFSEILFVLFSSGSKICMCLFRFTMPATTGYFVFLYTYVTVM
LQVMVPCWFGSRLMDKSSQITIAAYDCDWTPRCRRFKSNLRLLLVERANRPITIGGKMFL
SLGTFTAIMNSSYSFFTLMRHMQR-

>HarmOR20

MDEELEFKPFHETYRLITFSLCIAMIYPNPRTEKWRLFSIPILIATVAPVAIMIFLDMYKCWK
NGDIVNIIRHSTVVGPFLGGFFKMILMYHKRVQAKQILDEFDRDHLMFNTVAETYKDIAR
ASIRNCQIYSERLWACLVTTCVMTFPVMAIVLNIYNFMFKSEPTKYMIIHLEKPFKEPEE
RFESPYFELLFVYMFYAAAILYVVNFTGYDGGFFGLCVNHARLKMELYCKALEEAMMADRE

EVYGRVIAVIREQCRMFRYVDLIQDTFNIWLGIIFIATMIQICTCLYHITEGYGFDIRYMIFVY
GAVVHIYLPCTRYAAKLKAMSMETSNRFYCSGWERVDDERVRKMIVFMIARAQVPNEITAF
NMMAFDMELFLSILQTSYSMFTLLRS-

>HarmOR18

MEMKVDVLPEKKYKGFNETFKLCAFLAFAFLYPNRTTALRRCITITLIVTFCGGQLFWFIT
YTFKCLYTLDIYNFARNMTLAVVVLVFFIKTYVVIYATSKFAPLLDKISDDLLEANNLEEEF
QVLYDDHIKIAKVGEISWLLIPTIMSALFPIYAGALMTIESIQTDDYERRMVHDMELLFVED
IQSETPFFQCMFAYNCVQC VVLVPNYCGFDGSCFIATTHLRRLKLMKLVNKAFKYSKS
RQELRMRLYDSIKDHQDALDFYVQLQNVYGPWLFVAVLLTSFMISFNLYQIYLLQRIDPKY
TSFGVVGVLHIYLPCTRYASDLTRVSEEIPDDLYLAQWEAWADPSITKLLMFMITRAQKEMI
VTGMGLVVFNMEMFKSILQTSYSFFTLITA-

>HarmOR17

MFLRSECARSVAPHVRVLRVCGFLRGAALSSRGRAERLALRSYHALALAATSLYVLQAV
YAYQERGMMDKPSQVMFLMLCHVTCVVKQIAFHVDADRIDLRIASLDEPLLNCAGERG
ALLRGTARGAARLLRXYAGCAVATCVLWIVFPVINRIQGISFEFPFWTGFSYDHNNAVFTLV
LQSFYCTNLVAIGNTSMDAFMATILDQCKTQLRILRINFESLPERARALHVESGENYDITLD
KLFVDCLVHYNKITEMCTELHDVFAVPLLQFGVGGWIPCAAYKIVSLDVLSEFASITLF
ITCILIELFICYGNEVTVESERSQSLYSMEWRRARLTFRRSLVLMERAKRPLRPAAGR
VIPLSLDTFVKILKSSYSFYAVLRQTK-

>HarmOR14b

MAGLRDFFNYEANEAITPKNYPYLIIMRISLSLIKCWPKKTENLAAGAKMKAKVWG
MVQNVLHLAFCVLTIVGTATYVMIHKKNMFTFELGHLYITLMLSCVVFSRLATLTFNEEYQ
VVANEFLNKIHLFYKDNSEFSMQTHKQIHRVSHLFTLYVTGQMLGGLSLFNLTMPYNNY
SAGKYSKGGKLNSTFDHSLYSSYPFDVSTGVRGYIFSNILHWFFSYIVSTWICTLDFLSVI
VFHIWGHFKILLHDIDNFKPSKMVSFKLKNTNVTISNENYSTEELEQLADKLLKCIDYHR
EISFTNKISEVFGPMLLAYYGHFQASGCLLLECSQMTPEALARYLPLTLILFQQLIQLSIVF
ELVGTVSSKLNDAVYGLPWEDMDVKNRKTVAFFLLNVQEPVHVKALGPADVGVTSMTKI
LKTSMSFFTFLRSM-

>HarmOR14a

MGGIRDFFINLEAKEGITKPTDYPYMLCRHLLTVITCWPKPEKGLDTRAKLKARIWVTF
QKIFHLNGCFITTIGMAMYIALHKNSMSFFELGHLYISLLMTVVIFSRVTTLWCWNPEYQAVA
TDFLTKIHLFYKDDSDFSMQTHKQVHKISHLFTLLTGQMVAGMSLNFNLTMPHNNFSTG
KYKKGGLKNSTFEHSLYFSYPFNASSDVRGYILSNIFHWIISYLCSTWFCTLDFLSIVVFH
VWGHFKILIHDLNHFPRSLNTISFRLDQSNITLTTEMYSSRELQVSRNLNKSVEYHRRIVS
FTDKMSEVFGPMLFVYGFHQTSGCLLLECSQMTVEALVRYLPLTILFQQLIQLSIIFELV
GSVSDKLDKDAVYGLPWEDMDTKNRKTVAFFLMNVQEPVHVKALGLADVGVTSMTAILK
TSMSYFTFLRSM-

>HarmOR12

MEDEPLLIDKTVKNIEFLFRCTGINIKSGTKTRKDMIKSRTVYIINFLWLNIDLAGAVMWFF
TGIANSKSFTELTYVAPCITLSFLGNLKSFLILREKHVDKLIQVLRDLEINEKARPKSEETD
AIIKYEHNFTVTTVISVLNVLYFVLLVAFALSPVSLVALKYFTTNELELLLPLIVYFPDPYDIR
YWPWVYLRQIWSEVVIIIDICTADYLFYTFCTYIRMQFRLLKHYIERVIPEDDGGGRLTNIE
QVRAEFVLLIKWHQDLISSANMLETVYTRSTLNFVSSSVLICLTGFNVMAISDVAFVATFL
SFLFMSLLQIFFLFCFFGDLLMTSSTEISEAVYNCRWYLADTSLGKDLLLQTRAQTCKLTA

SDFSEVNLKAFMKILSTAWSYFALLQTLYGAPT-

>HarmOR10

MAVKNTSLFLGRPKKILSAHGVPWPHNNFVILRKLYMLFVMWTQYSFLLFEIYYIADVWG
DIDAVSEASYLLFTQASLCYKSTAFMVKQSLLELLEIMDCEIFEPKSAEHEKILAAQARKI
KRLCLFFLTSATTTCTLWAMIPLFDAASKRSFPFRIWMPVTPLKSPDYELGYLYQMVSIIYS
AFLFISVDSVAVSMIMFGCAQLEIIMDKIQKIKYVFESADSEEGRRNIKTNNEFLVECCKQH
QTVRFIQLCEDTYHANIFFQLTGTVAIICNIGLRISIVEPNSVQFFSMLNYMVTMLSQFLY
CWCGHELTIRSENLEWLYQCPWYEQDTEFKRALFIAMERMKKPIIFKAGHYISLSRPTFV
AILRCSYSYFAVLNRVNT-

>HarmOR9

MLDQFDRCLKSVNLYLKFLGLYLESKDTDKTFVERTRSHRLYFAHLFSLNLEVVAQVLWV
LEAVITGKSFVEITRIPCLILCLISNFKTSLLYYGRHNNEFIVTMRSLLNQMQVEEKEHR
FRKNLIDKHVLIITSISKISYVIVLDLLMFALAHAFIIPHYFKTDEVKLEMPFIAYYPFNEF
DLRVYPWVYFHQVYSAVIAMIMVYGPDCFFFTCCTFIHIQFSLNNDMERIVTEETPRYDK
TKFKKLAVRHIELMRCVNLEKIFSKSILFNALTSSVIICVTGFNVLVVDNIVMMASFTAFLI
FGLMQIFLYCYYGDTIMRSSMEVSTSIYNSLWYNIPAADRKGFLIVIIRAQKPCALTADGFF
KMNLSAFASILSKSWSYFALLKTMYPH-

>HarmOR7

MKIKMSKPLIFDQSIKLGVLFRFSGMNIKNKIVTPLDTIKYRWLYTLNFLVVFSAIIGSVYY
VILGIKQGKNFIEVTSVAPCLTFSILSMIKSLYHLMYEEHIQELIDLLEHEIRENNREKCKIEK
EEIIANETGFLNKVINVLYVLNCSMIVVFDMTPIVMIAVKYKTNFEMLLPYLDVFSFIPY
ELKYWPFAYIHQIWSECVLLDMAAADYLFFTCCTYIRVQFKLLQYDFERMIPDRSISKGL
FFEENELRNKFTELLKWHQDIIYSSTILEIYKSTLNFNLSLVICLTGFNVTVDDIVIIITFL
TFLSMALMQVFFLCFFADLMMTASLEITNSVYNCKWYSANIKVKGKILFVQTRAQEPCKL
TAAGFADVNLNAFMRVLSSAWSYFALLRTVYGAK-

>HarmOR6

MSFRKFLFENEAVDGIKSPSDYLYIKILRFTLDVIRSWPRKELGEPESASFTVFMKYFYLVLT
IATVVGSIYVHVHSELSEFLAAGLMYLILMSFLDALTVMMLTFSKRYVLAKDFLTKIHL
FYYKDRSKAAMEIHKKVHLISHLFLSWLLFQMLSGLSLNLTPMYSNLAAGKYRRGGLG
NTTFEHSLYLYLPFNTSTDVFGYIVACILHWIISYLCSTWFCMFLNFISLMVFNLWGHFKILI
ITLEEFPRPKSIGTSESAYKYSQEELVEVAERLKDCCINYHREIKNFTNRMSDVFQPMFLVYY
SFHQASGCLLLECSQMTAQALMRYLPLTIILTQQLIQLSVVFELVGESEKLDKAVYSVPW
ECMDTKNRKMRFFLMNVQEPHVKAMGLANVGVTTMAAILKTSMSYFTFLRSM-

>HarmOR3

MTLVLDLRFYLIDDGFFSFNLKYLFFVGLWPEKTLTRNQKILYKMYEHFISFLTTTFFIVLAGI
GTYQHKDDLTVVFCNIDRCLVYNFFFKTIFFIKRNQLRDLIDEIEMSGDEVTEERKCLM
ANYVMFITGVTAAVIGAFSLLALFEGTMSIEAWLPSPDPMESLMNQILSLEILAFVFPGLCR
AFAMQGLVCSMIMYLCQDQIHLQKELRDLYVKETEMVMRTKFKNAIRKHIRLMGYSGR
MENIFKEYFLVQNLAVTVELCLNAVMMTVVGVQQITLLITFLAYLMLALVNAYIYCYLGN
ELIQSQGIALAAYESTWTSWPVDLQKDLLIVILAAQRPLKLSAGGMALLCIQTFSQALYN
GYSIFAVLNDAVN-

>HarmOR83bORco

MMTKVKAQGLVSDLMPNIKLMQMAGHFLFNYHSENAGMSNLLRKIYASTHAILIFIHYAC
MGINMAKYSDEVNELTANTITVLFHAHTIIKLAFFALNSKSFYRTLAVWNQSNSHPLFTESD

ARYHQIALTKMRRLLYFICGMTVLSVISWVTLTFFGESVRMVTNKETNETLTEVVPRLPLK
AWYPFNAMSGTMYIVAFQVYVLLFSMAIANLMDVMFCSWLIFACEQLQHLKAIMKPL
MELSASLDTYRPNTAELFRASSTEKSEKIPDVTVDMDIRGIYSTQQDFGMTLRGAGGRLQNF
GQQNPNPNGLTPKQEMLARS AIKYWVERHKHVRLVASIGDITYGTALLFHMLVSTITLTL
LAYQATKINGINVYAFSTIGYLSYTLGQVFHFCIFGNRLIESSSVMEAAAYSCQWYDGSEEA
KTFVQIVCQQCQKAMSISGAKFFTVSLDLFASVVGAVVTFMVLQIK-

>HarmOR13

MKILSDGSDLEGVEKVEDIFYINLARKSMWILDSWPRTPNESVITYRYFVLALNVATLVGG
AVYLRNNTGVLSSFELGHTYITVFMNCITCSRCIMILSREYNEVMLS FVNKIHLFHHRHKS
EYAYKTHIFIHKISHFYTVYLLGLALNGLLLFNMIPFYNCYSRGMFRDVIPANATYDHSVYF
SVPFDYTTKFKGYIAMTSFNCFISYTCTSYFCVVDLTVSLVIFHLWGHMRPLTYHLANFKK
PASVLESNENTDAIKDHSYTQEELKEVFGKLREYIRHHNLILKFSSEMSNAFGPALLAYMV
FHQVSGCILLECSQLDMKTLVRYGPLTVVILQQLIQISVIFELLGSSNDKLIDAVYLPWEY
MDTKNRKLVFVMLRQSQRSIDLKMMSMLTVGVQTMTAILKTSFSYFVMLKTVAEEE-

>HarmOR11

MHLAGNAVGTGITGPM DYKYMKVLRFLRIISGWPGKALGEKTLRIEGMGHAYYNTILSLV
YLALGIAYLKKNFHRFDLELGQLYIVLLMNMLSTSRAFTLCLSQKYREVAKIFIQKIHLFY
FKEKSDFAMKIHITVHKISFISAVYLSVLLFIAACMFNLIPMYNNYSAGRFASFDNLENTTY
EQAISCLYPWNFETNFNGYLAATLSGWYGTILCGSSVSMFDLFLCLMIFNLWGHFKILIYN
LEHFPRPASEVVDAEGEERSGRTVGSEMYSQSELEEVAVLLRDCIQYHMLIYNFTNNMSD
AFGMALFIYYSFHQITGCLLLECSQMTAAALTRYLPLTIIMFGEVLLSIIFETIGTMSEKLN
DAVYKVPWEYMDTKNRRTVLIFLIKVQEPHVKAGGLVDVGVTTMASILKTSFSYFAFLRT
F-

>HassOR1

MKILSDGSDLEGVEKVEDIFYIRIARKSMWILDSWPRTPNESVIYRYFVLALNITTLVGGAV
YLRNNTGVLSSFELGHTYITVFMNCITCSRCLMILSRKYNEVMFSFVQKIHLFHHRHKSEY
AYKTHIFIHKISHFYTVYLLGLALNGLLLFNMIPFYNCYSRGMFRDVIPANATYDHSVYFYS
VPFDYTTKFKGYIAMTSFNCFISYTCTSYFCVVDLTVSLVIFHLWGHMRLLTYHLANFKKPA
SVLESNENTHAIKDHSYTEEELKEVFSKLREYICHHNILNFSSEMSSAFGPALLAYMVFH
QVSGCILLECSQLDMKTLVRYGPLTVVIFQQLIQISVIFELLGSSNDKLIDAVYLPWEY
DTKNRKLIVYMLRQSQRSIDLKMMSMLTVGVQTMTAILKTSFSYFVMLKTVAEEE-

>HassOR1(2)

GLITWFM LCGDLLFCIFLSHITTQFDLLAVRVRRLVYVPVDKQLVDITYPLGEYCKDYAGR
NKEMINIFDDNDWEVKHQRELSDIIVRHRALIRLSGDVEDMFSFALLVNFNSSIICFCGFC
CVIVEKWNEFVYKSFLTALSQTWLLCWYGQRLLLESSEGLSDALYESGWYRASKSVKSSI
LIMLHRAQKDVHVTTYGFSIISLASYTTHIKTSWSYFTLLLNIYKK-

>HassOR2ORco

MMTKVKAQGLVSDLMPNIKLMQMAGHFLFNHSENA GMSNLLRKIYASTHAILIFIHYAC
MGINMAKYSDEVNLTANTITVLF AHTIIKLAFALNSKSFYRTLAVWNQSNHPLFTESD
ARYHQIALTKMRRLLYFICGMTVLSVISWVTLTFFGESVRMVTNKETNETLTEVVPRLPLK
AWYPFNAMSGTMYIVAFQVYVLLFSMAIANLMDVMFCSWLIFACEQLQHLKAIMKPL
MELSASLDTYRPNTAELFRASSTEKSEKIPDVTVDMDIRGIYSTQQDFGMTLRGAGGRLQNF
GQQNPNPNGLTPKQEMLARS AIKYWVERHKHVRLVASIGDITYGTALLFHMLVSTITLTL
LAYQATKINGINVYAFSTIGYLSYTLGQVFHFCIFGNRLIESSSVMEAAAYSCQWYDGSEEA

KTFVQIVCQQCQKAMSISGAKFFFTVSLDLFASVVGAVVTFYFMVLVQLK-

>HassOR3

MTLSVLDRFYLIIDDGLFSFNLYLFFVGLWPEKTLTRNQKILYKMYEHFISFLTTTFIVLAGI
GTYQHKDDLVLVFCNIDKCLVDLQFFFKTIFFIKRNQLRDLIDEIESSGDEVTEERKKLMA
NYVMFITGVTAAVIGAFSLLALFEGTMSIEAWLPFDPMESLMNQILSLEILAFCVFPGPCRA
FAMQGLVCSMIMYLCDQLIHLQKELRDLTYVKETEMVMRKKFKNAIRKHIRLMGYSGR
MENIFKEYFLVQNLAVTVLCLNAVMMTVVGVHQTLLITFLAYLMLALVNAYIYCYLGN
ELIISQGIALLAAYESTWTSWPVDLQKDLLIVILAAQRPLKLSAGGMALLCIQTFSQALYN
GYSIFAVLNDAVN-

>HassOR4

EDIYHETKPYKLYSIVTFSIYTIMIFLENVAALFGKFPVEVEKNSAVMFSAIHDIVLTKMFLLL
YHKQSIRKLNNDMSTVGSSEEDHVMRQYKLTTVGIWLYVISVYLSLGAYGVESARRSI
VEGAPFYTVVTYLPFYDDNSVVALIFRIFFYITWLYMMLPMSADCMPITHLITMTYKFIT
LCHHFERIRTEFDEDTKIMNKREAIKHRAGCLEGIRMHQKLLCLADEIHRVFGIIMSLOV
CESSAVAVLLLLRLALSPHLDTNAFMTYTFVCSLFLLLALNLWNAGEVITYQASLLSNAM
FQCGWHLCELEKDNHRDIR-

>HassOR6

MSFRKFLFENEAVDGIKGPDTDYLYIKILRFTLNVVRSWPRKELGEPESAFTVFIKYFYLLIT
IATVVGSILYVVVHVTELTFLAAGLMYLILISILDAITVMSLTFSKYRVLAKDFLTKIHLFY
YKDRSKHAMEIHKKVHLISHLFSLWALFQMLSGLSLFLNTPMYSNLAAGKYRRGGLNR
TFEHSLYLYPFNTSTDFVGYVACILHWIISYLCSTWFCMFSLSLWVFNWGHFKILIT
LEEFPRPKSIGNLQTAYKYSQEELVEVAERLKDCINYHREIKNFTDRMSDVFRMLFVYYL
FHQTSGLLLLECSQMTAQALMRYLPLTIILTQQLIQLSVIFELVGESEKLDKAVYGPWE
YMDTKNRRMVRFFLMNVQEPHVKAMGIANVGVTTMAAILKTSMSYFTFLRSM-

>HassOR7

MKIKMSKPLKFDQSIEKLGVLFRFSGMNIKNKIVTPLDTIKYGWLYTLNFLVVFSAIIGSVY
YVILGIKQGNFIEVTSVAPCLTFSILSMIKSLYHLMYEEHIQELIDLLEIRENNREKICIE
KEEIIANETGFLNKVINVLYVLNCSMIVVFDMPVIMIAVKYKTNFEMLLPYLDVFSFIP
YELKYWPFAYIHQIWSECVLLDMAAADYLFCTCTYIRVQFKLLQYDFERMIPDRSISKG
VFYEENELRNKFTELLKWHQDIYSSSTILEIYKSTLFLNLSLSSLVICLTGFNVTVDDIVIIIT
FLTFLSMALMQVFFLCFFADLMMTASLEITNSVYNCKWYSANIKVKGKILFVQTRAQEP
KLTAAGFADVNLNAFMVRLSSAWSYFALLQTVYGAK-

>HassOR8

LVQDVFSRSLFVQFGMGSCIICLMRLTMPAPLGYIYIFLGTYLFLVMVLQFIVPCWFGQRII
DKSNLLAFSAYACEWTSETRQFKSNMRFFIDRAKKPLSITG-

>HassOR9

MLDQFDRCLKSVNLYLKFLGLHLESKDTNKTFAQRSRSHRLYFAHLFSLNLEVAQAQVLWV
LEAVITGKSFVEITRILPCLILCLISNFKTSLLYYGRHNDEFIVTMRSLLLNQMQVEEKENR
FRKELIDKHLVILTSISKISYVIVLGLLMFALAPAFIIPHYFKTDEVKLEVPFIGYYPFNEFD
LRIYPWVYLHQVGTAVAIIMVYGPDCFFFTCTFIHQFSLNNDMERIVTEETPRYDKTK
FKKLAVRYIELMRCVNLLEKIFSKSILFNALTSSVVICVTGFNVLVVDNIVMMASFTAFLIFG
LMQIFLYCYYGDSIMRSSMEVSTSIYNSLWYKIPAADRKGFLIVIIAQAQKPCALTANGFFNM
NLSAFASILSKSWSYFALLKTMYPHE-

>HassOR10

MAVKNTSLFLGRPCKILSAHGVWPHPNFVILRKLYMLFIMWTQYSFLLFEIYYIADVWGD
IDAVSEASYLLFTQASLCYKSTAFMVNKQSLELLEIMDCEIFEPKSAEHKKILAAQARKIK
RLCLFFLTSATTTCTLWAMIPLFDAASKRSFPFRIWMPVTPKSPDYELGYLYQMVSIYISA
FLFISVDSVAVSMIMFGCAQLEIIMDKIQKIKYVFESADSEEGRRKIIKTNNEFLVECIKQHQ
TVERFIQLCEDTYHANIFFQLTGTVAIICNIGLRISIVEPNSVQFFSMVNYMVTMLSQFLCY
WCGHELTIRSENLEWLYQCPWYEQDTKFKRALFIAMERMKKPIIFKAGHYISLSRPTFVA
ILRCSYSYFAVLNRVNT-

>HassOR11

MYAGNAVITGITGPMYKYMKVLRFLVRIISGWPGKALGEKTLRIEGMGHAYYNTILSLVY
LALGVAYLKNFHRFDLELQGLYIVLLMNMLSTSRAFTLCLSQKYRQVAKIFIQKIHLFYF
KEKSDFAMKIHITVHKISFISAVYLSVLLFIAACMFNLIPMYNNYSAGRFASFDNLENTTYE
QAISCLYPWNFETNFGYLAATLSGWYGTILCGSSVSMFDLFLCLMIFNLWGHFKILIYNL
EHFPRPASEVVDAGEEERSGRTVGSEMYSQSELEEVAVLLRDCIQYHMLIVDFTNNMSDA
FGMALFIYYSFHQITGCLLLECSQMTAAALTRYLPLTIIMFGELVLLSIIFETIGTMSEKLD
AVYKVPWEYMDTKNRRTVLIFLIKVQEPHVKAGGLVDVGVTTMASILKTSFSYFAFLRTF
-

>HassOR12

MEDEPLLDKTVKKIEFLFRCTGINIKSGTKTRKDMIKSRTVYIINFLWLNIDLGAIVWFFT
GIANSKSFTELTYVAPCITLSFLGNLKSFLILREKHVDKLIQVLRDLEINEKSRPKSEETDAI
IKYEHNFVTTVISVLNVLYFVLLVAFALSPVSLVALKYFTTNELELLLPLIVYFPDPYDIRY
WPWVYLRQIWTEVVIIIDICTADYLFYTFCTYIRMQFRLLKHYIERVIPEEDDAGRLTNIEQ
VRAEFVLLIKWHQDLISSANMLETVYTRSTLNFVSSSVLICLTGFNVMAISDVAFVATFLS
FLFMSLLQIFFLCFFGDLLMTSSTEISEAVYNCRWYLADTSLGKDLLVQTRAQTPCKLTAS
DFSEVNLKAFMKILSTAWSYFALLQTLYGAPT-

>HassOR13

MKILSDGSDLEGVEKVEDIFYINLARKSMWILDSWPKNPNESTTYRFVVLALNVTTLIGG
AIYLRNNTGVLPSFELGHTYITVFMNCITCSRCLMILSKKYNQVMSSFLNKIHLFHHRHKS
EYAYKTHIFIHKISHFYTVYLLWLALNGLLLFNMPFYNCYSRGMFRDVIPANATYDHAUF
YSVPFDYTTKFKGYLAMTSFNCFISYTCTSYFCVVDLTVSLVIFHLWGHMRLTYHLANFK
KPASILESDNTDAIKDHSYTEEELKEVFSKLRREYIQHHNLILNFSSEMSSAFGPALLAYMV
FHQVSGCILLECSQLDMKTLVRYGPLTVVIFQQLIQISVIFELLGSSNDKLIDAVYLPWEY
MDTKNRKLVYVMLRQSQRSIDLKMMSMLTVGVQTMTAILKTSFSYFVMLKTVAEEEQ-

>HassOR14

MSGIRDFFIFNLEAKEGITNPTEYPYMILCRHLLTVITCWPKELKEGLDTRAKLRAKIWVTF
QKIFHLNGCFITTIGMAMYIALHKKSMSFFELGYLYISLLMTVVIFSRLTTLWCWNPEYQAVA
TDFLTKIHLFYKDDSDFSMQTHKQVHKISHLFTLLTGQMVAGMSLFLNTPMYNNFSTG
KYKKGGLKNSTFEHSYFSYPFNASSDVSGYILSNIFHWIISYLCSTWFCTLDLFLSIMVFH
VWGHFKILIHDLNHFPRPLSMISFRLDHSNITLTNEIYSSRELQVSRNLNKCVEYHRRIVSF
TDKMSEVFGPMLSVYYGFHQTSGLLLECSQVTVEALVRYLPLTIIVFQQLIQLSIIFELVG
SVSDKLDKDAVYGLPWEDMDTKNRKTVAFFLMNVQEPVHVKALGLADVGVTSMTAILKT
SMSYFTFLRSK-

>HassOR14b

MAGLRDFFFNFEANEAITTPTNYPYLIIRRSLSVIKCWPKKTENLEAGAKLKAKVWGM
QNVLHLGFCIFTATYIAIHKKNMTFFELGHLYITLMISCVVFRLLTLTFQEEYQVVV

NEFLNKIHLFYKDNSEFSMQTHKQIHRISHLFTLYITGQLFTGLSLFNLTPMYNNYSAGK
YSKEGLKNSTFEHSLYYSYPFDVSTDVRGYIFSNILHWFFSYIVSTWFCTLDLFLSVIVFHI
WGHFKILLHDIDNFRPSKMVSFRLENTNVTISNENYSTKELEQLAAKQCIDYHREIISF
TNKISDVFGPMLFAYYGFHQASGCLLLECSQMTPEALARYLPLTLTLFQQLIQLSIVFELV
GTVSSKLNDAAYGLPWEDMDVKNRRTVAFFLLNVQEPVHV KALGLADVGVTSMTAILK
TSMFFTLRSM-

>HassOR15

YLSGQMMLGLFLFNVTMYSNYSAGKYKSGGLKNSTYEHALYFPWPFNASTDFRGYVV
SNILHWLLSYSCSSWFCVVDFFLSLMVFHIWGHFKILLHDLNHFPRPSNKISFMIEDSCVTI
TYEMYSRNELDQVFHRLNKCIDYHREIVSFTDKMSEVFGPMLLAYYGFHQASGCLLLECS
QMTVAALVRYLPLTILFQQLIQMSIIFELVGSVSDKLDKDAVYGLPWEAMDTKNRRIVAFF
LMNVQEPVHV KALGLADVGVTSMSAILKTSVSYFAFLRSL-

>HassOR16

MGLRQFLFENEAVEGINSASDYHLHIKVLRFMLVIVNSWPRKEIGEPESPKFSEFVKYLYLVV
TFLLSAGFILYVVKHNSLFTLETGHMYIVLLMSFIDVSRVATLTMSTTYREVARDFLTKIHL
FYKDRSKQAMETHRAVHKIAHLFTLWLCQMLSGLSLFLNIPMYSNYATGRFSGEVSKN
STFEHSMYYPFDTSTDIRGYSIACILHWIISYLCSTWFCMFDLFLSLMVFHLWGHFKILN
YTLNDFPRSSKVEAAKYSEEELVDVAARLKDCIVYHREIILFTDRISNVFGPMLFLYMFH
QASGCLLLECSQMTAALIRYVPLTVILTQQLIQLSVIFELVGSSESDKLDKHAVYGVPEWEC
MDVKNRRSVAIFLANTQEPVHV KAMGVAKVGVTSMAILKTSLSYFMFL-

>HassOR17

MFLRSECARSVAPHVRVLRVGFRLGAALSSRGRAERLALRSYHALALAATSPLYVLQAV
YAYQERGMMDKLSQVMFLMLCHVTCVVKQIAFHVDADRIDRLIASLDEPLLNQCAGERG
ALLRGTARGAARLLRITYAGCAVATCVLWIVFPVIDRIQGISFEFPFWTGFSYDHNAVFTFVL
LQSFYCTNLVAIGNTSMDAFMATILDQCKTQLRILRINFESLPERARALHVESGENYDTILD
KLFVDCLVHYNKITEMCTELHDVFAVPLLQFGVGGWILCMAAYKIVSLDVLSIEFASITLF
ITCILIELFICYGNEVTVESERSQSLSMEWRRARLTFRRSLVLMERAKRPLRPAAGR
VIPLSLDTFVKILKSSYSFYAVLRQTK-

>HassOR18

MEMKVDVLPKYYKGFNETFKLCAFSLAFALYPNRTTALRRCITITLIVTFCGGQLFWFIT
YTFKCLYTLDIYNFARNMTLAVVLVFFIKTYVVIYATSKFAPLLDKISDDLLEANNLEEF
QVLYDDHIKIAKVGEISWLLIPTIMSALFPIYAGALMTIESIQTDYERRMVHDMELLFVED
IQSETPFFQCMFAYNCVQC VVLVPNYCGFDGSCFIATTHLRLKLMKLVNKAFKYSKS
RQELRMRLYDSIKDHQDALDFYVQLQNVYGPWLFVAVLLTSFMISFNLYRIYLLQRIDPKY
TSFGVVGVLHIYLPARYASDLTKVSEEIPDDLYLAQWEAWADPSITKLLMFMITRAQKEMI
VTGMGLVVFNMEMFKSILQTSYSFFTLITA-

>HassOR20

MDDELEFKPFHETYRLITFSLCIAMIYPNPRTEKWRLISIPILIATVAPVAIMIFLDMYKCWT
NGDIVNIIRHSTVVGPFLLGGFFKMILMYHKRIQAKQILDEFDRDHMFNTVAETYKAIARA
SIRNCQVYSERLWACLVTTCVMTFPVMAIVLNIYNFMFKSEPTKYMIHDLEKPFKEPEER
FESPYFELLFVYMFYAILYVNFYGYDGGFGLCVNHACLKMELYCKALEEAMMADREE
VYGRVIAVIREQCRMFRYVDLIQDTFNIWLGIIFIATMIQICTCLYHITEGYGFDIRYMIFVYG
AVVHIYLPARYAAKLMKAMSMETSNRFYCCGWERVDDERVRKMIVFMIARAQVPNEITAF
NMMAFDMELFSLQTSYSMFTLLRS-

>HassOR21

YKSSNTTEFLINLNKFGFIFGLPNFWIEELDFSDTFLKIIIGRLNKYGNWLVFGLILAEYGYF
TQKNLDERQTSDFILFIISHTIITGFRVRISHQEVQIRNVMYKLGIALKEVYNDSEADQMIK
RSKFFSYALVLCIMSVMYTVAAVMRVRIRAGVTFTTITVYPTVEDRSTLSDVVRAIFYII
WCIYLTRVFAVYTLVICLTIAMSHQFKNITSYFYSLSNIFEDEQMTQTEKEQEYERSFRAGIK
IHSETLNCTGDIQRMCRDVFSGQIIFNLTLIVLMYQMVNSPRNLTNALTLVIAGLTILLSTG
FFMWNAGDITVEAQLLPTAMFSSGWENCGRDSSVRVRKLVIAMMQAQEPVVLTLGLLI
ALSYQSYVSIVKSSYSVFSVLY-

>HassOR25

DAIQNVFSATLFFQFSFGAMTTCVIMCSLLMPATMEYRVFLVIYLISMAGQILVPSLLGTLT
HESAELVTAAYNTEWIGRSESFKKSLMLFRQRAATPITITGLKMFPLSLVSFIAMKTTYEFF
TLIRNAQET-

>HassOR26

EVESIFGEAMVVQFFVMAWVICMTMYKIVGLSIYSAEFVSMAYLGCMLAQLFIYCYFGT
QLKVESELVNQSIYCCDWMKLSPRFRKQLLVMMQFCDRPIAPRTAYVIPMSLDTYIAVLR
SYTLFTFLNR-

>HassOR27

FFVATLTLCSVAVRLKSEDMSVMQLVSLIQYMCGLTQLFLFCRYGDAVLHESTMGMGEG
PFAAASWCLSPRVRDLMLSLAGMMSQRHLRAGPFSFIDLPSFIQVVRAAYSYYAVLGKK
E-

>HassOR28

LVSGYVEAQMLALTEELLHLYEDAEAEYKTNQAVSVLDHNNERNLKSKAINEYVEKRL
KEIIQSHGRNINLLHKLEHVFSGAIALEFLLLIGLIAELLGGLNTYLEVPFALMQVGMDC
FTGQRVMDASVKFE-

>HassOR30

SVDRKHGTKEALSQNYKKLVDCIKHHQAIVTFTTELVENAYHPYLLFQLVGSVGIICMSALR
ILVVDWRSMQFFSILTYVSMISQLFVCCWCGHELTATSEDLHTVLYKCIWYEQDVKFKRE
LCFAMMRISRPLVLRAGHYIILSRQTFVAILRMSYSYFAVLNQT-

>HassOR33

PMLLPGRHFMDVVLLYGLEPMFETPNYQISFVLMGSSCVLICYLCANISAFIIVTGYVQ
AQLALSEELTHLWEDAENYRGTELEDITDDGDHNDKNKDAILNDYVTVHLKDIKSH
AENINLLGQIEGTFRGAIAIEFCLLVIALIAELLGGLQNTYMEVPFALMQVGMDCCLIGQRV
MDAGAVFEDAVYDCKWERFNKKNMKTAMVLLLNAQRPMPTISAGGVTTLSYVSFMTIIS
IYSTYTLRSTMHEP-

>HassOR35

GGLAETIANMLTVLNAVFTIFLLSLSGQFLCDTSSEVADAAYESYWYESDHKVKKLILSIIR
AQRPSYLSALGFSELTKSFSKILI-

>HassOR37

WKSMDLAKAAFEGPWMNSDRQTNMFIILLERCKRPLRLSAGKIFTLSDTYTVLINWSY
KAFVMRNMKK-

>HassOR38

MYTYVKIAVFWMNKDKVISLLEYLYCKEFKPEPEHRDIITKSIKSARFVMTYYSTMCVG
AVSVGIIIMPLTENFDILPTNVEYPPFDVYRSPAYEAVYIHHIYKPATCIIDGVMMDTILAAFV
SAIGQIEILAFNLRNFDLVAERQRRDLAQNKYIEEYPAQHYVRSVLKECIRHHNCIIRYVS

MIESAFSLASALQFMLSVMVLCLIGIQFLSIE-

>HassOR39

ICHSLFIFLVYCYQGQRLTTASEKLEMAVYYCGWENLRVKERKQVLMMLKRAQEPVIVYA
AKVIPIRLSTFAT-

>HassOR40

LEMAMRNLSLTMSTVCVFKACNLVIWQNSWKELIDYVSELERSQLSKNDAVVNKIISGY
VKYARRVTYLYWALVTATVVTVILAPLFIYLSSPNYQESIKNGTAPYPEIMSSWTPFDRSRG
LGFCGATLYQMLACFYGGTVVANFDSTAVVIMTFFTGLKVLVSVNCERLFGDGNELVDYD
EAVKRIKECHLHHYYMVEFSSVLNSLLSPVFLYVIICSLMLCASAVQLTTEGTGNMQRIWI
AEYLMALIAQLFLYCWHSNDVLYMSNKVDDGVYSSA-

>HassOR41

CVTAYQITIETSPMQRFLTTEYL VFGVAQLFIYCWHSNDVLFASADLMRGPYESIWWTRSV
RYRKDLYLLAAQFNKT VVFSAGPFTKLT VVATFISILKGAYSYYTLLSQSQMK-

>HassOR43

PYDTSKSPAYELTYINQSSAVTLAALVNVCLDTLVTSLIAVCRCLRLVALSLRSLCDGIPLP
DKQLISPTTEERIVLSRLSQCIIKHESALKAARQIQRCFSLPILAQFAVSVVIICVTAYQLAMEL
NNRNWFRSIPMVAYLLCMALEVFLYCYQGNELLEESSEIAGAAYECPWYQCSVRMRRTLL
IVMVRTRRELRLTAGGITLSLACFTSIIKASYTFFT VVKQVEDRNP-

>HassOR44

VIMSEVIMQAHLIPLVCQFNVLANCFENVFECAAEPDINKHELKNNTFVEKYRKRLG
DLVKQHREILDQTTDLKTILSAPMLGQLACSGLLICFVGYQATATIAENLGKFMVSLFYLG
YNMFTLYIICRWCEEITIQSQRIGQSAYFSGWESGVSHVPGARATIILVIARSNKPLVFLAGG
MYTSLTSYTSLVKASYSALNILLTTKHE-

>HassOR51

EALARYLPLTLTLFQQLIQLSIVFELVGT VSSKLNDVYGLPWEDMDVKNRRTVAFFLLNV
QEPVHV KALGLADVGVTSMTA-

>HassOR53

EVKERQGS AIVIMSMFGCDSL FYGLCVYIKTHFQLLGLRFENIVGATKSETQRNLAKAVVR
HQELIDL VNMELLYSKSSLVNIIT-

>HassOR54

KHHQFLMNFHGKIREMYKVIFGAHFLSMTVVLVTTLQTMNVWDYRNTILTGMMSGIMPLF
LYCFGGEKLISAGLQMSSAVYSCGWEMMEAKQAKVVLLMLCLLQRPLYLTAADIFIMNR
ETFGDGAQVVYKIYAVFN-

>HassOR55

CSMTICGSVVQFTSKEATASQKLWVIQYTCGLVLQLFLYCWHSNEVTLQSKVVDGGIYNS
NWWKSDVRVRKQLILLAGKLNRPVLVDAGPYTTLSVPT-

>HassOR59

SHFVMITDLKMQTHLLHLLCQFTVLVDCFQNVLRDCRIGFEDVAENNLVYEKRFAEKYTK
RLGDLVKQHKLILSQT MNLRD TLRSPMLGQLAASGILICFIGYQATTTIAESPFQGLMSAFF
LGYNLFGFYIICRWGEEITNQSEKIGEAIYCSGWECGLTKLPGVVRSTIMYVIARANKPLVLT
AGGMYNLSLTSYTSLVKTSYSALT VLLQFRHE-

>HassOR60

AAYLNVAKDTLVAALIAQCRCRLRLLLGYALRTLDKGMENEAYTFSPEQEKTLSLRLGSCV
VQHQKALDVGKELQECFSEPTFAQLTVSLIICATAFQLSMGP-

>HassOR62

LWAAWVCVFSVYGPDCFFFTCCTFINIQFRILQDNLKEIVKVDARNRPDVTTETFKAELVQ
LVNDHRELIRCVNLETTYSRSTLFNVVTSSLIICAAGFNLMVIENLALMAPFTSFLTFLGL
QVFFYCYYGDY-

>MsexOR-1

MIFMDDPLSKSIKDPDRDYRYMKLFRSTLRLIGSWPGRDLKEEGATKYEIAPLYWVLVIKIT
CFLLTIIYLIENTNKLGFVEIGHVYITVFMITLSRSITLSLNPKYRRVMTKYITKMHLFY
KDMSDIALKTHIRVHKLSHFFTMYLSTQVVLGTVTFNIVPMYNNYKVGRFENNILVNDY
ELSIYFKTPTKFLSTLNGYIAITTFNWySSYICSNFFCMFDLALSLLIFTVSGHFKILHNLN
FPLPAVVSDDSSKVLKTDEIQAPLYNKTEKKDITLRLKQCIDYHREVLEFTQDISEAFGPMLF
VYYLFHQVSGCLLLLECSQMDAAALMRYGLLTAVLFQQLIQLSVVSVGTVTGYLKDA
VYNVPWEYMDTQDRKTVCIFLMNVQEPVHINALGLAKVGVQAMAGILKTSFSYFAFLRT
VSN*-

>MsexOR-2

MTMLLRKMYSTVHAILIFVQFVCMGVNMAMYADEVNELTANTITVLFFAHSIIKLGFLAF
TSKSFYRTMAVWNQNSHPLFTESDARYHQIALTKMRRLTYFICFMTVMSVVSWVTITFF
GESVRMIANKETNETLTPAPRLPLKAWYPFDTMSGSMYVVFVVFQIYWLLFSMSMANLL
DVLFCAWLIFACEQLQHLKAIMKPLMELSASLDTYRPNTEAELFRVSSDKSEKVPDPVDM
DIRGIYSTQQDFGMLRGTGGKLQNFVQNTVNPNGLTQKQEMLARS AIKYWVERHKHV
VRLVASIGDTYGTALLFHMLVSTITLTLAYQATKINSINVYAFSTIGYLCYTLGQVHFHCF
GNRLIESSSVMEAAAYSCQWYDGSSEAKTFVQIVCQCQKALTISGAKFFTVSLDLFASV
GAVVTYFMVLVQLK*-

>MsexOR-4

MKFFVDGSEIAHITKPQDIQYMQMLKFFTNSLAGWPPIEAVEGIDGKKNFYWRNGLVVIAY
AYFFGQVFYIYRYINDYTFLVMGHSYITVLMTIVTIARHTLPYFKCYDDTTADVFHNIHLF
NYRNKPGYYKEFHLKIHKISHAFSVYLCTLLVTGPSMFNGIPLYNNYASGAFSFRNSPNT
YEQAVSLLLPFDDTNNFKGYFVFLANCCVSYISSCCLCIYDLLLSLMVFHLWGHLKILTK
TLDNFPKPGFLNPQAIADPNKSLKFSDEELKVIHKKLGECVAHHQLISNFSTRMSNTFGLS
LFIYYGFHQLSGCLLLLECAQLEAAAICYGPLTLVVFQQLIQLSFIFELIGTVNEGLTDSVY
CLPWEAMDQGNKKIVFTFLRQSQKSMNLKALNMLSIGVQTMAKILKTMTYFLMLQTIA
KDES*-

>MsexOR-5

MKVPLKFRPTETTKLLDELNKLFIYFAFRGFVVEEVKLPKTFVKIYDAMY PALNVSLVIF
CALQIGAHFTQKHLNIQKININIMGIAQPLTKLCCLNCMYYKEECKQVLYHLFVAVKEYI
NDEETEKMLVKKLKFSLWVYMFSSVSTLLYGMALIEMVRSSTFGVGTVAWPDTTDT
ALAACARVYLYFFWIVYTSTGSMVILMVLTFMGLTYQYKNLQKYFENLNSIFEDKQVTH
EELEMNFEKALQKGIAHSDTLWCVNQCQTICKRINMAIVLINTGILIVLMQGF LSKDDI
LKVGTCCLIVLGMCLMILAFFMWNAGDVTVEAQKLSDAIYSSGWYNCYGKRSARIRSLV
IAMIQAQEPVVFTAFGVIELSYETYVAIISAYSVFSVLY*-

>MsexOR-6

MEETKKYAPTDTTKLLDKFNKILYVFGFRGFWMGDVKLPKTMKIIDILYPVLIITQGTFG
TLQLGAYFTQKHLNSVQKIDALVMGFGQPMMLLYCLNCRYKKACREVFYHLFVVLKT
VYNDKETEENMVKRLKLYFGAYLIFSLLVLLYGSYASVETVRKGATFVTVAWPDPVTD
TSKLASYARVGIFMYWSVYSFTTSVVIIIIVLIIFLGLTYQYINLQRYFENLNSIFENDRLSHEE

MEKNFEKALQNGIKAHSETLWCVKQCRMICSAINAGVILLTTGTLVILMPAILGSKDDLLE
AMMYLMVSNIVLMIMAFFMCNAGDTTVEAQKLPNAIYSCGWYNCYGKRSARIRSLVVV
AMIQAQEPVVFTGFGVIELSYENFVTHIKSAYSLSLVFH*-

>MsexOR-7

MDEPEFKPFHKTYQIITFALSVGMIYPNPATDKMRLASIPISILTILPLACMIFLEMYQCWTQ
GDIVNIIRHTTVLGPFLGGLFKMFLMYHKKRQAKQILDEFERDYHLYNSFTGDYLNARD
GIRNSLIYSEGWAITVTTCVMTFPVMAILLNMYNYTFKFQATKYMIHDLNKPASPEAR
FDSPLYEIMFFYMMYCSLLYVINFIGYDGGFGLSINHACMKTNLYCKMLEDAWKAEPNER
YRRVVAVIDEQCRMFEFVNLIQDTFNIWLGIIFLATMIQICTCLYHITEGYGFDLRYMIFVSG
ATHIYLPARYAAKLKAMAAETATHFYSSGWERNDRRLRNMLLFMVARAQTPLOITAFN
MITFDMELFVSIMQSSYSMFTLLRS*-

>MsexOR-8

MAQTLFDKSLSKLSMVFRWSGTNIAIGEAAPTNNTKRNRCIYSFNFILQNTNVLGGIYWFIS
GLKTGKSYTELTFIAPCIISILSVMKMSMIIYEKKVYQLMENLRMMEAHERNRENTAERR
KIIKGVNFLNLVINVLCGLYLIMFVCFAFSPLVLMILKYMKMNEIEFKLPFFIAYPFDYNI
KVWPMVYLRQLGTEIVTVSNMCVADFIFCFCYSITIQFRLQYDIEHVITGTRESIYNDEM
HGGKIRNKLVEIKWHQELIMCVNLENISISMLFNFISSSVIICLTGFNV TENHDIVLVITFI
TFLFMGLVEIFLLCFFGDMLIDASSDVSDAVL*-

>MsexOR-9

MTSPDSKIKEFFRKFTLITYLCGLADFWIEDLDLPTQFIKCYDTFCKIFNNFLYLYVIAQILSL
FTQHNLTQKQRNYQLMFCVAHPFVVTFTPLIAKHRKKLQSVLFRLLVSLKLVYNDLDIEKE
MIKRIKFYLFVSAFPWISMISYCVDSYVQVVTSGTTFNIMILAWPLVDDHSVIASLARFIY
HIIWILFETRVTAAYVMVISLTTICISYQYRNLRSYFESIHRVFEEDLTQKEKEKKYEKLLKIGI
QAHSDTLRVTKDGTACSAVLSAQVLFNTVFLVILMYQAVVNNENRSLVKMFSTLCTVIT
LLFSTWFFTCNAGDVTYEASLIGTAMYTSGWQNCRGLSSLSIRKLLVIALARAQEPILKGF
WILTLSHQSFSLIVKFSYSIFSLLY*-

>MsexOR-10

MALHFDDTIKKNDFVFRYAGINIKSGERKKNDIAKSRRMYVFNFFWLNIDVYGSIFWFDG
LRMGKDFIGLTYIAPCISLSTLSLIKSLFLISSEKHMFKLIDNLRELETRENARPRS VQKEEII
NTEIKFLNYVLKTINILYVVLVMTFALSPLIIIAIKYMQTGEVELILPFLILYPFDYNIKLWPF
VYLHQFWSECVTLNICCSYIRIQFRLQHDFERIISAPSGNRRVRENDFKAKFIELVKWHQ
DAIESVSLETIYSKILFNFMSSSLIIICLTGFNITVVNDFAFVVTFLSFLFMGLVQVFFLCFFA
DLLSESSVEVSNVYNSQWYMADSNIGKQLLLVQTRAQKPKCLTAWGFADVNLNSFMRV
LSTAWSYFALLQTVYGGQ*-

>MsexOR-11

YSFRKVFLNETLGYPHILPCWAVLDELSFLGYLLTIVAEAVAAIYCVVVHITFDITAVGIMIFI
CGQFESLRRCSESIGGKGVKVCNVTAEARARFRIKKCHRIVILIHSEIKELKELIKNILGVY
FFVATFKLCSLAVRLKTENMSKMQLVTLVQYLGASITQLFLLCYGDAVFNESAITMGQGP
FGAAIWCVSPKIRRDIVILGMGMMKPHSLQAGPFVNLNLPFIQIVRTAYSCYAVIGPK*-

>MsexOR-12

MEQAKREIDESLKLSAFCMRRIGLSFEKHKNASAHLRQQLMFALSVCISICYHVFSEIMYIG
LTLANSRVEDVPLFHTFGYGALSIAKVFWALWYKKDVFSQLLRELVGIWPTPPLEDEAQA
IKDKSLDALRITHKWYFAVNVLGWVFNVTPIAVYFYRLWQDGAQVGYVWVSWYPFD
KHQTIAHVAVYIFEIFAGQTCVWIMVSTDLLSGMASHISMLLRMLKRRLESLASTEKTDD

EYYHEILENIKLHQRLITYCYDLEDAFSLSNLVNIVLSSLNICCVFVIVLLEPFVAVSNKLF
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AMKFTNISLVTSAILTRSYSYFALLYTMYNEN*-

>MsexOR-13

MENNRNFRQAIYSCGWEEKQPDKGVRQLILFMMTRASLTLGITTVFYEICLDTFAEMCRQS
YAIFNLMNAAWS*-

>MsexOR-14

DRWIQWKVTAVSAFIGVCALMEHILSMMSAIGLHCAPSQYLRKYILNSHGFLLRINEYSLW
FAIPIFILSKISTMLWNFQDLMIIIVISMGLTSRYNRLNMYVGHIIKIERKLSDSPKTGSDLHVH
NEIWRRIRESYVRQAELVGMVDKEFGALILLSNINLFFICLQLFLGLNATARGALINKLYY
FISLGWMLFRACTVVLAASNVHMHSKKALVFLYSCPKSGFNIEAKRLKHQLIHDHVGLSG
MGLFSLKRQLLLQVAAVVMKYELVLIQYDK*-

>MsexOR-15

MLYIYTRWNNIAFSTHGTIFTIVPITFLILTQVLSAQKESYRRLMKTFLQEIHLNFGSNSYM
KQRAVEVEKYSRYLATFFFVFLVVYRALWTIVPIVFNLKNKAIENKEIPLKTCFYMWLPP
DYEHEYKYWVITHIANSTLIALGCIVVTSYDTINYSIVFHLIGHIKSLKHLIKTNISQNLSD
ETKRGLVEVIRYHCFVLKIFGEIERAFGINVTGNLYNLIADSLLYHMLGDKENKLMYG
VMLLVFMGGLIVMTLILEEVRRTFDIPQTVYDMPWEKMSVSNQKIVVIMLARTQPTLEY
KSAGGLKAGVNPTIQIISTFSYYVMLKSSL*-

>MsexOR-16

MGIFVQNVNRSRFLCTMLKLTGFLVPNGVIEFTVFHNIYWFFWMMFVVGINVTQTGDLI
QVWGNLSLMTSAAFLLLSDVAMMMKIINVVMRGRVIQTVIDGMDLELRSEARAKGRKII
KECDDQTRHLYLFLCLSGVTVLGWAGSAEHNKPLRAWYPYDTSTSPAYELTYIQNQL
ITTGQNTIDLRLRSCVLKHQAALRAASQIQECFSEPIQTASTVVICVTAYQLRIEIHQSNL
VRVISMAYLLCMMLQVFLYCLQGNQLAEESSNIAEAVYECPWYRLPLPLRRSLLIMVR
SRRVAQLTAGGIATLSLACFTSIIKVSYTFFTVLQSVED*-

>MsexOR-17

ELDDLGDAMLLTYIFGSVFICLTAFTATVVGDIYMTVRYVSFFLSLLVEVFVQCIIQILID
HSEKFERAIYSADWPHSELKTKKMLLILLTRAQKPFVYSANGYLVMNLDTFGCICLSYQF
FNLLRTAYN*-

>MsexOR-18

MLSFLKNLEDSERPLGPNYWILKKMGLLLPKNKISKIFYILVHEIVTLFVVSQYMELYVIR
SDLDLVLTNLKISMLSVVCVVKVNTFVFWQSDWKQVLEYVTKADMFERQNQDVPKSNII
NSYTKYCRRLTHFYWGLVFTTFLTTNTPFMRYLSSSNFRNNFANGTEMFPHFSSWMPFN
KNHSPGCWITILWHVLLCAYGAAIMAAAYDTCVVVIMVFFGGKLYLLRERCSNMFKNSDE
NASEATVKQLHGIHIQLIKYSRLFNSLLSPVMFFYVMCSLMLCASAYQLTSATNAAQKL
LMAEYLVFGVAQLFLFCWHSNDVLIKNENVTLGPYESNWSASLRQKKNVLILSGQLRIS
NKFSAGPFADLTLATFITIIKGAYSYYTLLRK*-

>MsexOR-19

DLIIACIKHHQAVKRLVLKIEDTFHSSVFCQLCTAVLIICIIGIRLSQDSPNNASFYGIVSYLTL
ILSPLYLNCWCGTEITDRSLDFRDWLYEVPWYDQDKRFTSTLSVLLQCTKKPLEFRAGHY
VLLARATFVSVLRCSYSYFAVLQQANEG*-

>MsexOR-20

MAVSVLKRLTYGDNIFEFNKYLMVGLWHNENWTRNQKLLYKIYDNTLDVLGLIYLTL

TAIGHGNMDDITAALAGVDKSLVAYNFMLKIIVFHFRKHQLRKLVEIISGDVVPPEEHKI
LVAKLSLATTITITTIIVTIFTGISVLGELPAKVWLPFDTSKNFMNLLAGVQICLVTFGVPCY
RGLALKCFVSTMI FYLRDQLIDLQVKFKELDNFKDAEEVVRTNFKKIVKKHIRLIRYSKTID
NLLREYFLIQNLAITIEVCMNSVTLLTSEGISSAAYNTSWTSPVDMQKDLLTVIIVAQSHF
KLTAGGMAVMSLETYAQTLYNGYSIFAVLIDAVN*-

>MsexOR-21

MLVGFWHNENWTRNQKLLYKIYDLTMHVFGITDIALSAVGIYQTKHDLTVALAGVDKAL
VAYNFMFKIIGFHTKDQFKKLVKEMIASGDVVPENHEILMAKLSLATTITSTIIVIFTGSS
MMVGDLPARVWLPFDISKSMHLLAGVQFCLVIFAIPVCYRGLALQCFVSTLIFYLRDQLI
DLQDKFKELENFQNVETELRRNFKKIVKKHIRLIRYSKEMDYLLREYFLIQNVAFTTEVCM
NAVILTLIGFSQKTLAINFIAFLITALIHAFVYCYLGDEIIEQSKAYRLLLLTIQAGPRGPSTMQ
KNLLTVIIAAQSHLKLTAGGMAVMSLETYAQTLYNGYSIFAVLADAVH*-

>MsexOR-22

MGWIERIKGFILKKSFDLDRPDICLYNFHPQLRILFALKGIFFNKQNSKLKIILPTYFNLLTIL
GMVFEGMFAHRGLTIKDYSAIESFLYFIILTSTPLVYLCLFYHKDKIQLDDMNNEEFKFC
SLGPRHRTPFLKGQLLIWKLCYAWYTLSTGTAFMMFPVMALVYQTLFVTHTEKTIRPLA
FTMWLPNDPPYRTPNYEIFLFFEMNYCVIIVQTFGVYIYTLFHLLLHHYFILDMMILDFEAI
FDGLDESVAALPSKHPRRREVQLILNARIKRIVTWHNSVIKTINTLSIVYKPALVFQILLSSI
MVCLIGYQIAESLDNGVIDFLFIMLVCTCMQVWIPCYLGTLLRNKVFVAVREACWNCGW
HRNSLGTILRLDILIIIQRTQVPLLIKLSDMSTVELETFSSIMSAAYSYFNMLRNSN*-

>MsexOR-23

MSSFCQTDIFKPNFFFWKCFGIWGGRTENKNYKYYSFSYLFVTLFVFNILLTINLIYTPLKIE
SLIREVIFYFTEIAITVKVLMILVMRSKILDVFNLLDCKEFQGDDEESKQIETNHSFYRTCW
KLNAVLSNISFASNVFAPLFINLIWTAKIEFPVCKYYFLSDEMMDKYFIFWFIYQSIGIYGHM
MYNVNVDSFIAGLLLMAITQLKVLNAKFTKFKLEKRHEKHHILIQNKIQILRLNRYLKHY
DCVLRyceiiQDLLSVTMFVQFGMASAIICAIMCGLLLPSTTETFMFMVTYLFAMTIQIFVP
AWLGTQLSHESCG*VFAAYNCEWIPRSMFSKRSIMIFVERANNPIQLTGLKMFPLSLATFTS
IMKTAYSFFTLFRNLQDHDDGAN*-

>MsexOR-24

LLSLTKYFFVLNAVLSVYNFSSPIIMLYQYIAKNKVVVFLPYAVLLPFPTDGWLSWFLAF
VYSATCGCICVLFFTTIDVLYCVLTSHVCNNFSIISDQLQHLQVNNVNIIGNIVKEHQYILKL
ADDLEDIFTAPNLFNVLVGSVEICALGFNLTTGNLAQLPGTILFLTSVLLQILVMSVFGENIIT
ESRKIGESAFLCKWYEMDEKSKKMILTIMIRSRKPQILTAYKFSIISYGSFSKIISTSWSYFTIL
QTVYKPELIVKNNIN*-

>MsexOR-25

MELCKTIWRIITPTKALQSSGHLETFFESVYRVSYLMGLSTSDHDMFYLLYSTTVKFM
TLLVCGELWYIFTETSSLDGIASSINVTLIQFITIYRYKNMMDHKDIYKKLATSMESPYFDTS
NEKRKQLVFWAKRNEKYLKLLLFLGNCTLAAWYLYPLVDDIEYNLIIGFHTPFSEKTPLR
YPVVYLVVIAFTYISHFVMVTDLIMQAHLIHLQCFTVLADCFENLLDDCQHGFEDVPR
NMLVNNKQFAAKYIRRLGHLVEQHKKILKHTVNLNRTLSPMLGQLAASGTLICCIGYQA
TTTMTESIVKCLMSLFYLGYNSELYIICLWCEEITQSMNIGDAIYCSGWECGVTKLPGVR
STIMLVLARANKPLVLTAGGMYNLSLTAYTTLVKTSYSALTVLLRFRHE*-

>MsexOR-26

ITYLYLFGLPNFWIEDFKLPKWFMRSDIFTKIINNVLYFFILMEMIAFFTQENLSERQKSDL

LVYGISHPILYSYRVFISYKEDNLRVLLDLVVTLKRVYNDVKVERQMIKKSLLYSSALVFS
CILAMFFYTFDSILHVIRTGATFNVVITTPKVEDRSTLANAGRIVFYILWWFFMSRVSGAY
TTVICLTCLSHQYTNLRSYFENLNNIFETNFDQAVKEQKYEDGFKVGIALLHDLTRCTRE
CHSICQGVFSGQIILNILLVVLMSQMVNSERTLVAFATASSASAVLISTGYFMWNAGDVT
VEASRLSSAMYLSGWHNCHGRSSITIRKLVVITMFNAQKPVILKGLGIVDLSYQSYLSIVK
SSYSVLSLLY*-

>MsexOR-27

MYTYVKVVVFWFNKKKVVNLEFLHCKEFKAKEMEHREIIHKSIRKARFVMTFYSTMCV
GAVSVGIVMPLTENFNILPTNVEYPHFNVYNSSTYVAIYLHHIYYKPATCIIDAVMDTMLAA
FVASAIGQIEILTNLRFNFDVVAERRRKAIAKGNKYIGLQNNNNYFMKCILKECIVHHNHI
MRYVSMIENAFSLASALQFMLSVMVLCLIGIQFLSIENPSGHPMQMVWMAIYLTCLMVEV
FILCWFGNELIWKSTGLRQAAPDAPWLATDPKNAKYIILFMERCKRPMKVTAGKIFTLSLD
TYTALINWSYKAFVMSNMKK*-

>MsexOR-28

MAWFGFIHTPHTGDLLAAMVVLSLGISVQIGTLKFFYTFVYINKETNIVKYYLECDSLIVP
GGRFSGNLLRALRNVKKRAIVYWLVIINGITYVTKPMFMRGRHHMEDRYVIYGLEPMFE
SPNYEFAYFLMTAGLCFICYPPANVTVFLIVVGYTEAQMLALSHELLHLDANEHYQK
NINQHETTLINAQASKNKIINDYVRYRLKEIIMHAFNIHLVRQVEFVFRGAIAIGYVFLTL
GLIAELGGLENTYLQIPFALIQVAVDCYTQKVTASLIFERAVYDCKWENFDKMNMKMKT
VLLLQNSQKTMISAGGITMLNFSCLMSVIKSIYSAYTTLRRTMK*-

>MsexOR-29

MKNYYILKTYCSKIFLLGSGDFWYENKVIIGDDKRILYRMYSICALFFIYGFMTVLEIMAAL
MGEFPTDEKRDSVTFVAVSHAIVMFKIISVVFQKELVKTLNRKMTICEHYEEQALMSEKY
RIMKINVIVYFLIVYGSAACFVFEGLRKLFDGSHFVTVVTYYPDYEDNSMFANSVRILATVI
LFLMLNMIVCVDSFTMVYLIMYKYKFITLRHYFENLSVTIDKLNTPGNEEVVAKMLTDG
LVEGVEMHSKLLRLSKDIDKAFGTVMALQLCQSSGSASVLLLQIALSDQLTFVASLKIVFF
VMALFFLLGLFLCNAGEITYQAAQLSDAIFYSGWHVCRPRHSSRHVRKIVLLAIMQAQQP
LVMKAFKMLELTYGTFILVVRATYSVFALFYAQDK*-

>MsexOR-30

LENAERPLLGPVVKALQFWGLLLPKYRLKRYFYLTMHILVTLFTFTECVDVYFVKSDMNL
LLNMLKITMLATVSVCKVNTFLYWQKRWTDIIAYVTRADLNQRNTKDEKKLALIKKFTLY
CRKITYLYWFLMYTTVVIVVAQPIFKYAFSKNYRDNVRMGTEYTLQVVSSWVPFDKNTII
GYIAASIYQTYAAKPNASADIIHTGGRSSMHLEGPIRPIVSRITIHWPSPFYNVVTGKTLALPN
LIALQHI-

>MsexOR-31

MAQNTELFLGRPKILTFFGIWLPSKQYQDLVKIYMILVMITQYSFVLFVYIINVWGDIE
VVSEASYLLFTQASVCYKTTAFLIKKRKLVLLLEHMEQEIFASQSKDHEKILLELSLRIKRL
CTFFLTSAITCTLWAMIPLFDDAGHKTFPFRIWMPVTADESPGYELGYLYQMVSIYISAF
FIAVDSVALSMIMFGCAQLDIKDKMQKVREVPICLVNDEKKEKLSNNDLFTFCVRHYQ
NVISFVELVEETYHANIFFQLSGTVAIICNIGLRISIVDHSVQFFSMLNYMVTMLSQFLYC
WCGNELTIRSEVLRDWMYQCPWYDQDTKFKRTLWITMERMKKPIIFKAGHYISLSRPTFV
AILRCSYSYFAVLNRANT*-

>MsexOR-32

MSCIMYLAVSEQLTMTLNSEDLYLNRAKFVMKFLGVVWVPPNDENIIRKLYRYFMISLQYL

FLIFQIYYIIQVWGDLEVVSQASYLLFTQACLCKFKVTVFHVNVDLLKELLQMNGETFRAQ
SFDHEKILESQAARIKRLLLAFMISSQLTCGMWAVKPLFDDVGSRKFPFDMWMPVTPESP
HYHIGYTFQLVTICMSAYMYFGVDSVALSSVIFGCAQIEIHKDKLMSIQPVDKNANDAINAF
SDNYQQLVNCIKHHQAIVRFTDTVENAYHTFLLFQLVGSVGIICMSALRILVVDPRSMQFF
SIVSYLSVMISQLFVSCWCGHELTATSEDLHTTLYMCAWKDQNTKFQKELCFAMLRMSRP
LVLRARHYIALSRQTFIMILRMSYSYFAVLNQTVN*-

>MsexOR-33

MAETLLDKSLSKINILFRCSGTNIAIGKAAPTNTKRNRCIYVINFILLNTDVLGAACWFISG
LKIEIVAVFSICAADFVFNLCYITIQRLLQYDIEHVITGTRKSIYNDEMRRGGRIRNKLVEI
IKWHQELITCVNLLNIYSISMLYNFISSVIICTGFNVTSIEVSNVYNSKWYLVPKTRK
TILLILTRAQKPYKLTAYGFADVSLKAFMKVLSTSWSYFALLKTVYSTE*-

>MsexOR-34

MKIFIDNANGTLWLSLNLRRWVGFLVPDNFEGRKKKLLPFYSFFWFMFIVGIYVIVQTGDL
IQVWGDITLMTGTSFLLFTNMAFITKIINVMVRRDAVLAIIIDEGDEVLRSERRIEGKAIKVS
SNQETSRLLYLYGLLTVVTVFGWAASAEGSLPLRAWYPYDTSKSPAYELTYLHQSVAVIL
LAFLNVSLDVLVTSAAVCRCRFQLLALSRLTLCHDIPIDEKHLVSPEHKQIVHERLRLCVL
QHQSILESAKIKTCFSGHILAQFTVSIIVICVTAYTLALETDRNPRIAMFSYLLGMMM
QVFLYCYQGDYLSEESSDIADAAYECPWYACPIPLRRSLLVIMARSCRVAITAGGFSTLSLA
CFVSIKASYSFFTTLQTSRRMSDHESTCCTNSTHHPKIFGSSSF*-

>MsexOR-35

MVVIEKILSFLEDPYPSVGPHIRLLSLTGLWHPDLKSPKSRFKIIIIFLTVAFFLSQYVKCIK
FNTDDLKILQYAPSHMGIKTCFQKDYKIWEELIDFISSVELKQISRKDENLDKVMKAYI
RRRRVSYFFWALAFFSNFSIFTEPYQKNFNVTSTYLYIFDGYTPFSREPNGYYFSMCI
QTMLGHIVSAYVIAWDTLVVSIIFAGQLKITRLYCTRMITANNEESHARNIAECHRFTSL
VKYQKTFNCLISSVMFVYLVVISVNLGVCIKQIAEIEDDLPTLVSSCVFLMACLIQLLLFYW
HSNEVTIESDLVSYSTFQSNWAQSNKNIQKEVALLALTRKKLFRAGPFVMSLSTFVSIL
RASYSFYTLLKGTN*-

>MsexOR-36

MAETLLDKSLSKINILFRCSGTNIAIGKAAPTHTKRNRCIYSFNFIWQNTDVLGAIYWFISG
LKSGKSFTLTIAPCIILSFLSVMKSIISIIYEKKVYQLIKNLRMMEAHERNRENTTERGKIT
EKGVNFLNLVINVLVFNMLVLVCFALNPLILMILNYMKTNEIDFILPFIAYPFDYPIKIV
WPMVYLRQIWTEIVVLNTIAPDFVFCIFCSHITIQFRLQYDIEHVITGTRKSIYNDEMRRG
GRIRNKLIEIHKWHQELITCVNLLNIYSVSALYNFISSVIIICLSGFNVTENKDIVLVISFIAFL
FMGLLQIFFFCFFGDMLIHASIEVSDAVYNSKWYLVPPKMRKDFTSNSNSCPTSL*-

>MsexOR-37

MKIFIHNANGTLWLSLNLMMWVGFLVPYNFECQKNNLLPLYSFFWFMFIVGIYGSFRTRN
LIQVWGDITLMTGTSFLLVTNMAFITKIINEMVPRDAGLSIFYEGDEVLRQRRIEGKAIK
SSNRETSRLLYLYGLLTVVTVFGWAASAEGSLPLRAWYPYDTSKSPAYELTYLHQSVAVI
LLAFLNVSLDVLVTSAAVCRCRFQLLALSRLTLCHDIPIDEKHLVSPEHKQIVHERLRLCV
LQHQSILESAKIKTCFSGHILAQFTVSIIVICVTAYTLAETHDNPIRIAMFSYLLGMMM
QVFLYCYQGDYLSEESSDIADAAYECPWYACPIPLRRSLLVIMARSRRVAITAGGFSTLSLA
CFVSIKASYSFFTTLQQVEE*-

>MsexOR-38

LSLPLQSSHVTMDLNFDMYILTVMFAMRINRSHPSIAKDTKWFLQLLPMYGIFSIMFALLIN

CIIHYDLKAKDFSSTCRNGCLCVLYFISTLSYYVMLVHQTTLKIINTMNEDYAQALKFKA
DEQKVVLDYAKKGLYVCRQWLAMSIMGVGLFFVKNVLLYAYNYVDDMKLVPLHDMT
YPRIIIEKRDDIIYASLYALTYYGVFAAIMYMSFVPLGPVFMHCCGQLELIVMRLENLF
IKYTHEEANEKLDIIRHLQNIYGFVKNIEKCFYELTLKATTITLPIAVYEIIESCHRREL
RMEFLVFIFGAMIISNSPCYYSHLLMENGEQVRLAVYCSGWEVVPPIRRLALLSW*-

>MsexOR-39

HVVSVEFGQLQGLHRLVYARRVRRQPVLHFIIRIPIYHHPPGGTGYPASHPYLHSAESDE
LVIELVGNKNPSWQTHCTSVLVQCCKHYIKLRFSNRLNYICRPFYLTLLVSTMLVCMCS
VKIATSEKLSPTTKYYVHEFCFIQVVHMFCLLGQHVENECEKLEAVLEKWHIFNKPHQ
TNVRIFHTAVSQRMPIYIFGTIPLSLPTFTWFMKTGSSFFTLVMSVLEEENA*-

>MsexOR-40

MTYKNRQHQELEMELSHLPGDYKPLIACFDLLARCNIGFFHGNSSYFKKYWRYSYIISC
VVAYYSSLTVYALKIFLGQMEFELAYVVPVVFVCTQAILKAIIVIIHKGEIRALVLQGET
WRTDNLTRQLNKNLLKLNFCYGVFRIVYSYLGTEFLLISLCSHLSTEFCLLREDLLN
VKPVGNNRRFRILQDSSNIELHDIVVKHQKLIKSEQLNEIFNKMIFVNLSSVTITVCFFAFAT
KVARGPVDMANFMAMALILPIFNLCYYAEMLINASAGNKQESAYHSLWYVANKQYQ
MSIWFIIRRSQKPCCLTSLKFSVALHTFTAVLSTTWSYFSLASSLFENEN*-

>MsexOR-41

DLIIEELVIFYFTELA AISKVLTFVFFRDKLAKILDALEDPMFQAANGREQKIIDGAKRFNKR
YWKIVATVSLTSHATHILSPIVEHLFLSVPLQLPTCRYSFLENTIQQFIYPLYLYQTLGMHSH
LWFNANIDSSFFGLMILIAQLQILDRLRLRTVTDVKKNDDIGQANTSEARANYSLTQLNKCI
VHFDEVGKFCGLVEDTFSMTLFMQFSMSSCILCVLFRFTLPAPFEYYIFLGTVMCMISFI
FVPCWFGTRVMELSVLLCSSVYECDWTAMPKKFKSNLQLFVERAKRPLTITGGKMFMLS
LTTFTSIMNSSYSFFTLRLNVQTHD*-

>MsexOR-42

MASLWRKYFTKEIQVLKRVYEKSDYEDTYETPRKYLKWSGIRMKHNISKSLSICWLVIY
WFCFVNIVFASVAEIIAMCMTASAGTFDDAIAIFQMMPCNGFCGLSLVKSFKMVKHRPVFE
NLITEIGNMWPQRLVDEEEHKKIASSALREIKIFVKGYHWCNNYLMLSFLYPPFWELIKRLSG
EKWEPKLHFIYWLPFDPLQPVYYECMLALQTWQAMTVIWTNMSGDFMFLFLSHITTQF
NLLSVRIRKLIYVPVDQQLIESYPLGQYSEEYLRKNKEPVDSYTPQQWEEKHFKEITEIVLQ
HQALIRLSRDIENMYSLTLLVNVNSPLVICFCGFCVVVEKWNETAYKSFLVTALSQTWF
VCWYGQKLLDSSEGVAEAVYNSGWYRASKKIRRSMLMIMLHGSQKGVGVTTYGFSIISLAS
YSTIIKTSWSYFTLLLNFNSNK*-

>MsexOR-43

MLERLSKYLENPNHPLLGP TLCGLKCWGMWQPLGVNRIIYNAIHFFAILFVISQYVELWFI
RSNMELAIRNLSVTMLSTVCVIKAGTFVFWQKSWNDVIDYVSGLENIQLSKRDITNSVIS
EYTKYSRSITYSYWVLVTATVFTVILAPLVGFLSSDKDLMLNGTLAYPEIMSSRPFNRSR
GFGYWVAEIEHSLICFYGGGVVANYDSNAIVLMSFFAGQLKLLSINCARLFNDNEVLKYS
DTMKRIKDCHHHHVEIVKFSMVLNSLLSPVMFLYVIICSLMICASAIQLTAEGTSMQRIWI
SEYLMALIAQLFIYCWSNEVLHMSSKVDEGVYPSHWSAQNVRRRSVAPRRRATAQAH
RLHSRTLYQAHYIYFCSYSEGIVQLLYAAKQERRLRT*-

>MsexOR-44

FCTIAKTRAKPVNYKINKKKYNFTSITRTRIHFRILISIQPVDKNANDAINAFSDNYQQLVNC
IKHHQAIVRFTDTVENAYHTFLFQLVGSVGIICMSALRILVVDPRSMQFFSIVSYLSVMISQ

LFVSCWCGHELTATSEDLHTTLYMCAWKDQNTKFQKELCFAMLRMSRPLVLRAGHYIAL
SRQTFIMILRMSYSYFAVLNQTVN*-

>MsexOR-45

MDVCIMYLAVSEQLTMTLNSDLYLNRAKFVMKFLGVWVPPNDENIIRKLYRYFMISLQY
LFLIFQIYIIQVWGDLEAVSQASYLLFTQACLCKVTVFHVNVDLLKELLQMNGETFRA
QSFDEKILESQAARIKRLLLAFMISSQLTCGMWALKPLFDDVGSRKFPFDMWMPVTPES
SPHYHIGYTFQLVTICMSAYMYFGVDSVALSSVIFGCAQIEIHKDKLMSIQPVDKNANDAIN
AFSDNYQQLVNCIKHHQAIVRFTDTVENAYHTFLLFQLVGSVGIICTSALRILVSEDLHTTL
YMCAWKDQNTKFQKELCFAMLRMSRPLVLRAGHYIALSRQTFIMILRMSYSYFAVLNQT
VN*-

>MsexOR-46

MVGVSPLPKYNTPFYVITYILVGI AFNYTSHFCMVTDLIMQSHLIPLICQYSVLADCFTNL
VSDCEVGFEGIAREHLVNNKKFVKLYLRKLGNLVEQHKFILNHSIELRTILSVPMLGQLAA
SGILICFVGYQATTTISVNITKCLMSLFYLGYNMFTLYIICRWCEEITIQSQNIGEAICYSGWE
QGMSKIRGVRTTILLVMLRSSKPLIFSAGGMYKLSLTSYTTLVKTSYSALTFLLRIRRE*-

>MsexOR-47

PSPSLRMVRQRGLHSRLLRRSHGLQLPLVLV FCHHRDPERVAGCVLCSHLPCRCGTGLKP
QDSSLDRIICMGILTVQEITSIMVVASYDMTLLFLFSHTTAMFQILYEDVTNFRELAENYYD
SSEMKS AVFERLKNLLIRHSSILRTVQKMQDVYSVVVGIGFGLNAISMCLFFVLPIDVCLNF
APLIFHSLFVFFLYCYQGQRLTTASEKFEIAVYSCGWEHLGVRDQKTILLMLIQAQKPVIM
MAAGVIPIRIRTFAYTLQNIYKFVTLFKI*-

>MsexOR-48

SLDHSQSSNKEVSVICSFQILTVLLDFPHFHYENFSIFNHTHSQSLDFRDWLYEVS WYDQD
KRFTSTLSVLLQCTKKPLEFRAGHYVLLARATFVSVLRCSYSYFAVLQQANEG*-

>MS|comp957466_c0

WIMGLHQIDCFKIHMKFWRFLAIWPGDDDSRSYNRYSKIFISTFV FVYVYVLF TINFYFLPRR
LDIFIDMMFYFTDCSVVSKVLTFLMRHKIVAILDVLESEIFQPDDDDGRAIIA-

>MS|comp163536_c0

RRVAMENQNPPERVVPVQYGRGSRAFRQFKNPPQPHMCIQDTIKGTTEKLYINVLGWQKI
ANPKQYSDPIPLYGGMQVPQNYGPNAGRPPMIVFAVMVNPDILKANGKNATSPDREALV
SLLCDFVEAMNPGALARNPVIMKDRDLAGELKD VWLAVQNKREKGMNQDVMYKV
YDIDGIGEDNMNEDDNNQMKQGGSPNRGSGDKKPKVKSSKQILLNAGQKSEFDSGMNNC
QINQSHLNRDNKTGNTPTTYCTPVYGGQIVSTREHNQINDIQKFASNEIKPSSSFRKDW
NPMHGKTTEGWDEFKRNISTIKNDEKKRCIKDKSKISNGKSHYDFPYFDNKT VNETDV
PEEEDSMNKEQNSNEENSKIIDPMQKLV LHSTDKNICDNNTSALSSISS-

>MS|comp165911_c0

MSRKCNDPNSFCYVCGILTFKKQRQNFTNLVLECYHQCFGFSVAHQDKFWAPHVCCITC
VKNLTDWKKGARAMPFAVPMIWTEPRDHVSDCYFCLTDIKGINYKKKKQLSTLLPPLHIK
LGLIKNFVKGMDRSGSGVLYLKEKFPKISDAKIKEGIFVGPQIRELIKDSTFEEKLSGLEKC
AWNAFKNVVANLLGNHKGDSYRELSELLLSYQALGCNMSLKIHFLD SHLDFPDNLGA
VSDEHGERFHQDISSMEKRYQGKWSPNMLADYCWTIKRDQPEAKHSRKS-

>MS|comp11107_c0

YAYLIMMRHLLSVISSWPLKILDPLDTGAIQRRKIWVSIQRFFHMAVCLSTVVGGMVYVM
LHKKSMTFFELGHLYISLLMTFVIF-

>MS|comp111125_c0
EEEQLFIDITVKKIEFLFRCAGFNIKCSPKTHMDTIKSRTIFIVNFIWMNIDFVGCVVWFITGI
VNSKSFVELTFIAPCVMP-

>MS|comp143892_c0
VGIRLPLFYYPMPERYPLAYTIVVISFFYISHFVMVTDLKMQTHLMHLLCQFTVLGHSTT-

>MS|comp1530192_c0
MSQVVSTCDVLVVVATAGAGVYGAPRRMRKMLKFMENIASVDTSIGGQYSLVTERKLCG
IILGILIFFSVLIADDFTFYALQAKKLDREWEVVTNYLGFYLLWFVVLILELQFAFTALSVRA
RFSAVNDALALTA-

>MS|comp1754988_c0
KAKKFNKIYWKAVAFVSITSNCTHTMAPLMLHFGKGMELIFPVCSYAFFSESFRHMFYPI
YFYQSVGITFHMLYNL-

>MS|comp1789939_c0
NSTPKYIIFKLQGIPGWSGLAPAFGSGRDPGVPGSSPTLGS LHGACFSLLLCLCLSL-

>MS|comp1802501_c0
MVVLSLGISSEIGILKLLYMFLYIDNIRGLTDAFLDFDALTPGSRQASNLLRYMRDVKKRA
IFYWMVLMVNGTIYVFMP LAIP-

>MS|comp2429514_c0
MKSFKALKETLVETKRLVKEDSLESVMFIVNVVFNFGFSYKKDGKVTSWFWILHLSLLF
YVYA-

>MS|comp43532_c0
KYKGFNETFKLCAFSLAFAFLYPNRTTAIKRCVIITAIVTFCGGQLFWFITYTFKCLYTLDIY
NFARN-

>MS|comp790023_c0
EETKTWITFLSSISKLLLSQTILGVLAFAFGPFSLISSNYLKTGEIKLVLPFIVWYPFDELDR
W-

>MS|comp102652_c0
CAQLDIVKEKILSITSINGQRGTREVD EALAKNYNKLVNCKIKHHQAIIKFTELVENAYHPYL
LFQLVGSVGIICMSALMILVVDW-

>MS|comp102652_c1
VSSQITCGMWALKPLFDDADRKFPFDMWMLNPEKTVQYYIGYTFQLVTICISAYMYFGV
DSVAFSSVIFGCAQLD-

>MS|comp1032844_c0
KFLGVVWVPGENG SFLHTGYRAFMMTLQYLFLIFQIYIIQVWGDLD AVSQASYLLFTQACL
CLKVTVFQVNMGM LKDLP-

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S-

>Pxy1OR2a-like

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CLKHYDSLRYKCTHIQDLYDPAMFVQISVGAASNCVILASLLSMSNDKSFIIYGSVMAI
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>Pxy1OR2a-like(2)

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>Pxy1OR4-like

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RMFSFALLVNFNSSFITLFCFCGFCCVIVEKWNEMIIKYSFLTALSQTWLFWCWYGQRLLLESS
EGISDSLYKSGWYLAACKIKSSIIYIMIHRSQKEVHVTTYGFSVICLASYYTTIIKSAWSYFTLL
LNVYKK-

>Pxy1OR4-like(2)

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YYFILNVILIVCYNFWPLLIMLYNYAVNGEIQFLVPYAILVPFSYDSLYTWFPVFFHLISGGFI
CVLYFTTVDALYFFLTSQVCIQFLVLSNELEKLQNEQTKLKDIVKKHQYILSLSDDEDIF
SLPNFFNVIVGSTLICALGFNLTTGELAKMPKFLFLSSVLLQILMMSVFGEHLIQESGRIAD
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KPDIN-

>Pxy1OR4-like(3)

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RILKRRLEIFITGSEIGGELEVAKKFSILAKRHQKLIELVGRLERVYSTSIFLNYGCSSFLICFT
GFNVTTLNDAWSVLNVLVFFSSNVSQIFLICLFGDLIMNSSREVADGIYNCKWYATTPKIRR
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>Pxy1OR4-like(4)

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>Pxy1OR7a-like

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>Pxy1OR10a-like

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FGAHFLMMTIVLVTTLQTLNAWDVRNTILTGTGILPLFLYCFGGELVISAGEEMAAALYS
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>Pxy1OR13a-like

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MLAERRRRRDADAGRVDVGKGVVARPDDYYVMAVLKDCIKHHNSIISYVALIERAFSL
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SL-

>Pxy1OR13a-like(2)

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SIENIPIAKGLKYNMEENTEVGIKLIAIIDHHRDIVRFAANISSFFGPMLAINYMFHLVSGCIL
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>Pxy1OR13a-like(3)

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>Pxy1OR13a-like(4)

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PGIDCYDYFYILTALNVYFSYITACSVLDLLLSLIVFQIIGHIQILNYNILNIPMEGLKYNK
EENSIVIGKHLISIIDQHRYIVRFAATISSFFGPMLAMNYMFHLVSGCILLLECARPDPETLAR
FGPLTIIVFGQLIQLSIIFEFVGYISEKLIDAVYCMPWASMDVSNQKTVKFFLSRIQTPIQLTA
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>Pxy1OR13a-like(5)

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>Pxy1OR16

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>Pxy1OR17

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>Pxy1OR18

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>Pxy1OR23a

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>Pxy1OR24a

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NVKECQNRHAELVKYASVFNGCLSPIMFLYVLVTSFGLCASVYQITIETSTMQRLLTAEYAI
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>Pxy1OR30a-like

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>Pxy1OR43a-like

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FHKVFTVSLHHKEIVRMAVNIEDIFGGAMFCQIVVTGWIFCTTAYRAVDMNPASVEFCSM
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>Pxy1OR47a-like

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PAYRQLIQTCDGNASSMVRIFRVGLGACVVLVPAYPALKHALQAGPRRVEPPVAAYYPVEI
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>Pxy1OR49b-like

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WKVMAAISYLSNSTHVLSPLFTHLLTGADLVPLCSYLFLADDFRNAYIYYCYTYQSIGM
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NKCIHFVKVAKYCGLIEEVFSLVLFVQFSIASVILCVCLFRFTLPAPREYYIFLVTYVFVMV
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>Pxy1OR49b-like(2)

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HYDSIRKYCAHIQDLYDPAMFVQMGVGAASNCVILASLLSMPSEKALYVSVLMYGTV
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>Pxy1OR67a-like

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FDVSTPARRALLQAWARRSERYLQLLLALGTCTLAAWYVYPLVDDLDYNLTVAVRLPYD
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KNENYHSLAWGDKYVKRLGDLVNQHKFIMSNTLELKRIWSTPMLMQFLASSMLICLAGY
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>Pxy1OR67c-like

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YPFDKTVWYFAAYSWEGLMTGIVVMIYMYSDMINIFS VTSICMEFRILGISLKNLVSDEDIQ
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>Pxy1OR85d

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DDGERRNDEDVVLERDIAKAAIKHFDSIMQLFLFCVSVFTFFSLIVSLN VYGSDSL FYA

CCNFIQMHFRLQCQIEFLIGRQWGPNDSTLNEKFKGIVRRHQGLTEIVRQLEFLYSYSSL
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-

>PxyIOR94a-like

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DLARRAKFIHNWAFGLTQVTCVLWTLKSMVMHLSGSEVDFAIWLPFDHNRHTYFYFVLF
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FQEKFKMLLLHYNEIIRLAKGMEYIFGGSIFFLVTGWIFCTSTYRCVNINPMSIDFASMV
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>PxyIOR94a-like(2)

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LDFYRWSRVVFWVCLSMPIITMVMWSFLSRLPTHRGGNAVEFGIWLFPDPNDDAYFTLV
MLYEFTQLTWLGCNDCNVDTFVTILLQQCTTQIRILRLDLETAVERAQENAASEGITFDEAF
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CIVVELFLYCYFGTILTYESMKLTAAYYMDWLRLPSRHRRALVIFMERVKSPIELLAGNIV
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>PxyIOR94a-like(3)

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FQEKFKMLLLHYNEIIRFVINPMSIDFASMVSYMICVLIEIALYCYFGNGLSYESEQLLYSAY
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HI-

>TcasOR1

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SNNRYHGIALKKMRRLYIIIIWTSFSAIAWTGITFVGDSVHNIKDPENENLTITEPIPRLLVK
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TIMLTLAYQATKITGVDKYAATVLGYLLFALAQVFHFCIFGNRLIEESSVMEAAYSCHW
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>TcasOR3

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CIKHHKAIVSFARECNKFYNGIVLGQFFSTIALGLAMFLLSLVTPPLSTESNTLLFYLGATTS
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TFTTILRTSWSYFAVLRQVNGQA-

>TcasOR7

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KLIFLAFVITCSFTVLFWAIFPILDSSEEEKRLPLLAWYPYDTKISPNEYELTYLHQVASIYIC
YSHLNIDTFITALNTYIQCQFDILCDNLKNIKSDTKNVDTKLAKCIKHLLILMFANTSNEF
FSWIIFQFTSSAAITGMTLFQLTVVKPFTEFYNFMAYVTAEVVQIFMYCWFQNEVQVKS
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QVNS-

>TcasOR17

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>TcasOR20

MNSFNWQESIKTNLALRLVGLWPKSDFYKFDLYTFCTSLTVGVIVCGHNLSQIVYILQVY
SDLKALTATIFVASINFLGAVKMYFFIKHIKTVKILFKMLKTYQFKPKNIHQTLIKPFLNLW
KILYVGYSINVYLIVAMWSLLPVLNGWTWQKLPFPARYPFDVTKSPYELAYVYQFICI
WYITVANLNLDTINIALMMYTSCQCDLLCDDLKNLTETRFHKKLIECIKHHKAILVFAEK
SNGLFNMIVLSQIATSTVVLALTMFQLSMVSPLSSEGLNHLFYIGGIIMQILLYCWFQNEVE
AKSSNILYAIYESTWFEASKNSKKNLLIFSIRCQRPIKATAVKLFALSLRTFITIVRSWGSYFA
VLYNVGSK-

>TcasOR24

MEEDFDLSSSLQTTFLCLRCVGTWPSNTYKLDAYTLYATASITICLFGHNFFQTVNIFFIFND
LNTLTGVIFVALTCLVAILKSLFIFNMRRLLKLLLVDIRQKLFKPRNRQQVVMVQSRVNF
WKKIYFMFTGMGVATMFFWALFPIMDGTVKEHRLPFLAWYPFSVKNKSPFYEITYIYQIVSV
FFIVIVNMNSDMLLVALMNLGVQCDDLCDNLKNIQFRERINEEFLRCVNHMMQILSYASD
CNKFFNTIVLAQFFTTVVSGLTMYQLTIVTPFTSEFYSFIVYGGAVLMEIFLYCWFQNEVE
FKSLNIPFASFGFDWTIGSVGLQKNLIIFIAKSQRPIRMSALNLFHLSLETFFVKILRTAYSYFA
LLNNVNSLN-

>TcasOR46

MSKSEKIHTLATYFDSNIAFLKLTAFWIYDDETTRRKKYLQHAYNIFWIFYLVAYQPAELL
YVYYSFNDLSVFLRALRDIGNHVSLEYKAFNYFIMRRDILKLMETLQHGNHYHEDCGDF
QPKLIVDEEKKEALKWTKYFLNFCNAICLSMFANGVFTFIFLSDKQYVERNQRVYHQEQ
PVNTVSPFGSGTKLRFVTFIYTMIALTFYAWTIVALDSLFTIMSCISSHLKILQGAFKTVRA
RFIKLCASLSKLLISVSGKLESIYSTQTFVQTFISLGEMCFSLYLLSETADQNIGNEITYLIATG
FELLMYCWFQNRITEASLKISYALYESDWFPSTLSFKKQIIFTMTRMQKPINVTIGKITPLAF
STFLTIARGAYSFFTFLKQRHGINH-

>TcasOR58

MPFTIKDYDLRNAFETERTLLTSLSGFYPRRTKKYNFFYNTSALINLFIAYGQLFSMVVQMVI
DRNELSKLSETLLFFMTHFTFLCKLTNFVYYKKKMFIEDNLSRKIFYGFELWQIKPKIDSC

KFIAKIFRILCILVFLFYTLVPLYDDKEDLSLPLPGWLPYNTKKYYYPTVIFQVMSVSVSAY
NNSSIDVLCMLITVASAEFNLLKGALKTIDFHPKGHNTKQLIEAKFENCVNHHEIVKFA
YQIETIFSKGIFLQFFASIIVICFTGFQMIVVPIPSMQFIFLIYFSCMMMCQVAMYCWYGHDIIT
TDSIGQAFYMSNWEYSDVKIRKNICIFLERTKKPVILTAGKFVTLSTTTTLRSSYSYFAV
LQHLYKEDS-

>TcasOR59

MDEEFLIGTFETEKFLRYGSFYPCGKRIKFIFLGLFMFVYSWTEFLSMITVLFVERDNLTK
LSETLLFCMTQAAFLKLVNFLYHNKTMLRIESILKNPILNCLDQFEKNIIEKYMIRVKYLA
RLFRILCILTVSFYGLFPFIDEDPDHMLPLPGWFPFDVKTHQIELVIAQTCGIAIGAFLNSTLD
ILPTILITLGSAQFDILKIRLENITSVDTSKSWLVKKAIKKCVIYHTILLNYITQIEILFHKGIFV
QFTASVVVICLTGFQMLVISVRSIQFILLMIYFSTMTCQIALYCWYGNELMYRSMGLSDAC
YMSEWNKCDTSVCKSLAIIMERGKRPVVLKAGNIFSLKLTTLMTVLKSSYSYFAVLQRLY
ATSE-

>TcasOR60

MSEDYTFRNVFAREKKILTISGFYPLREYEKNYFHFFSGTIQWIISLGMFLFSMIIQSVIKRND
LMVLSETLYFLTTHLTFVCKLANLEYHKKLLLDIEDMLKTTRFQKTLSDLIEKTGMNEKI
RKFNLVAKTFRIVCVWCVVLYVLVYPYFDPGKSKTLPTPGWFPFNWTDKYYYGYFFFEVA
GISITAHMDSSIDILSWLLVTIASFQCDILKENLNKIYNYDKEHDIRETFKDCIRHHEEIIKF
TTKVEQSFSQGILLQFLCSALVICFTGFLMLVVPVLTQFANTIMYFCCMMIQLGMYCWYG
HEIMTTSDEIGQYFYLANWYDSSLTLRKDFAIFLERAKRPITLTAGGFVVLSTLNTFRILRSS
YSYFAVLKHLYNKS-

>TcasOR61

MGDYDFRAAFAFEKAIFSLSGYYQRQAGFSSLIICAIASLITIAQFLSMVMQIIVAGNDLTVL
SETLLFFMTHFTYMCKLVNLLFYKSKLLHIEDLLSRPRFYGFSQNELTIKDGIEATNTVANL
FRIFCVLACIAYGLVPYLDHTKAMALPLPGWLPYDTTKYYYPTYFFQMVAVSITASVNSTI
DILTWKLITIASVQFDILKRKLDLDYKLETTSLQIQFKTCVKHHKEIVNYVKNVEKTFSK
GIFIQFFASVIVICFAGFLIITPVLSMQFLYLTLYFMCMISQVAIYCWYGHYVMTSDEIGQD
FYMSNWEYSDVAFRKDIIFMERVKKPVTFTAGNFITLSLVTLTRILRSSYSYVAVLQHLYNE
V-

>TcasOR63

MGFMIQDYDLRNAFSLERKLMVVGFPYKRDNKHEILYWLSAFFNLLISYGQLTTMIIQM
VFDRSDLKLTESLLYFFTHFTFLCKLLNFQYYSKDLIEIENFLTDPIFYGYSFEQLDIKAKI
RSCAFISNAFRICCTFTCSFYCLVPFIDESRKKILPLPGWFPYDTTNYYYSTFFVQSLSLFISA
YCNTAIDILTWKLITLASAQFEILKENLTKIDYEGGFNETKGALVRCITHHAKIVNYTERVE
AIFSKGIFLQLFGSVIVICTTGFQLIVVPIPSVQFAVLGTYLCGMITQVATYCYYGHEVMTTS
DAIGMSLYLSNWEYASHVKIRKIVMIFLEKTKKPTIVKAGNFITLSLATLTQILRSAYSYFAVL
QRLYKDS-

>TcasOR64

MMSDEYVKDVFIANRWMLRCAGLWTPSTRSKLVQIPYKIYAIVVFLFVNVYFTSTEFSLF
YTHKNLYNFIKVNFFLTHFMGAVKVFVFFKGHVLRDLMRTLESPEFHYEPCEGFQPLI
WRKYRRIGFKYSLGFLALAHMTLSSSYIPPLTKLPYFSWMPFSYSTPRSYLLALGYQAGP
MFSYAYSIVGMDTLFMNIMNFIAAHLVILQGAFASSKMRVLDPGQMNNEMKRNCRHLQTI
LRVSEDLERVHRYLTLGQLTATLFICTSLYLSTTPASSKQFYAELVYMVAMGFQLYLYCW
FGNEVTLMASEIPVNVWKADWYDCDQSFKKSMIFTMTRMQKPIYMTVGKFAPLTLQTFV

YILRTSYSIFAVIKNTSI-

>TcasOR65

MTATKSLKEIPPIYLRVHLLTVLQILGIDILPVESVPQNLFYTYTALIISTMCLFTIAEFLDMVL
NYEDIYRLTFGLCYCVTHVLGTVKMFLMLYLRRKKLWGNLTTLEEGIFKPNPTRGGPEELQI
VNDAITMCNRQGYVFYTLVFLIIGARLLYASLANWPYDKHNYFDGNVTVIVNTKEMPYTT
WMPFDYNDSPLYETIFAFQIFSTTVYGFYIGAADAVICGFMMLIKAQFLIVKRELETLIERA
QKAAIAENPDNEDNFGREIERIELLDKRTQDYVAKYANECVYHHQELIALCDHAEEDFCY
LMLLQFISSLLIVCFQLFQVSTLSPDSVEFFSMVCYLLLMLFQLLCYCWHGNEVQIVSGEL
SRYAFGINWIIMRESPKKTLLLLMMRAQRPCYFTAGKFSLLSLQTFMTIVRGAGSYFMFLR
QMNI-

>TcasOR66

MSKNLKEIPPVYLKVHLLTVLQILGIDILPNERIPQTLFYTYSVLLIATMVVFTTAECLDLVLN
YEDIYKLTFLGCCCVTHVLGAAKMFLMLYLRRKKLWGYFTTLENGIFKPNPCRGGAEEFEI
VTSAINMCKRQGYVFYVLTGVGTGGQGLYAALANLPYDKHNYFDGNVTVVVNTKQMP
YATWTPFDYNDSPLYEIMFAFQIFSTTLYGFYIGAADAVICGFLMLIKAQFLIVKRELETLVE
RAQRAGNPDRGDFGGGINRIEMDDGTQVFVEKCANECVYHHQELIALCEHAEEDFCYL
MLLQFISSLLIVCFQLFQLSTLSPGTFFFFSMACFLFILFQLLCYCWHGNEVQFVSGELSR
YAFSINWIIMRESPKKTLLLLMMRAQRPCYFTAGKFSLLSLQTFMTVVRGAGSYFMFLKQ
MNT-

>TcasOR67

MDFTIRDFDLRNSFSLERKLLLVLGFYPIRDKEKHRILHQLSAFLNLLLYYGQLLTHIQMVI
DRNDLSKLT DSTLYFLTLFTFLCKLFNFQYYGKDLIEVEKSLTDPIFYGYSFHKLQIIKAKVR
SCTLVCLAFRISCTCSCFIYSVVPFIDRSGQKTL SIPGWFPYDTAKHFYITFFLQSLSLFISAH
CNSATDTLPCKLISLATAQFELLKDNLR TIDYENSFEETKHALVKCITHHRKIVNYTKRVETI
FSKGIFLQLFASVLVICTTGFQLVIVPFGSLKFAIHGIYLCAMTAQIAIYCYGHVDMITSDEI
GTSLYMSN WYASHIKIRKIMVIFLEKTKKPTIVLAGNFITLSLVTLTQILRSAYSYFAVLRRL
YADD-

>TcasOR72

MAKLEYLTGATFTLKCAVLYPIDSNNPKIKKILYAVWAIFILTFVTGFIQCFVFCINPFDLV
QEAMIIMS L V FYSTTFFYFIVFYKNWQNMVALVTNINKNFHRATDNVIEKISMDQASELSD
KLAYVWTSSLA VGSVVPVVLAIATGNLEMPMPAWFPYDYNKSPVFEITYLWQVFCLITLAI
IYGASDMFFPCITIIIGQQFKILASNFKNNFYTSLIKLGAESIVQNFSDIKTHEFRSFYIKY
GNIFKILNNAKFQTLNRAFLKRNKHHKLLLRFCEDLNKILNTFLLIRVSAIVFNLI FIGFNIII
NADFLWTL Y ECPWYLCDVTYQKMLILVQMRVKRMVSTKAGNFFTMIAPSFIAFQRAVFS
YITLLKEVTDLGKD-

>TcasOR73FIX

MTRKHIFLNFTVTILKLSFLWPSNDNYDQWRLVKDASLIVSLMPCALPILAHFVLQITGDV
YNMV TITENLIALICIIGMIYMTICFVKNRKLVKTLVKNLPAFTKYSKTTDIILTDKKNLYT
KIFV FYGVIGNVVY MIMPYL NIEKCQQRQNDVPCGLVTRCWFPFKFDYSPVFEIVFVHQ
FYTCLMVS V IILDLTMLICGFLMHITNQLKHLRGFIKRFDCSSQKIAEDVIYCVKFHTAITY
SEKTNEAFGTMMMLHITLTSLVISALGFEILVDNFNDSL RFTLHLLGWLVL LLL LICYYGQL
LIDESIAVAEDIYYVPWHLAPVDVQKDIYMILMRSQKPLTLNAANIGVMSFPTFLRVISSAY
SYFTLLLNIKS-

>TcasOR76

MMESTVTRLKRMYLWPTASVTSRKPFFLITFSCFLLYGSVMHLIVNDISMEEVHVIETTA
GQFGVLYYLTFTIYRKGILEIYADLSNFTKFGKPYNFDKRNKQLNQWSRWFSVVLYFFVI
SVFAWPGIFTQSCEDLNVALNKTEVCGVWVSPVWLPFRFDYKPMKQFVYFWQSFCCLYSN
GGAGTISFAMSETIEHLILRVEDLKILFPKIVAERSPEVRRKMLAKWVDYHLWLLSIGKLM
NDTYRYSFSVIVLCAGTLFGCIGYTMKNASTNFNSSIFFGWMESVVICVCGQRLMDA
FHSVGTTVYNSEWCDDVDFQKGVILITIRAQKPVRIYAGPFSYVSHLLILTVFQTSYSYIN
LLNASS-

>TcasOR77

MKYILMKKTIAFLSVTGFWPKTKESTKTRAFILFSSSFLFGSLGYLIVYRKFGSDDIDSIE
TATSHFGVLYFMFFWILKRDGLVHIVNLLSDFSKFGEPFFNDRNRQLDYLLQYCFVLSVA
TGGVFLCPIIFVKNCEMVKQEKNLTKVCGLVSNVWAPFDYSEYPMKRVVSLWESYCCFIN
FGCGGIMSFTMIKTMEHLHIRVEQLKDMFPDVVNEKNLAVRKQKLEKWKYHLHLYDIG
ELMNNTYRYCLSVIVLCVILFGCIGISTMQPGSSHNSLFLFMGWQFQSIICLMVGQRLLD
VFLSVGVMAYDSAWYEKDVDFQKAVLMIMIRARRPVLIYAGPFTNLSHLLILGVLQTSYS
YINLLNAK-

>TcasOR78

MGHAIMTEILTYLTLMGFWRSPKSSKASAFLIILSTSFLFFGILFYLVNRRQFGSSEIDSJETI
TSQFGVLYYLILFTWKRNDIVEIVELLSDFSKFGKPPFFDQRSTRNLNYRLSCIVLILIVANIVV
AALPVIYIDSCHKANEQLNLTCTGLIAPVWLPFDYNEYPRKHLVFAWEVYCCVMNYVG
SGIGALTMVGTMEHVIRIEQLKYIFPKILDQPNPIREQMLKNWVRYHLALFEIGRLMND
AYKWSLSVIVLCVGFALFACIGISMLQSTASQINSICLFFGWFPFIAFLCMWQRLDSSLSV
GTAVYSSRWYDMDVAFQKSVLMILIRSQKPIRISVGPFTHLSMLLLLGVFQSAYSYINLLNA
TS-

>TcasOR79

MGHVIMNEILTYVTLGLWPRSRKSTKTISYLIILSSSFLFFGSLLYLVVHRKFGSNEIDSJET
VTSQFAVLYYMTFFTLKREGTVRIIDQMSDFSKFGKPPFFDQRNRRLNYLLSYFVLCFVAI
VGVVALPAIYTGSKHANEQLNLTCTGLVAPVWLPFDYNGYPLKFLVFAWEGYCCIIYA
CSGISSLVLVGTMEHLIRIEQLKLMFPEILNEANRHIREQKLNWVQYHLALFGIGKLMTA
TYTYCLSVIVLCVILFGCIGVSTMQSASSNNSVFLFLGWQFSLIVLSVCGQRLIDTCLSVG
IAVYNSRWYDMDVSFQKSVLMILIRSQKPIIYAGPFSYLSHLLILSVLQTAYSYINLLSARG
-

>TcasOR80

MGHVIMNEILTYLTLGLWPRSRKSTKTVAYLIISSSFLFFGSFLYLIHRKFGSNEIDSJET
VTSQFGILYYWVLFLLKREGTVEIVERLSDFSKFGKPPFFDQRNRRLNYLLSYFVLVLMVA
IGGVVALPVVYIDSCHKANERLNLTCTGLIAPVWLPFDYNEYPRKNFVFAWEVYCCIMT
YACCGIAALVLVGTMEHLIRFEQLKLMFPEILDEPDRHTRQQKLNWIEYHLTLFDIGKL
MTSNYTYCLSVIVLCVILFGCIGVSTMQSASSHNSVFLFFGWQFQSIGVLCIWGQRLDTC
LSVGIAYSSRWYDMDVSFQKSVLMILIRSQKPIIYAGPFSYLSHLLILSVLQTAYSYINLL
GAKG-

>TcasOR84

MTEEKELRLCLWSCYYLKLMLWPLKREEFKSSKGLYLRLLVFVIISGSTFTAMIFMHLK
SLKVGSYDVSEDLAILASNIGYVLMMTMYVSRQKDLELLLLDLSDFKTYGKPPNFDKVR
KRMDLYAHLIFFYSMFGSFVYNMDKIILIDKCKEARRINEVCGSAIPFWTPFETEDLFTLTL
VITYVLINIFVVVKVAMTVSVQVLEISSHINLRIEQLKIFIAGCFDRDFKASRERLDFCIRYH

NVIIDFSERFSRCFSYVMFIHLAITGIIIGCLENQIVQEHQPEAMLHMGGWSTATFIACYGGQ
LLMDASTSIADDEFYNCPWYEADV KMRKDLILILRAQKALFVSTGPFNVLSFALFVSIMKL
SYSIFTVLS-

>TcasOR86

MALNQEDAICSKSCFYLRYSFLWPPEAPTRSFYAKFILVLILSFLTAFLPLFIHFLILVERGLD
PSEDLFVIISYTGFEALIMIIYVIHVKKTSYLIVQLSDFEKFVKPRGFDYWDKKFRLISSGVYY
YVLIASSGLNLGRWVGMAECKERDFQVCGIVIPYWLPWKVDSWLFILLDLYVLKMTL
VVNCALFLIIIQILEITTHLKLRLIDHLKEMLVKCFDSDSQTNRKQLVNCIRYHTYIINCSKLF
KKCFTHAMFSLIVTMALSCGCLESQVVKFDLWALPPISAWIFILFIACMAGQILMNASLSIG
DAGYHSKWYQTDANFRKYLILVLMRSHKALVLSAGPFNILCFELFVAIMKFSYSVFMLLN
QN-

>TcasOR87

MKHVIMDELLIFLTLGLWPRTPTSPKIISYLMYIYSTSFLFFGSSIYLILHRKFGSDEIDTIEIIT
SQFGVLYYLLLVVVRDGTIKIVNLLSDFSKFGKPPFLDQSRRLNLLLRLFVTVLLAATVA
IVSVPVVFINSCKNLQNLQNLATKICGLAAPVWLPFDYTNPRKYFVSAMEIYCATMNYAG
SGSGAFLVIGTMEHLVIRIEHLKKNMFPEILNEPKQIREKRLKKWIEYHLSIFEIGELMNETY
KWPLSVIVLCVILFGCIGVSTMQSVSFQNSSVFLFFGWFQSIFVLCFWGQRLLDSDSLSIRK
AVYNSKWHEMDVSFQKSVLMILRSERPVLHAGPFSYLSNLLVLGVLQTAYSINLLNAR
S-

>TcasOR88

MTEEKQLRICLSSCFKWSFMWPTKSEEFRTSKGLYFRLLAFVIISGLTFTAMIVMHLKLS
VEAGDYDISEDIAILATNTGYILMMLLYIIRQKDLESLLVDLSSFKKYQKPPKFDEVNRKLE
WCTRMVFGYCVFGSVFYNLVKILAI PSCCKSRRINEVCGVAIPYWVWFDTENWSIKLPLIL
HTFLVIIIIVDKVTLLVSLQVLEIACNIKLRDLQNLNMLVSCFDGDVEASRRRLNECIKYHKE
IISYSEIFSKCFSIEMFTHLTTTGIIICGLENQVVQEHPEAILHIGGWITAFVSSFGGQILIDS
SLSVAEAAAYSSAWYEADVSLRKDLILVILRAQKALFVSTGPFNVLSFALFVSIMKMSYSILTI
LQ-

>TcasOR89

MKEAVLQQSKKEMHLLNLWPKGHVKHFRFRYVITLIIVSPFTLGLTLTHFINVLKENLDVDL
SGDISVIAVVTGLHFMLITFVWGHKKIAYLWENLGPHEYFGKPDNFEKRCCKQLNFYSRLYA
YYCYLGLTVYIIMKNRGGIECRRLNVERNLTICGLVTTFWAPFDIDFFPFRQILFVDQVFAT
YFIVKGGAAISFTTLEVGEYIILKIKHLKRLVKEVFDDPREEVQRKKLVFCIKYHQYIISIQE
LYDGRYKHCNGCYILMVGIIIASLSNEIMKNHNIEALLHLVGVVFSFYICCFSGQSLLSESL
TIPDAAFESKWYEAPVYMQKDLLMMLRSQKPLMLHATPIGVMSLSLFLITLVKTSYSYFT
LLNQST-

>TcasOR90

MAKDTSPVLRESIEVMKYLLQWPQNERTNLRRRYFIVIFLCSPLHLGLATHLVVCLKDNLD
VDLSANIAVLSAVTGLTYMLIVFVWSQDKLVHLLAKLDTHEIFGTPDNLTKRSRRLNFYAK
LYSYCYFGIVYISLVQIIEMPQCRKMNEEKGLSEICGMIVPFWAPFDIDWFPLKQIFWLNQ
LLGIYIIKGGAAVSITTFEVAQYICLKIKHLNRLLEAFDDPCDVVVEQKLLHCIRYQQHIIR
TNELFNVCFKHCNGCYVVMVGIIIASLLNQILKEKSVGALVHFAGWICSFFICCHAGQAVIS
ESLTIPEAALDSHWYEAPVKYKKVLLLLLVRSQKAFNLQATPIGIMSFDLFIALLKTSYSYF
TLLHKST-

>TcasOR92

MKNQEIKICRATLTVLKYSLIWPSEADEMNPWKWYYIRVVTFILFTCPWVLSVFMHLIVSIR
NNADIHLSEDAVMVAFTGVYYMTIIVVKKQPKVAFLLRDLSYFQFGKPPGFDETERILGF
LSKLTFCYSVMAVVIYNYIKYRQKPECERMNKLKGLKENCGLTPTWWPFEINYSPAFLQ
IFLYIFTSTQVMMKLSLMISFNVLEMAHHILRINHLKTMILESLDEQDYEASKRKIKTCILY
HLEILGFAERMDDCFNSGMFAHLTITAICGCLEKQFVDGDNQLGSLHIFGWILALFLAC
LGGQHNLINASETISDAIWSSKWYDADLRLRKDLIFMMARSQVGLYLVNCGGFGILSYALFLS
VIKMSYSILAMLTS-

>TcasOR93

MTNLEIKICRATLKILKYSLIWPNEADEMNPWKWYYIRVATFLLITSLWVLSVFMHIVMSII
HDADVHLSEEVAFCVAFCLYMTIIVVKNQPKVALLLRDLSKFQFGKPPGFEEKERILG
FLSQFFFYCVMAVMVYNLVKLLQKPDCEKMNEIKGLKENCGLTPTWLPFDINYFPAFH
LTFLYVFISTQILMKLALIISFNALEMAYHVILRIDHLKIMITECLDQRNYEVSRRKLKTCILY
HLEILSLSNRLNDCFSNIMFAHLTITAICGCLEKQFVDGDNRLGALLHVCWISALFVACI
GGQHLLNASLIPDAIWSSKWYEADVRIRKDLLFMMAKSQVGLHLNVGSFGVLSFSVFFS
VLKMSYSILAMLTS-

>TcasOR94

MAIKICKFTRKNMQISLIWPREFEINPGKWYYIRIVIFLITYGVFPFCTFLHAVVVIHNNLDI
RISEDIGAVVSNIGISYMAIIVVQQNQIAYLLKDLSDFKDFGKPPFFEEENKRLNFWISICTF
IYPTCGASLYNLSKILEKSECNKINEENGLPATCGFIFPIWVPFNINYFPLFHIMLISTWFCTT
MFVRLHLSISYNAFEIAHHILRIKHLNGMIITCFDCQDYKISRQKFTTCVLYYKQILDLSNR
LNQSFSSIMFVHFTMTSAVCGCLEKQFVDGEYVGGFIHLVGVIIISLFIASVGGQDLVNASQ
SISEAIWSSKWYLADIRLKKDVLFMLMRSQKDLHMSVGSFGVLSYAFFVSVLKMSYSILA
MLTS-

>TcasOR95FIX

MVVKESEIKVSRVTRKILQYSLIWPKEGDEINPGKWYYIRIFTFLSFTSLWCIAICMHFIIVL
KDKIDWDVTEEIAIIAIYGTYYMVLAYVKNQKKAARILRDLSNFERFGVPPGFEEEEKRL
KVYIIGIFIYAFLTITFYNFFKLSQKGACERFNEEHLDENCGLLSPVWIPFKVDRFPQFELV
FLYLFTCCHELLMKLPLVVSYNALMVMHHILRINHLKIMITECFDEPEYEISRRKLTQCILYH
IEILEFATRVDDCFNSCMFAHLTLTGAICACLEKQIVAGISRFGAILHFIGWILALFIGCLGGQ
HFINASDTIPESIWASKWYNANLRLRKDLLMMMRQRDLHITAGPFGVVSALFLSVLK
MSYSILCVLTS-

>TcasOR97

MNNQKIQISNMTRKVLRYSLWPKTNEELNPGIEYQFSVLGFFLVTVGLVLCITIRFFITIKA
VHEVDAEVLAILIASYGSYMICAHKLNQHKVALLMRDLSVFNNFGKPPNFDKRNNQLN
FVAKLLALYSFLATIFYNGEQLINKTECKRINKEKGLSDHYCGLLAPCWLPFEIDYFPVFHL
ILYAFSTGYLLIKMAIHISYNAFEIVSNIVLRIEHLKAMILETFENRNKQVCHKKFLQCILYH
IEILDFAARLDDSFNSMFGHLALTGGICACLEKQIVSGVNVVAGTLHFIGWILALFIGCVA
GQYLINASEILPSAIWTAKWYDADLELKKKVLFMLARSQKSLFIRAGPFGILCYPLFVTVL
KTSYSILCMLTS-

>TcasOR98FIX

MVKKESEIKISRVTRKLLQYSLLWPTEGEELNPGKWYFRIFAFLSFTSLWCIAICMHFIFV
MKDKPDWDPTEEIAIIAIYGTYYIVLAYVKNQRKAAGILRDLSNFDKFGVPPGFEEEEQRL
RVYIICVFIYGFITITFYNFYKMSQKKSCERFNIENLHENCGLLSPVWIPFRIDKFPYELVF
LYLLTCHELLMKLPLIVSYNALEMVMHHILRINHLKIMITECFDDPDYEISRRKLTQCILYHT

EILEFATRVDDCFSNCFMFAHLTLTGTICACLEKQIVAGFSRFGAILHFFGWILALFIACLGQG
QFINASDTIPEALWASKWYNADLRLRGDLLLLMMRSQRDLHITAGPFGVVSYALFVSVLK
ASYSILCVLTS-

>TcasOR100

MSPKDKIKICGITRKYVLRYSLLWPVENDELSPGIRYKLTILAFFSITGILVFSISVYSVLEIKQG
YDIDVEDVAILIAVYGTYMVSAYLNNQHQIALLERDLSQFYKFGKPPGFEQLNSQLNFAV
KVLIIYSFLGTFVYNGTKMLLREECKKNSQEKGLSDNHCGLIATFMFPFRVDYFPVFYIVL
VITFLLAHTLIKLCMHISFNAYEIVNHIVLRIEHLKEMILSCFNERNQTIVQKKLRVCILYHIE
ILDMAARLDKNFFNTMFGHFALTGAICACLEKQIVLGVNIVAGTLHFHIGWIIALFVGCVAG
QCLLNASEIIPNALWAAKWYHADLRTQKTLLFMLARSQKELTIKAGPFGILCFPLFVSVLK
TSYSILCMLTS-

>TcasOR102

MQNQSKPCQLDMMDETYLQFFVKSFTYLNMLPEKTTTCTTIQQYYVSVIITITTFPILADL
VSQFYEESISFTSVNENFVALSALFAVIYVSVCFINRKHKIRALIADLALFETFSSKAVITETD
KSVKFYTKLFIVYGIVGNLCYGLLPILGYKKCHESKSVHMTRYGIPCGLVVRFLFPFKFDY
SPLAELVALYEILVCILGTSVVIVVTTLICGVLIHITVQLQCLRKIILDLSQVNDLEILEHKMK
FCVKYHTAILDYGIRTDLAFNQMMLLHITWTGFIISVLGFEISTDDYVEAFRFFMHLLGW
LGMLFVVCYYGQKILDESLAIADAVYTFWLWYKKSIVVQRYVLLILLRSQKPLTLRACGVK
VMSLATFLGVLYSAYSFYFTLLLKLP-

>TcasOR103

MKQALKLADVLGFNPLKNDNLTKLKKYSSLICMISVVVSAILEFVSNFSALETYESAPESL
VPQFQTLAKISSLLLSQKDITELIDEIKYFWKLDQFGDFHTRKLLKIYKYVTIFFYFYTLML
SGACVLFITTTVIFTPEKPLFLCYGGLHGLPSPQFEIYFVVDLAAIVIMSGVAAYDGIFFYF
AFHVYAEFKLVKVAFKGKSTFIEAVKHHDFLLKYLRKLNIEYSPIFLCQFFSNLLGICFCLF
MLSRSGMPPELTSFSKYFISLVAFTVQTYIFCLIGDLVSELSLDISNVIFYVDWLDDEVYKSK
TARLVIMNKAQSPVKTIGKFTGMDLRTFLLIVRNAYSFLAFVNNALD-

>TcasOR105

MKPALKLANVGLDPLRNDNYTQLKMMFCALCIVSLFVSAYLEFFSNFTTFETYETAPESL
IPHFQTMFKMYSLIFSRTEIVELIQMAEQFYKFSQCORDERKCLKLYKRVDLFFYVYASLVAA
ACVLFIVTLIFKPGKPIFLCYGGLHGLSPFEIYLVVDLIGIVIISVTPAFDGLFFYFALYI
YTEFKLLKIAFKTMSGQELREAVKHHDFLLKYIKLNSVYSPIFLYQFFCNLLAICFCLFML
SRSGIPPEMVSFSKYFLCLLAFLVQSYTFCSIGDLITELSEDVSNAIFYTDWLDDEAYENKT
ARLIIMSRAQNPVMLTIGKFANMNLRTFILIVRNAYSFLAFVNHALN-

>TcasOR106

MESALKLIDIIGLHPLKSDKYSTMRTISFLSLVVILISAQLEFLSHLSVFEVYNSGPHSTIPP
LQSLLKMATLHFYKNELIDLMEKSKSFWKLDKFGDLYKQELSKLHRLVTIIVYIYIALLTAT
CVQLAVLTLIFRRGKPIFLCYGGLYGLSPHYEYISILDAIGIGVISIAVSGYDAMFFFFALDI
YTEFKMIKSAFKRHSQTVSSYNKQFIEAVKHHDFLLQYINQVNDIFSPMFLQFFSGLLGI
CFSLFMISRGLQDINTLSIYSAGLLGFTAQSYTFCLVGEVISELSEDISNEIFYTDWLDDEV
YRNKTAILVMNRAQESPKLTIGKFADMNLRTFIMIVRNAYSFLAFINNALD-

>TcasOR107

MENPLKLLHIIGLDPRQSDKYSTIKKVISFLIVLAVLLSALIEFFLHHNESQVYDTAPQSTVP
NLQALLKMFALIYKKEIDLFTKGNHFWKLDKFGDCHKQKLTCLHXYVDLFFYVYAVIIT
GAFLQLALLILIFEPGKPIFLCYGGLYGLSPQFEFYAVLDFLAIGVIAISVTAYDSIFFYFALY

IYTEFKMIKIAFKRENCAQFIEAVKHHDFLLQYISKVNEVFSVIFLTQFFSGLLGICFNLFMIS
TQGTRDMKSFSTYFVGLVGYTAQSFTFCLIGELISELSEDISNEIFYTDWLDDEVYRNTTAR
LIVMNRAQESPKLTIGKFADMNLRTFIILRNAYSFLAFINEVLD-

>TcasOR108

MGSILLNSVLKMEKALKLVNIGLDPRKNDTFSKFRSIFCFTILISASFSSHLEFFLNFKG
LETCEAAESIIPQYQTMCKMATFLLYKTEMLDLIKKSERFWKLDREFGDLQAKNLHSTYPI
FQIFFYVYVILFLTCAMFALVNWIFDTGKPISLCYGESEGLETPWVEFYIVLQSVVEVTIIFL
GITGYDMVFLYAGSVCIQFQMLKMAFAERKMNERQFLKAVKHHEFFLLQYVEQLGDIYS
MWFLQYFSSFLGICFGLFLISKEGLPTEPERLSKYFPYIFSFTMQSFTFCMTGTMUSDWSS
EISDEIFHSDWSDDQVYKNKTARLIVMNRAQRPAKISIGKFLDLNLRSFILLMRSVFSFLAF
VNNILNRIN-

>TcasOR109

MGKVKFTEPLEFLNVVGLNPENCSNFSLFRRVISLGFLLVITLGLLELLHFEGLTCSRA
SEAMIVQYQLFIKIAVLLKHRKNLVVLMQKTRKFWPLDKFGQDAKIERPHKLLKAFFAY
KLIMILMALQYILRKFSKNGKPLAIAFGESKGLSPKVDHLYFVLHSTSTFVVLHAVTGFD
RLFFFLIGHVTELKLVKKSRYRLTQNRREKFLQVQHHAFALEFVRKLNRIYSQVLLNQHL
SCLFGICFGLFLVSKDGIIPDLGHVTKYVPYVISFITQTFTEFCFIGSLLITWSLQVPDAIFYND
WGKNQAYKYKTDKIIAMIRGQRAAKLTLGGFGDLDESFNLVVKNAFSFFTFVNAMNQK
-

>TcasOR110

MDKVEFSDPLFFLNIVGMHPFKADKFSKFRSLAFSIAVYFAVIFSGVLELIVNSQGLETYARA
SDTLIPQCQLVCKIFVLAKYKKQIARLLNGSQRFDLGGQFGARYGNSFGKTHKYLSFFL
LYKVMLTFTCLQFLAVKIIFKIPKPIAISFGETKGLEPLYDHLVYLVHAMITLVTLNIVNGFDG
LFFYFIGHVTELKMKVAVAFGDSPINETNWSEEKRFKFAVRHHRFVLDIEQFNIVYCTMLLV
QHLTCLFGICFGVFLMTKDGVPDDLDRASKYLPYIVTFIFQTFTEFCFAGNLLSWSLEIPNEI
FYHDWAKKTTYENKLAKIISMKRGQRAARLTLGGFANLDDLSFRMVLKNALSFFTFVNA
MMNKKAVTSV-

>TcasOR111

MEKVRLEPLFLLHIVGMSPHDSGTFARIRKIFSILVYTSTVVLSMAELFFNYKDLETVIRAT
ESFFTQYGLAWKIAVYVYKTELAQIIRLCDNLWPLDEFGTGHNQFLHKLRRFFLLYTG
NLALLCTQFAVTAFFDDQFKSVMVYYGEKESRSQIYDNFVFTLQVIYLYVGCFFVAGFDC
FFFYLLGHAVTELKMLTISFSCKEIGRNWGYEERFKCSVKHHIHVLELLDKINKVYSVMLL
NQHLCSLFGICFGIFLMTKDGIPPNDHFSKYSTYIFTFILQVWTYCFAGDQIMHWSLKIPD
EIFYDNYWNKYSLKNGLNKIIAIQRGQKAAGVSLGGFAMLDIESFNVVIKNAVNFMMFMD
KMYKRE-

>TcasOR112

MITRLMAQFAIKGRVGTGGYIMDKVKLAQPLAHLNIIGLDPLKNDRFSKIRTVITVAVFALC
NVFSSELFLHYNNPHVIVRSSEVVPFFQNDWKIAIMLVYKKNLAQLIQNTSRFWQIDAF
GKNYQYSMGIKHKYVRIFYLVYRLMLMFSCSYILLTIGSDRPMILSFGETGGLGSGALLF
YLIFHIVYLLIIFNVINGFDGLFFFLVAHVLSLQMVKVAFSSSKVITFWNHKRRFKSAIQHH
RFVLDYINRLNSIYISILLNQHISCLFGICFGLYLFISDGFPPDYEHISKYVPYVIYYITQVWV
FCFAGQLIIDWSVNISDEIFYHDWTLNRTYENKTDKLIQRAQHAARLSLAGYGNLQLQSF
NLVLKNGLSFFTFVNAVIHK-

>TcasOR159

MRGKTIESTTNPYSSLKKVFIDFAYSKLVISYTKASLTFHVLSLLEVYYLVTNFSVELICRY
GMMCLMTYMYSKKLLLEKPCLLDFWKVYNSSTATQRLISEKSSKTNRRLYCALTCCFF
LAILFPWIWGDLEFFIFSQVYEKYFTSWAPAFCYFYVSTLLWCCFYCFHLPGIIMYLTLHLD
LQFKLIKDKITEIDKNCSQKEIYQILRLCISHHVALKKWMDKLDLVTIMPPFFLFGALNSI
ATSFFVLYTLQNTTMILKIRLGTTLTLCNFIIVSTFAEVGQIFSGQNNSLFEQLMDCSWYLWNI
KNRKTLLMFMLNCMKPKTFSWGGITLNYSFVLFILKTSLSYASVLFKLRGETF-

>TcasOR160

MSGKTKRITTKTIHLSNPYSSFKKVFSDFAYSKIMIFYTIATLAFHMLSFLQIYYVATNYSV
ELICRYGPMMLAIYVVTAKVVGVFYKFTFMLENQCFLVWKT CNSSPTTQRLILNKSL
KMNQKLHLALMSYFLLAIVMLPTWGDLELFFIFSQVYERYFKFWAPVLYYFYISTFLWCS
YYSFHLPGCILYLTLLLDVQIKLINDKITEIDQNFSQNEISETLRLCISHHIALKRWMSTLAK
MVNSVMPVFLVLLGALSTVAVSFFVLNTLQNTTMILKIRLAILTVCNFVIVSTFAELGQIFSD
QNNSLFEHLIDCPWYLWNVKNRKTLLMFMANCMKPKTFSWGGITLDYSFAISILKTSFSYA
LILFKLRGETIRN-

>TcasOR164

MSGKTKRTTTRKINLANPYSSLKKVFIDFAYSKIMMFYTKATLAFHVLSLLELYYVATN
FSVDLICRYGCMICLMTYVVTAKVVGIMFSKPFKLEKQCLFVFWKTYNSGPTTQRLILD
DSLKMNRLYLALMFYLLAIVLLPVWGDLEIFIFNQVYETYFKFWAPVLYYFYISTFLW
CCYYSFHLPGSIFYLTLHLDLQIRLINDKITEIDQNFCQNEISETLRMCISHHIALKSWMSKL
AKLVDVAVMPVFLVLLGALSTVAVSFFVLNTLENTSLILKIRLTTLTVCNFVIVSTFAELGQIFS
NQNNTVFEHLMNCPWYLWNTNRKTLLMFMLNCMKPKTFSWGGITLDYRFALTILKTSF
SYALVLYQLRGETN-

>TcasOR165

MSDNTKKATTKSLDLTNPYSSLKKVFINFAYSKIMIVYTSATLIFHILSLMLEIYYLATNFSV
ELICRYGMMCLITYMVTAKFFGMLFSNQKFLEEQCLDFWKAFNSGPTTQRLILKESSK
MNRKIHLALTFYVILAIIMLPWEDVNDFFMFSQVYENYFANWAPVLYYFYISTFVWCSYY
SFHFAGVIMYLTLLLDLQFRLINDKITEIDQNSTQNEICGTLRLCISHHIALKRWMNKLANS
VDTAMPVFILLGALSTIAVSFFVLNTLQSTSILKIRLATITVCNLIVVATFAELGQIFSDQNN
SLEHLMDSPWYLWDVENRKTLLMFMANCMKPKTFSWGGITLDYSFALSIFKTSFSYALV
LYQLRGNTF-

>TcasOR167

MAKTGDIFPVRDPVKRCLFIPKLLLESTNFWPEKRNFLTGFANWVMLIICVLIESGQIAFVV
VNIKDITKIASAMSTVSTTFQAITKLTVLYIYNDKLRLLILKSVWYEFWPSYTAGREINTKLE
TYNKIVIVSFLTILISGICFAFGFLSSPLISGERILPFETVYPFDWTKSPYIEIYVTEWMTNIA
FILIGICGHDFLMGLCSNVVGQFTLLRELFYLGTKNVAQIIKKGHDTNIEPNRQLLRICI
IHHVRVTEICKEIAEIFSFCFIQLLSSVTALCVGALIMTFADIDAALFTVSSAYIVGHLLQLF
LYATLGNEVIYYASRLPNAIFHSHWYNIDLEVKKDILFVLQRAQKEVKISAMGVSVDLYQT
FIQVLRLSFSFYTMLSKVTDH-

>TcasOR171

MVKLFLLLKHLTMKAQSDNPYIVLRRVFDFAFTSHMIIYTKITFVHFLLTLLLETYYMIT
NFNVELFSRYGMMCLMTYSNVQIVLAKLLEILFARHIKFLLEEERLSHFWKLEESSEETQK
VVNAESSKIRKKTFFVLSWFVALGFVLFPIFGDLNDFMFRVYRNYFGSWAIIPCIVYST
FPSIAYNSICLPAVVSYFIFHLNLQISLINDKLGKISEKSRQSEIYQKLCSCVAHHVRLRRWT
NIFQNELESALPFYFLGAINSIASFFILYNLQNMTLIFEIRLVVISVCNVLILWIFAEAGQEF

SDNSDSIFDAVVACPWYSWNAQNRKIMLIFMLNCLKPMTFWSGGVKLDYQFTVTIVKMS
YSYALVLYNWRYEK-

>TcasOR172

MSFQALKHLLKMCAEKTPDLNPNYLTLRRVFDIFPYSKSMKIHTCITLLFHFLSLILEIHYL
VTNFSFELSSRYGCMMLMTYVISVKIFVIMFAKPLKILEEQRELHFWKIGDSSHAMQOSV
ATEALQVKKQTYFALSFCVLLAVILYPVWGHVNDLFMFSQVYEKYFGDWSVIPYYFYVFT
FMSSSFNSFQLPGVILYFTLHLNLQISLINEKITKISGENYCQDEVFKQLRDCISYHVALERW
MARLIDLTKTAMPVFILLGALSSIAVSFFVLYSLENTRFILKIRLTVVAICNVLIVATFAKAGQ
RFSDKTGLIFDAIATCPWYSWNVPNRKIVLIFMANCLKPKTFWSWAGITLNYQFAIKIVRTSC
SYALVLYKLRNGNY-

>TcasOR187

MSTKREVVKNFPPYYLFFKICIDFGYSNVVKRLNICCITMIVMFHLTQIHVMQENFSKELIL
KYGSGIALGIYTILSMSVQMLIEHEIKDLIAEALFSMWAVDSCGPQVEKLILRRAKVMNIY
CSIFAWFALMATVMLPMWGDHSEWLLYDPILVEDVKTRLKIIYYLSTFIIFPMIAFSAIRLPG
ILLYGILQIHMQIMLINHKLQVQVSEDLDDLNNVKKIDQDDYQERIYKELCLCVEHHIKIKL
WLNKLMKIVQLLMPYFLLGSINAIYLLFFVYNDTSNILKVRCLLIVGGQILCMFAEAG
QALGEETGRIFDTLVNCPWYLNKKNKQALTIFLSNSFQPYTIAFAGFTLNYSLALALLRS
SVSYALVLYNMRN-

>TcasOR188

MFVKRQVLEGFPYYLLQLCLDVGYSKMMKIANIFCIINLLNVLAQIGYIKQNF GKELL
RYACGIQLTIYTIVTMLFEFLVEQNVKMLMDEALSEMWPIDFCGLEIKKILKRSTVMNSIF
YFMFAWFALIAIVMLPMWGDQSEWLLYDRICKEFFATWWKIPYYFYFTTFPVVAFSGIRLP
GLLLYTIQTHMQIILINQKLVQISGGLDGINDVRMIDQKNYQKRIYKGLRLCVAHHVAIKR
WLQKPKIVQSLMPIYIIMGSTIFISLLFATVYSFRDSSNILKVRMSVVLMICCLILCMGAEA
GQALSNETSRVFDTLVNCPWHLWDQKNKKALTIFLPNTLQPVTTITLAGITLNYSFVGLLK
SSASALVLYNMRN-

>TcasOR189

MEKMFPQIRTEDMKKFPYYLLKICIVFGYSKIVKLLNVVCIITSSSTIVLQVYYLKQNF SK
ELILKYGCGISLTIYTIASMLVEFLIEQKTKKLLNEAGTILWPVNFCGVKVEKLILKRVTVM
NIIYYFMSAWFALMGIIMLPWGDHSEWLLCDVISNEYFETRWKILYFACSCFSFPVIAFSSI
RLPVILLCTILQTHMQIILINQKLNQISEQMGNLNNIKLVDDKCYQKRIFEDLRLCVSHHGK
IKKWLNVKLVKLVQSIMPLYIILGCLNFISLLFFASDGLQNASNILKARLCVVLIVCCLVLSMF
AEAGQALSDETSGVFDTLTCPWYLDKNNKKVLSIFLSNSFQPDSISVAGITLNYDFAVA
LLKTSSSYALVLYNMKN-

>TcasOR190

MSTKKQDLLKHFPPYYLWVFINFGYSKLTCLVTISCIHSSSLFVEIYYIYCNYNKEIIFKY
GCMMSLLGYITISMVVELLEKDTNNLVCEARSLFWTIDSCGVQAQQIHKRAVVMNATF
GFILMWVATLGVIMFPIWGDQSEWVLCVKIFENYFENWSQMANFVFFSTFPMVAYSTIRLP
AMLLYGILQTHMQIFLINQKITEISRSKDQEKIYKELCLCVSHHVEIKRWLQRFLKMOVLT
MLMLIPLGVLSCVCLFFVIYSFLDTSNILKMRLTVVACTVLIVYIFAEAGQDFSEDEISCIF
DTLVTCPWYFWDQKNKKALVFLANSLKPYTLIAKITLNYDFAVALVRTSVSYALVLYN
MKN-

>TcasOR191

MRLEIEALKNFPPYYLLKICIDFGYSKIVKCNVVCIIINSSTLFIQVYYVQQHFNKELIFKY

GCGMALTIIYTIASISVEFLIEKNAKNLVNDATAFVWPVDFCGEKVKKLILKRATVMNKICY
FMSAWFALMGIIMLPVWGDHSEWLLCDLLSKEYFETRWKILYFACSCFSFPVAFSSIRIPG
ILLCTILQTHMQIILINQKLNQISEQMGNLNNIKLVDDKCYQKRIFEDLRLCVSHHGKIKKW
LNKFLKLVQSIMPLYIILGCLNFISLLFFASDGLQNASNILKARLCVVLIVCCLVLSMFAEAG
QALSDETSQVFDTLTTPWYLDKNNKVLISIFLSNSFQPDSISVAGITLNYDFAVALLKTS
SSYALVLYNMKN-

>TcasOR192

MVSEQTLLKNFPYLLRIFIDFGYLKITKVLVACIIHSLSTLLEIFYICQNFSELVVFQYG
CITSLATYVITSMTTGFIENDAKNLIRETVTAFWPIDFCGPQVEQLIFKRVARINTFNFFLLA
WFAIFGIIMFPVWGDSEWMLCVIAFKKYFPKWWRVVYVFFATYPMVAYS AIRIPAMLL
YGILQINMQFFLISQKIIQISQKPQNKTHQPGFYQKTVYKCLKQCISQHAIEIKRWLQRFLK
MVKSVMVVFIFVGGLCFMSILFFVVYTFQSTSNILKVR LGVILMICNLILVTFAQAGQTVID
ESSGIFDTLMTCPWYLDWDEKNKKTLLVIFFSNSLKPITFSIASITLNYFAVALLKTSASYAIFL
YNIKN-

>TcasOR193

MSELEKQLPYYFLMQFCINFFYSKTVKVVVTSSCIIIQSLSLLLQVYFIITNFSKELILKYGCE
MSLATYLLTSLLDVVVENTTKQLISEGHTSFWSIDSCGHDVKNHIIANSARLSVVIYFILA
WFAVLGISVLPVWGDQSEWILFVQIFNTWKKILCYVYLSTLAVMVFLSIRLPAMLLYGILQI
HVQIILINQR IIQIGRENTNDIRMMNQMSYQNRIYKELGFCVSQHARIKRWLKLLGIVQS
AMPIFTVLGGLIFISVLLFVLYSFENASCFLKIRLGMVVISCSLVLCMFAVAGQAFSDETSRV
FDTLMTCPWYLDWQKNKTILLIFLSNSLQPINFSIANITLNYFAVALLKTSTSYALILYNMK
N-

>TcasOR194FIX

MAMKQYPFLYKIFLDFAYAKIGKMVTYSCIIIQSLALQLQVYFIVTHFSKELIVKYGPGVLV
VTYLVTSLVVELMIENKTRKIIDFARLTFWPTDFCGLEAKNRLIKNSSKVSIVIYLILMWFA
AQGIVMFPVWGDQSEWRLHVEIFDQWKLFFYYIVSTFTIIVFSVRLPGILLYSIFQTHMQI
VLINQKITQISQNDPNDIRMMNQTYQKRIYKEMCLCVSQHIAIKRFIKLLEIVRPVQPIF
MVLGLLGVISIFFALYNLENTSNILKIRLVMVVISCILILCLFAEAGQAVSDETSRVFDTLT
CPWYLDWQRNKALAIFLSLSLQPISFSMAGFTLNYGFGISMLRNSASYALILYKMKN-

>TcasOR195

MFRERVYDDR FIVLKTIFLEFAYCKEMKIYNMFLV FHLFSFSLQVHFIVLNFSVELITRYG
CMLTVFLYLIAAKSFSIIIKQVRMLEMEATSFFWPIDCCGPQVKKNYDRAARQNIQNYFT
LAWFALFGIIMLPVWGDQSEWFLCIQVFQQYFGCWKLFYFYFSTFPMIAFTAFRLPALML
YGILHEHLQLILVNQKIVQLSVRRSLKENIVDNANYQKTVLKKLKCISHHVKLRDLSGKL
IGVIQLAMPVFLFIGALGSI AVL YFVLYIFLSSNILKIRLVVITICNGLIVYTFSAAGQALADE
TGRVFDLMTCPWNTWNIKNR KVLLIVMSNTIQPLTFTLAGITLDYKFGLTMLRISCSYALI
LYNLH-

>TcasOR197

MFKKRKFD DRFIVFKKIFFEFAYS KEMKIYNMICLVFHSFSFVLQVYFIVQNFVELITRYG
CILAVFLYLIAAMSFAIFIEKQVKMLEVETTSFFWPIDCCGPQVKKLIYDRSARINILNYFTL
AWFTLFGIIMLPVWGDQSEWFLCIQVFQQYFGSCWKLFFYFYFSTCPMIAFTAFRLPGLM
LYGILHIDLQLVLIYQKIAQLSARRIFSENIVDNAHYQKTVFRKCLKCISHHVKLTCLRKL
ELIQMAMPVFIFVGA VCSIAVLFFLLYVFSSSHILKIRLAISVVS NVLIVYTFSAAGQAI
ADE TSHVFDLMTCPWNAWNNKNR KVLLIIMSNTLRPLTFTLAGITLNYKFGLT MIRISYTYALI

LYNLN-

>TcasOR198

MPNVTNKRQKRLFSKTRTKSEDPFVMIKDVFDGGYHPVTKMLNYICLVIHSCSLLLELN
YFVHNYHFDLMMKYCCAMSLMGYIATMLFAIFQEHS AIDLTKDILSLFWPIDYCGPRVKE
EIVKKATKINRIHYIVLLFAGALGITMFPWGDQKEWFLCVQVYQHYFGKWSKIPYYVYFF
TYPMLAFSSVRLPFMTMYAIVQIRMQVYLLHQHISEISGEYVYDMKNLQILCDQNYQNEI
YDKMRLIISHHIMLKRWMRKLVTQISMPVFLVLLGTMTSISVLFYAIYSFHNINFILKVRL
ISVSVCTVLVVYMFSEAGQALSTETTGVFDLLMTCWPYVWNINRRILLIFMANSLEPMT
FSLAGVTLDYRFALGMLRTSCSYSLILYKLTGI-

>TcasOR204FIX

MTNFFSNFCSPLKNHWAKTKHLFSKFLSSDQPFIMIKLVCVDIGYHPVAKTINYICLAIHIS
SFLLEMNYLRLNFSTDLIKYGC GISAVVYDISTLIVAPMIERPTIGLSEGITTSFWPIDFCGP
KVKQLILEDTKKTSKIYYRTLVTIFGFAAVIMLPWGDQKEWFLCVQVYEHYFGKWAQIPY
HIYFLSFMWFAFTSVRLPLMMSYAIKNIRVQVFLVNQKIAKMSKEYEAKIEDVNYQNRV
YKNLRLCISHHVLKWWLRKLQKIVRFCLPVFVIGILTESSVVFYLIYNFKVNLKIRF
LLLACTTGVIYFFSEAGQSLYIETSQVFDLSLPCWYSWNVKNRKLVLIFLTLNQLPMFFSL
VGFTIDYRFALTMIRTSFSYAILYNLSSGSQIASI-

>TcasOR205

MTNIFSNFSLYFKNTWTKTKQRFSKTLPSNVPFMMIKLVFVDIGYHPVSKIINYICLAIYM
SSFLLEMNFLRLRFSTHLLIKYGCSSLSVYFISSMTVAAMTELLAVDLSEGILSSFWPIDFC
GPQVKQLILKQSRADKRMHYVLLVFSITGLAMLPIWGDQKEWFLCVQVYEFYNGEWS
KIPYYIYFFTFPWVAFSSRLPFMMNYAILNLRMQVFLINQKIAKMSNAYDQTTIEDVNSQ
KRIFKNLRLCISHHILIKWWLRKFNHVKFCIPFVIVGIATSSISVYFYLIYSFQQVNLVLKIRF
LSIACCCWFVIYLFSEAGQSLYEYTEIFHSLISCRWYIWNVKNRILLVFLANSLEPMTFSLA
GITLNYRFALNMMKTSCSYALILYKLNCDSQIMD-

>TcasOR213

MAKFNDPFKVFRTIIFVDMNSYKVIKTCNVLLNIYSLIHCLLIYYLCKNLEINLLIRYAPAIL
LFILVIFGAVFSIYMDEDILEVRSVFRENRSLSVLKENSQTKLGRKCQFINIFILLVLLIVS
TLAINAPCFGNQRELLICIQVFEEYFGEWSFIPYYFFLGFPLLYNFFRLWMTFVYGLLEG
QLQFFILEEYLCGIYETEDSKSWKYLQDSRYQOEIEKSLRLCISHHIGLKKFLKMFVENQTL
KVMFPYLVFGVLILICYFSFIINFADTVTTIGKIRMFMTAICMMGVAILLSWIGQQLIDVTS
IYFTLGGAPWYYWSQKNAKLLMFLTNTCKNESVTLAGISLDFTLFVSIVHTTLSYALVLY
NLRESSLVSSSQK-

>TcasOR229

MSARPLHLRNFPYYFLKVLVDFEQYSAGKVLVSYFCAIVHSISIFLQMHYLVKNFTKETMF
QYGCVLTVLTYCVVALFFAIASGNFVEKLESEISSFWPLDICGEDVKAAILKRAFYTSLVA
YITIIAFPIFSVIMFPVLGDQSDMFLCVRVFNEYFTKWSQIPISLYFYSFPVIAFSGIRLP
GMLLYAILITHIQMFLNRRIEQISELSNQRVVFETLCSIELQAKLRLIRNVFQLVYIAMP
IFILLGAVSSVFLFFVNSLETASYFLVLRMGCFGANVLVVFIFSQSGQSFSDETGRIFD
TLVMCSWYNWDKRNKKVLLMFLANSLEPMSITAGITLDYKFALAMLRTSCSYALVLYQ
MKN-

>TcasOR230

MREKPLHLSHFYYLLKIMLCDTEQYRLGRFLSYSCAVIHSISLLLQMYYLIDNFKETVS
RYGCVVIVTTCVVALIYEILYAQPSVSMMSQQISTLWPMDACGEKVKQMILKRAFFTSV
VTYSILFSFPIFGIIMFPLWGDQSDMFLCVRVFNEYFTKWSKVPIYLYFCSFPVLTFS
GIRLP

MLLYAILITNIQIILLNQKIAHISDLGDQRLVFGTLCSCVSLQIKLRQMLNKVLQFVYLVMP
VFLLLGALTAISVLFLLFYSLNPSDYL MIRLACFLGGNILVVFTFCESGQALSNDTGRIFDI
LLTCPWYKWDKKNKNILLMFLVNSLKPMSITIAGITLDYKLA VTLIRTCCSYALVLYQMKN

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>TcasOR234

MQQAALRNFPWHYIKRIFIDFGYHRTMKIFTIVYFILYSGSLLLDLYYLFNNFSIAAMVRYG
CMIMLISYVIAGMLFCFIFEKQLLNLLSEAETIFWPPEMITSELPKFIHRTNVLNYFIIAWFGL
LGVILFPVWGDQSEWFLNVWAYKAYFGSWWYIPYNLFYYSQPMAAWTCVRLPFIMMYF
SLQIKLQIFLLNQILEIPKGHNTNSETAPDDL SYQEAVSQKMCLCISHNVKIKRWTKSFLR
KVIQAMPVFVLLGILGSIFVTFSVLYSFESTSTILKIRLVVVVGCTILSVYMFVEGSQRLCDE
SSQMFEMLAYSPWYLYNKNNRRILLTFMTNTLEPITITWGGIILNYNFGLTMLRMSFSYAL
FLYNIH-

>TcasOR264

MVYLKDPFITLRVMFLNFKYKIVKCCDFSIIFYSLVFCLQIYYLISYFSANPLIRYATTILL
VLWGIVGAILSVTLEKQILEATAFLDEMCWPLNMVRKEAQTCLERSCRIINIYITCSLLILI
TVVFNMLCFSSQRDFFINIQIFEEYFGELSHVFNGLYFTGFPYLCYHGARLCYVFVYAILQI
QLQFSLIEEYLLQVYEIDCLKSWRYLRDTRYQQEMGKSLRLCITHHNALKKFVKMINDMS
LICMPFCLVLGVLLISCLAFVINFGDTLTIFVKLRILIFVV SCLCVLSVFCWVGQQLTDVSSY
IFLTLARAPWYYWRLENIKILLTFSTNCTKNDSIVLAGIRLEYMLFVSMLRISCSYALVLFN
LRK-

>TcasOR276

MTMQFIVKRATRGIHDLRVLKFISSDIFDIKIMKLCLFITFLIHLTACAITIHAFMFNNFSRR
EFISCAPVLFGC FYGLLGLTILFKPSMTRTLMLELKAWDITAADDAVSSRIKFEINVITVFC
LVNYLLALVASFFY YMSFYGDEEIFYLIRFLEDHCPNHKRVLIKLYKISFVLLGYVMV VHA
CQVLYATQHVR FQLILCAHFMANVTKQAKNIKDEHLPDDNNYQNMIRERLKFCIIRHQEIR
RFYFDKLEEMGNLIGGFALLGCFLGISFAMHMLTSEFLRYHFARTVSSIIAGVTTFATVIAA
GQSVETEVDISTRV VKEVKWYTFNESNKR SYMLMLLNSMQTYKIKFSENYSINYELGLSI
VRGVFSIVSVVVQLDY-

>TcasOR277

MDQVLEKFPENDWLRGVKFISSDIFQRKLVKAVLFMVLLVHLTASVITIRAILIKDITAKEFT
FYGPVFFGCFY GMLAIYIILFEKNFIANLSGELKMWSFRSAGAEITRQIRFESRVVTIYAINF
VMVVIASCLHITPLESDYETFY MIRFFEDKIPDYANVCKTSYRSTFLVMGYVMMVHVYQII
YATQHKGKQIMLYLEYVKRVTQFNEKIGEKCLFYNESFQKMVARKLKN CVIRHNEFLKYH
RKN TREMSHWIVAFSLCGCLLGISVFFYILSGVIYREQYFRVAVLLTTAASTFVAFIVAGQSL
ESRVDNGYSVVSRIEWYNFSETNKKTYFLLLVMMLMQPWKIKFSDKYSINYELGLSIVRGIY
SIISVMVNIRFDS-

>TcasOR278

MNQPQESFLKNDYLKVLKLISSDVFEPRLVRAILFVVFAVQLTASIITVRALLIKELTAKEFV
LYGPVFFGCFY GMLAIYIIIFQSSFITNMSQELEMWSYSSGEEINRRVKFQSRVITIYALVNF
LLAIVASYLYFSPLDSDNETFYMVRFIEEKIPDYAKICKIAYRTTFLAMGYVMIVHSYQVIY
ASQHVRFQIIFFTEYVKKVVEFDEKISEECLFYNERFQTIVGKRLQNCVIRHIQFLKFDRIKI
KEMSNLIAAFSLCGCLLGISISFYVLSGIFYREHFLRVALISVTAVSTFFALILAGQSMESKAN
SAHIIMNNIKWYNFNQSNKKAYLLLLMMSMKQYKIKFSENYSINYELGLTIVRGIYSIISV
MANMHFDN-

>TcasOR281

MDYSEKSLIQGDCLKLLKVISSDIFQPKLVKILLIVFGVHLVVDLLTLRALLVNELDFKEFI
FYGPVFFGSFYGMMALLTLVLKDDFISNLKQEFRLWPLDCAGDEIYSQIKFENKIIKIFVVF
NCIVTFIGSYLYFLPLSDNETFYAVRFIEENYPDHRNLLHGLYRSTFLIFGYAMTVHVYQV
IYNSQHRLRYQIIIFTEYVASIGNPDKRKENELFYDKGFQKVYERLKFICIMRHQEFLVISNK
KVGDMRVFIVGYSLCGCLLGISLTFYIFSGKFYREHFPRVSVACVGAVTTFWAVITAGQAIE
SEYDSLLSTLLGKIEWYYFNDSNKKNYLIMLINLMQPWKIKFSEEYAVNYELGLAIVRAIY
SIVSVIASMHFEA-

>TcasOR282

MHDYCFEPLTKNDYLKTVRFLCCDVFEAKIVKLGLWITFGTHLIVSVVTVRALLYDLTINE
FVHYAPVFGVGSFYGLLALWTLFRIEMVRDVRKQFKFWTIDCAGQEAHSRIKSEIRITTVLS
VLNFIITLYASYWYVYPIEGDKEIYYALKFFEEYCPRHKMVLVSVYRATFPLLSYAMIVQA
YQVIYTTQHIFQAILFIEFVLNIGHQTKNLSEEKLFYD TDYQKIVGERFKFCIMRHHFIAF
RRLKLNEMSNLIVGFSILGCLLLFSFGLFVLTGKLHREHFWRFGSLAAVCTFGSVIWAG
QSIEIESENVVNSLNSVKWYTFDENNKRNYYIIMLVNTMQPYKLFSENFSINYSLGVSIVR
AFFSILSVAALKLYFNHV-

>TcasOR300

MIGLTNGDYSPRPSMEGDCLKILKFFAVDIFNPKIVRFFLWIMLLYHVVFVTLVTAYFMLYVL
SNSEIIGYTPAFLGNFYPMCLCVWSVLFISRLIYVKEDMPLWAIDTAGAKVQASIKRKIFLYT
AFGIFNLVLSL SAGSFYLNKNSVEDVNVFLALRIFRDYFPNYYQVLDLIYRLIYFCFSYLMVA
PSYLLIYYILHVRIQAIIFAAAYVAHIDGHSYDGTIDLDNEEFQSEVERRFKFCIKRQIEFLL
MESKKLSQISNLIAAFSLAGCLFGISIIHFLTGTQLIQEYYFRIGLTS LAAIATFSAFIYTGQST
EVQIELVDNAIDNLCWYNFNRSNKLLYLIKADLARVRKIKFSGQWAVNYDLGFAIVKGIY
SIISVVVSMW-

>TcasOR309

MPFEWTIRKNKIKPILQNDVLLNLMLVPNTIISNKFLVILNYFYFGFIILQSVFVAVIIITKDE
WKLLNGQYAGYTS GCAIVWSSYITMYTYVDKFLNLYKEIFPHLWSLDVVGGQDHFNKFSK
MAKVLKLGKNILLVVGFLSATVGLPWYRDEYEIIITVRVYKDYVDKWTLLYFVLFSSLY
HIALTVIFCVLCLVYMVLHLHNQCVMLNKRLEALDDEQLFLDNDNYQDFVTKELKFCIQ
QHQLLKFARKLNDILYPTFYVLSGVVTGVSLLLFPKNDIKNLLRCVLIIVLGGGFAISF
CFLGQILENASEELLFSAYSARWYLNINRKLKLLSVLLKTQDNIVLSSSGIITINFRLISLY
QSIYSCLTFLLNIK-

>TcasOR311

MHHKNIQPMTDDYLKFIKIVSSDIFQLLPVKIFLAVVFLTHAVLDLLTIYFVLFVIEPHDFIT
YISVFLGEFYAPLFAIVMMLFRGKITDSLKHKLAMWTITSTDEKTQSDIKRQIVFFNGFVVL
NSVIISIASWFYAARLSDDVNAFFALRLIHEYFPKSIFEVIYRVTFNVLGQMMCVHVHQTLY
YTQHINIQQVQMFKKIIRDLENESKIEQQLKFCIERHAEFIKITLTTKELRGAFVGFAGFGLL
GVAVAFYIFSGLLTPEYYLRVGAIGLASVNVFAVTIWFQSTESHLDLMLAVGEVQWYNF
SQRNKKVYLILLMNMVKGKRWVSEEYSVNYRLGLAIVRGVYSIISVTSSYKKS-

>TcasOR313

MEQLPKNDPLLVLRLVPELLLLHKIVRHFVVFIVCYLTATTIFCLYVLATVRGLWDLFWSQ
YSLTFGSVIGFSCYFVAFWKGFLELRRRVFADYWALTSLGEESFQIKKLSKSANIFTV
GTILASIATSSTCMPWVGDEYDIMFPVRVYTDYFGERAVPLLVPFYLAMYCTGFVMIATGF
IFVHFALHLKFQFFLLNRRLDGLQTEPLVNDFSYQNRVKEELTCCIEYHQKLLKVAKEMNE

IVYYPIFIVVSSGIICSVCLIFYMKTENSIVRGTAMASISGGLITFGFGFTGQLMENESGRLFD
TSVMLPWHLWCLSNRKLYHIFLTKSQYHVSFSSSGIINLNHTLFISLYRKVTSIFSFLMNVSN
KNST-

>TcasOR314

MEQLPKNDPLLVLRALPEILMQHKIKEYVVLFIICYMTVTMILCSYVLATVRGLWDLFWSQ
YSLAFGSSIGFSCYFVAFWKGSEFIKLRRRVFANYWPLTSLGEESFQKIKKLSIFANVFMV
ATILASLATSTAGLPWVGDEYDIMFPVRVYTDYFGERAVPLLVPFYLAMICTGFVMISTGF
IFVHFALHLKFQFFLLNKRLDGLRTEPLVNDFLYQNHVKEELTCCIEYHQKLLKVAKEMND
IVYYPIFIVVSCGIMFSVCLVFYMKNFKNSFVRGTTMAMTGTLTTFGFGFTGQLMENESGR
LFDTSVMLPWHLWCLSNRKLYHIFLTKCQYHVSFSSSGIINLNHTLFISLYTKITSILSFLN
VSKKNHTK-

>TcasOR315

MTLVRKLQAAATNAFEIRIKDDILAELFNWPFLVLDKSWSTKFAVFLTVYCVFETLACALV
YSTLDVNMGMGYAIVIARFATTFCSSFFSFTKRKQYFEIINENFPHFWPLQSLGKSTFNRIK
MRASSVKFYSLNVVVMLIGAVILISFTQDESEVYLSVKIYKDYVNKWTGTFVMFFYVSFI
YIGLVAAISFVLTYTAFHLIFQCFLNQLKQINDSIVENEQKQAKFDEKYQSFIYKELISC
VKLHQRLILFGKRINHLVYAPLLVYIFGGIVVGVVALIYYLKSSVQHIFTSLILLIALINSTTF
VINGQMLENEAENIYISLTNLPWYSLNVQNRVVYVMLMQSQKIIHMSASGLVSLNYQLTI
VFFRCIYTGMTFLVNVGL-

>TcasOR316

MTLMRKLQTAIRNLFEIQIKDDILAELLDWPTLVLFKSKWPKNFAIFSTIYCVFDTLVCTLVY
STLDVEMLGKYAIFIAKSTIALCSFFSFFAKRKQYHKKIINENFPHFWQLQSMGESTFDQMK
KIATTVKFYSCLSVVAMLIGAVILIFTEDESEIYLSVKIYKDYVNKWTGTYIMFFYASFLYI
GIVTAAVVFLTYIVFHLIFQCFLNQLKLNINSYIVKNGQKLVKLEERNQNFYKELISCVK
LHQRLIYFSNQINDLLYAPIFMYTFSGIVVGVVALIYFLKTSIQYILTSLVLSIVSLIITTFVING
QLEDETENIISLTNLPWYSLNVQNRVVYVMLMQSQKIIHMSASGIVSLNYQLTIVLFR
IYTAMTFLVNMGL-

>TcasOR322

MTFHWITTPLEPILKDDPLFVLMALPNKLIGSKLQALVNYFFFVYMVILPVSCFLVIVATNQ
WQIFYSYSGYASGVFVWSCYVSFFIFGSKYRRVYRDVPHLWSLDVAGEEHHNRLKKGIG
KQLRTFKLVLITLAFIGATSGLPWFGDDYDFYIPIKLIVDYCDQWKLFFSIFFYLSFYHIGVT
VLSCFFSLMFLVLHLQNQFYLLKTRLQTFATDSGTSDVFLSMKVKDEEYNRSVTQEIVFCI
RHHQSVLMYCDRLNDLLYLPIFYFTLSFIVTGVSVILFPKYDLQALIRSLFVIVLGMCMTLL
FCSLGQLIENESENVLYSLIEAPWYLNWNTNRRLYYLLKAQDTVNLSSSGLITINFQLILT
LYRGIYSALTFFLNFS-

>TcasOR328

MSYNIKLTKDDRLKLLKIMASDVFSKTVKIILIVVFLVHAIANSITTYFALHVSDTKQFISY
ASVFFSEFYPMILAITIIFKGEVVQHLLTDDINIWTIDGASKKLQSEIKLKIKILTAFFVIINSFSV
VIGGFCFVQQLSDDVNLFAIRLIRDYFPNHSTILEFFYRMTYPICAYLMAVHAYQCLYYTQ
HINFQLQMFTEIITELTDLKTISLPENRLFYNKQYQTVIEQRLKFCIKRSQEFIKVCVTKNKE
IGSLIPGFAICGLFLGIGITFFLSTGKFTTEYYLRMGVTSICGLTTFALIWSAQTETMINDL
VMVINKVSWYNFNQSNKKLYLTFLLNTMKERKIKFTEKYSVNYQLGLAIVRGIYSVISVV
ASKRHH-

>TcasOR329

MNCENQFAKDDYLKTLKIMASEVFQSKAVKVILIFVFLVHAIANLLTIYFVLYVSDTKLFV
NYASVFFSEFYPM LAILTVIFKQIVQHLTDEFKIWAIDSASKKLQSEIKLKIKIITAFVITNSL
IAVWGGFLYVQPLSEDENLYFALSFIHQYFPNQSSSTLEFFYRMTYPILGYLMTVHAYQCLY
YTQHINFQLRMFTEVVAEFAPVKRFLLEHHLFYNNKYYQTEIEQRLKFCIKRSQEFVQICVI
KNSEIGSFIPEFAICGLLFGIGVTFFLSTGKFTSEYYLRMGVTSFGGVMTFSALIWSGQTTET
MTSELVKALNEVRWYNFNQSNKKLYLTLVMNIMKERKIKFTENYSMNYRLGLAIVRNIYS
VISVVVSKRRH-

>TcasOR330

MNYKKQFAKDDRLKTLKLMASDVVFQSKTVKIILT VVFLVHFIANS LTIYFVLYVFETKLFIN
YASVFFSEFYPM LAILTIIFKGDVVQNL TDEITFWTIDSASKNLQHEIKLKIKFLTA FVIINSFT
VVMGFSFSYVQQLSDDVNLFLAIRLIRDYFPNYSTILEFFYRMTYPICGYLMAVHAYQCLYY
TQHINFQLQMFTEVITELNNSKTSSLLENHLFYNNRTYQTNTEQRLKFCIKRSQEFIKICVTK
NKEIGSLIPGFAICGLFLGIGITFFLSTGTFTTEYYLRMGVTSICGATTFSAIWSAQTTETMT
SDLVMVINEVNWYNFNQTNKKLYLTLF LNM TMKERKIKFTENYSVNYQLGLAIVRGIYSVI
SJVASKRQH-

>TcasOR331

MNFFQKKLAKGDFFKTLKFIASDVVFQSKAVKMVLILLFLIHAIYLLTIYFLLYVLEPKQFV
NYATVFFAEFYPM LAILTVILKGIENLTDEIKIWA IENASKNLQSEINLKIKIITTFVIVNTLI
AVSGGFLYMHPLPEDVNLFFALRLIRDYFPNHYSLEFFYRMSFPIFAYLMTTHANQFLYYT
QHINFQIKMFREVCLEVKAWKTVSPFENHLFYNNKYYQTEIEQRLKFCIKRSQEFVKISVYK
NKEIASFIPGFAICGLLGVGLVFFLSNGKITWEYYLRMGFTSLGGVTTFLALVWTGQTTE
NITSDIERAINEIRWYNFNQSNKKMYLILVMNTMRERKIKFTEKYSVNYRLGLAIVRGIYS
VISVVLSKYQH-

>TcasOR332

MEFGNYKLMTDDYLKTIKFMSSDIFQPIPVKILLGFIFALHS AVNLVTAYYMLTTFD AKLFI
NYSSVFFGDFYPLLATFALISKNN TVRNLD ELETWIDSAGEKLRSEIKLKIKFLNIFVVCN
SLLVLVTGLTFIQPLPKDSDIFFAYRLIHEHFPKHGQALEFLYRTTYVLISYIVAVQPFQIFY
CQHINFQLQISIE TLKKISDWKTLSE DGENLIDNVKYQTEIKRRLKFCIQRSQNFICLHTEKI
KEVSTFIAGFAVCACLLGIGVIFYLISGNFTPEYYVRMGFTSVVGIIIFAATI WAGQSTESAID
EMVTS LNEVEWYNFDQSNKKLYLIFLINS MRERTIKFTENYSFN YQLGLAIVRGIYSVISIV
L-

>TcasOR333

MEFEVKT F MTRDY LKVVKFLASDIFLAKPMKILLLLIFIVQASVQAMTGYFMATAFNAKF
FN NYAPIFFGTFFPLLAISILLKKNKIFHNLKNELKIWSLDNAGEKIHSGITTEIKVVTYFVIV
NSVFLLANSTLAYPLSQDVNVFFGCYLIHKYILTYGRTFEFFYKATYLVIGHTNTGHVYQ
LLYYTQHINYQLQLYIEFIKFLDEGKTISKNEDDL FNNPTYQTLINQRLTFLIKRGQEIVKFHI
KKTNEIRTLIPAFS VCTCTMGIGV VFFIISDNFIREYYFRMGMSLVTVSTFAAGIWSGQSM
ETNLNEITTALNEVKWYNFNKSNRKLYLIFLTTSMRERKIKITENYSLNYQLGLTIVRGIYS
VISVIINMK-

>TcasOR334

MDHPDIKPM TDDSLKLRFIASDILQPLPVKIFLGVIFLFFTVGSNLLMIYFVLYVYDIREFM
DYAPVLFASFYSGVAILS AIFKGIHTLPDDISLWALDSGGEKIHSEIRFKARMVTIFVICNT
LLIIGGILNLIPLSDDLHVYFALRFIHEYFPNHKTCLILLKASIFPVIPHMLVHAYQILYYT
QHSNFQIQLFNKVIAEVDWFETPLRETEL FYSKPYQKGIKLLKFCIQRLQVLINAYIVKTK

YLATASSTILILLALYKTNRFTEFLNFKAFYRNRNLDVDHLEKWNRKQKMATVIIVLCVI
KFSTLIYTDLIGEYSTPCRGYFTEYLFYTNLFMCNARYLFEFSTACVVLHLVSEQLDYIAIS
MDCTMFLYIDISKKNIMSSAKKRKLYFDIFKQFEKWTDAYMNVKRSANLCDTVFAQL
AIMITTTITLYIILLYGITSFNIERGKFSVVKSLSYLISLFGFLIALLLLSKAGQRIQKSAENLR
RKLSKFLHLSLEDPEFHRAATNLLRLVCTHHIKMRCFGFIDIDMTLLPSCLMFVTSYTVIAL
QFNNAV-

>BmorGR13

MEDSFNRLLSIRNMIIFQNVCGFYHMCTEKLYISRIIKMYCVALAIVLSVFCFQNPDITYLS
WDVWVWTFGYTLNVIICLRYNGNYFFQYWNLHEIDIKMNLTSIDKEKVPISRAVFTVFLI
LRSTAFAMTIFVFGYLETGILSNTIISIYSINLTFYRNMSNIPMILMFETFYVRILKEQLCS
ELSTVLGCNNDARQLKLILKYLRNYSLSVRHLMDTTLPFKILILVILVGSFLRSLIGYAFV
YNSDQIILLSLPVMFSTKILSEVVEIKLICTEKLLKNKNEGLVLLDLDLSDKPTFLTSKACGEQ
LQDALSFLNRSYSYTLQVIEFDCSLAFVFTSFCITHLIVVVQFTHVLD-

>BmorGR14

MNLHKNIPIRNNLFANKVTAIALPKTSLVLFKLIHIFLLDLGVYEEKTFKIKCIVKFLTISG
SLTISVVCFSFMVSNLSEHTFVGWYGGFISTYIFVVLFFNLSNRMTFVEFYKTLRFDANYG
IDSNEYKFNFKIIFVNILFIANRMVLSFVYCSYYPQNCIRPRYAQILFMLPWLTLDVLLTTNM
FLFYATYCRIA KFPMLIKNSMNIVALRNSYKLIVDSLEKTQTSFDIVFIIALVFSVPEIMMSIY
STLLEVISKHFLEVASILSLNYVAIAQSLLLTLAPSLCAGVLPWKTNNIKILHEKLFTEKDK
ASAREIELFIKYIESRPLKLRACNLVPLDFSLTIIVLNICVTVYLVIIQFTHLY-

>BmorGR15

MISSSDINHCRNKVFAYNVPGIALSKTTLVLFKLLHYVLLLDVGIYEEKTFKNCIVKFLTI
ATGVSVSIVYFCLIA TVLRKN AFFYWFYVLFISQYMIIVFIFTL SNGMSFTDYKMLLRFDA
KYQINSNNYFNIKILVHISILNRIGMAIYCSYTKNCYEMSFSQIIFVLPWLTRDVILIMN
VFLFYVTYCRITKFPALLENKTVGSLRNSYKLIVDSLEKTQKPFDFVFTISLVFNIPEIMLSI
YFTLLQVIHSHFLEVAPTLSISYFSITHSVVLILAPSLCAGVLPWKTNNTIKIVLHDKLFLEKD
KNSARNIKLFIKYIEARPLKLRACNLVPLDFSLPVIVLNL CVTYLVIVVQFSHLS-

>BmorGR16

MIMNLTTDRISKRNKVFAYNVPEVTLPTTLKVLFKLIQFTLSLDFGVYKYKTFKMKCVAK
VLTLAGCLAASAACVSLIISNIFENQLFFGWYTLFVCQYTIVIFMFTFSNGMTFIDYKMMLL
RFDKAYQIDSNVYHFNKIVLVVISVTSRLFLCAVYCIYSTENCIKPWYNQLLFFPWLSLD
IVLIMNMFLFYATYCRLAKFPSLFENPKNVVPLRNSYKLIVDSLEKTKKSFDVLAALIFNI
PEIMMSIYYTLFQVMNKHQEVAPVLSLSYFTIILSVLLILAPSLCAGVLPWKTRHMRLLIL
EKLFAEKDKNSAREIELFIKYIEARPLQLRACNLVPLDFNLPVIVLNL CITYLVIIQFTHLF-

>BmorGR17

MGFSLGTTALSMFFFEPVVFTIIQITMIIVKPAKYKLSDFRPKDTSKLSSEIIMYFKLFHIF
LGIDLGGFRYQNRQVKYAVRLISLIQPLAIYGLCIYALLKIIANTEFLWYTISFTEYVAMSVAI
TLFSNEMTYCNFMINKFIDTKLKIGDESRIGVKLISSTILIGVTRCFTTTTTYCLLGFCAP
TAAQILFQIPWLTIDLMLLQYMFIFYACYCRLVKILRILKKRNTDIEEMRRIYKTLVDVDR
ARAPFDLAYLLGLLFSIPDVLYSIYESIIVKGEINTAKALSMSIYITNIQSLALMFAPALTAGF
LPSLTMKMRILHDKLLEEQDKKTYRHIVLFIKYIETCPLKLCACQIIPDFSPHILNIVVTVY
LIVAIQLTHFL-

>BmorGR18

MRRSTKVISMVNQSDKGEIKTCSRFMKIYFFVIYILTGFNFGFYTGRLNFLRVIQASVLLL

RFIIASNCIYIAFHFRLLLEAIWYSLTFSESLAIVVCFMLSRALSCKNLFEYLYSVDQELKKS
VGPSIEVKLALYTVVVSVLRLTVYVFCIAIYYETLHEGFCVELVYNTPCYCSPLYLVIHFTI
FHSVYCRLKALRISMNEKFDVYKGTLIYKSLIDNLEEIKKSLDVPFFVILLNAVAIAMINILV
TLEISYGQTMKFIRTPRYLETVLLFSSAFAPVLAADMMASEAQKIKVTLNINILQRDDSSL
EDDRRKVKQFAGYVSARPFRLRACRVLSLDCTLPVTVLSICVTYLIVVVQFTHLY-

>BmorGR22-like

MNRHDHRFSIYNPKRNEAMWKRELFVNNEGKDIKDFQIKDIYGPEITDKDGGALLDKHDSF
YLNTKSLLVLFQIMGVMPIMRVPKSIRTTYNWISKATLWAYLVWGLECIIVVKVGQERLAN
FQIGSNKRFDDEVYNIIFLSILIPHFLPIASWRHGPQVAIFKNMWTYQLKYLKITGKPIVFP
NLYILTWGLCIFSWSVLSFAVVLSQHLYLQDDFELWHSFAYYHIIAMLDGFCSLWYINCNAFG
TASRGLAINLHKALEAEHPALKLAQYRHLWVDLSHMMQQLGRAYSNMYGIYCMVIFFTT
TISLYGALSEILEHGLSYKEMGLFVIVAYCMTLLFIICNEAYHASRKVGHFQDRLLNVNLG
AIDRSTQREVEMFLVAIAKNPPIMNLDGFTNINRELFANISFMSTYLIVLMQFKLTLRQG
ARKTVTAIVRAIFNTTITDNGAGGSDEDQE-

>BmorGR26

MNKTKIYRKKLDKNERLVCSVQAMFARLIVGLYDIIKVSNRVKWMIKSYCISLSSFICYL
IIFRDDNFSLHPKLTSMMEYITYVTFSFLTCDKYLFRYLRFNPRTDGYPIFLYLCKKFEKFFKI
IICLFVSFKILGVVMMQSWPILSTPKYIWGTLALHFLWLASHMGRLVFILVYGILFCRMRT
IRIIFENRGFQNTQPQNLTPKRYILMYEAVLNSIESVDFPVKFLIFTFICCFAPKLVVSLFEIME
EMKKGELSLTTFIWFVLSVSPSYLFLLSAIALDLVSEDVQELLSITIDRRLNCKNEKERSEI
QEFFFYLRNPNFYTLWQVVSLLNRLTLVATSFSIANVIAIMQIKNSKI-

>BmorGR27

MVFKYKIMTKAPKSLPVLKILMLFRLVFGNYFRLSSNRYINFLVKSVCSTFTILLSVMCGK
RLKNDSPYMLSLTEYILNKILNYATSEGYIFKYCNSIKTCDKIMGFKKLPITIDVFIAIITVIT
RTAITIYFGFLFPFDKYQVVLYVGCIVFSNDLNSLTIMNVFGLLNRMNLLRKSLEAMTVPI
NIIGKNEVAPKVRLVRNAFRYYSNLLDNLDSVNHCVQYSLSVTLLLKFPKAVLLCYDSIKT
YFVKIDNNFAMDIVDPTTEILSIVVMSFPAMLCEMITNEVEKIKAILTKHLIQCSDNSLRFEL
NITLLYICHRPFKYILWRAIPLDTSVPIGIVSLIITYVIVLIQLLHFST-

>BmorGR29

MYLRSKKSRFKLFSFERMIKILLMICGHYVQTDSSNVVSSIHRIFSIVITICLCPYFQFNPF
HVIESVWYSILSQFTQYGGFFRYCSTIKTFDLLSGFKQIPLYTKRVCFFLLITLLVRLIIVLIHF
SAHQTKLKTFC AFLIILSANTGHILMTIMFSILNTRMTLIQKLFANNPIPVNIVGKNQNASHI
KRVKGLICYNNLLD TLKVAEKEIQFTLT VTYLCHVPTIICYVYFVITVIYKSKFSGYNLIPM
LDMILACMAVTAPALFAELTKNTVDKIKKILGSQLLRCSDESLRYELEITLEYVIQRPFSFSI
WRAVSLDASLPVAMTSLCITYVIVILQLTQLRP-

>BmorGR30

MYLRSKKSRFKLFSFERMIKILLMICGHYVQTDSSNVVSSIHRIFSIVITICLCPYFQFNPF
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AHQTKLKTFC AFLIILSANTGHILMTIMFSILNTRMTLIQKLFANNPIPVNIVGKNQNASHIK
RVRKGLICYNNLLD TLKVAEKEIQFTLT VTYLCHVPKIICYVYFVITVIYKSKFSGYNLPLF
DMILACMAVTAPAVFAELTKNTVDKIKKILGSQLLRCSDESLRYELEITLEYVIQRPFSFSIW
RAVSLDASLPVAMTSLCITYVIVILQLTQLRP-

>BmorGR33

MCYTNFVSRQVSKCIHFFSTIRYIYLRMFCGLYINCSSSFKIRCIARLYCFIYCLNLHYS

YIFTTNVSLTNFFHTFIILAEVSVHILFSLYTGESNFISFCIEMNKLTSDPNEFIATKCVTTHFIA
YLVIVSHILSSTLICGARASCFTFSVILTSMTFLTLLSRFTTIIMFDVWVIRMRSRKRILVNA
LESDLAENKAKSIESFLNAYKQIIASTRITKLATRNLVIFNFVSMFGRIMTLIYFCINNPGYL
DTYHMSLWIFGILLAGFVTCAPPVLVEMNVNELDEIKYALADQLVDYTDNRYRTAIYNAL
DYVEVHSIRYTLWKNFPMDLTMFFGFAGFCATYIIGLLQFTY-

>BmorGR45

MKSPEYLSKDILDEDFVRVFSFPFLVQMALGSCRVHLKARFITVPTLGQKLYTVMCIICSL
MYFNMTKLYLPLYYEHSIVYYIFVTVTGLDQLSFFANLIHLRFLNGETNTAFYIMMQRIDR
NMKIDHNNIFNKTVTLANILTITLILHYVGLVISTIILKEYSLLSLFGLLYGQLMLMVMEMAL
CSNLIIFFFMRVRFVNAIKNHVHPENQNQPPKLVRYFITNRITRYLAAQTHDFIVNDTDVY
LKQIFEGFSMFIDIYRFQVCPLCIKLVLTLLNFEFCLVAIQRNVLGPNHIGNYYIIVNSVMG
FFTALYVSGRCELFFREIRETKRLSVAVLLQYQEGPLREKATRMLKIIESTPQFSIYDMWQ
MDGYTFVKICSLVTNLIVTLLQFAYL-

>BmorGR46

PFLVQMALGSCRVHLKARFITIPTLGQKLYTVMSIICSLLYFNITKLYLPLYYQHSIVYYLFL
AVTGLDQLSFFANLIHVRFLNGETNTAFICIMMQRIDRNMKIDHNNILNKTVIRANIFTITFII
LIYVVLVISTIMLNEYSLVTLFGLLYGQLIFMVERAHCSNLILFFFTRVRFVNAIKNHVHPE
NQNQPPKLVRYFVTNRITRYLAAQTHDFIVNDTDVYKQIFEGFSMFTDIYRFQVCLFCIKI
VVLSELLTFELCFVAVQRNLETKNLNTY-

>BmorGR47

MKIRFLFGFYCDFPNKRFQNILKFYCVLVVLLIGSWACSTGFRSDKKIVYCEYIAYFLIS
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NELDGVLFINLLWIGLLLARLSLPVIYGLLYFRLRVLRMTLESKGFNSPQNRFTPCKYITIY
EKIMKDLLKMDYPLKYVFIIFLIGSVPKLLQNSWQFLNSLKNYGPEISKILEFTLECLHSYIV
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>BmorGR50

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>BmorGR51

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DQILKIDKNVNSTFCMKRVFFWVTGSIVYNLIEFYALEFYDNTSKGLMTIICTYTIALTHDC
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>BmorGR53

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>BmorGR58

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LVYACSVLNFLAQLSDELNKEIWRLGNKAVTVCKDGSKPDWNGINLTYINVLDAYNYFK
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>BmorGR56

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>BmorGR57

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>BmorGR60

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>BmorGR61

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LKKCASRWTVEARQKNFNNDQGWVVKLFNAFLNLTESYQLYQKIFEFYELLRVGVIFLG
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>BmorGR62

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>BmorGR63

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>BmorGR64

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>BmorGR66

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>BmorGR67

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>BmorGR68

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>DpleGR24

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>DpleGRP59

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>DmelGR9a

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>DmelGR22d

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>DmelGR93c

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GFVGYLSVAALYSEVNSFARIELRRQLRSLRPVGGPVGRKQLRIVEYRVDECISVYDEIER
VGRTFHRLLELPVLIILLGKIFATTILSYEVIIRPELYARKIGMWGLVVKSFADVILLTLAVHE
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>DmelGR93d

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>DmelGR94a

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>DmelGR98a

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>DmelGR98c

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>DmelGR98d

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>DmelGR98b

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>HarmGR1

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>HarmGR2

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T-

>HarmGR3

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>HarmGR4

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VSVEKQFESKQRFGTLYLQIQVWRRLREAYVRQSTLVRMVDRLNLSLVLLSNINLYFIC
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>HarmGR5

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>HarmGR6

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>HarmGR7

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>HarmGR8

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DGIALNA-

>HarmGR9

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>HassGR1

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>HassGR2

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>HassGR3

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>HassGR4

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>HassGR5

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>HassGR6

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>HassGR7

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>HassGR8

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>HassGR9

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>HassGR10

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>HassGR11

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>HassGR13

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>HassGR14

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>HassGR15

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>HassGR16

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>HassGR17

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>MsexGR1

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>MsexGR2

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>MsexGR3

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ANVVAEDFQQALRHVGPAGKVAEYRALWLR LSKLARDTGLANSYSFTFVNLYLFLIITLSI
YGLLSQISEGFGIKDIGLALTAVCSIFLLFFICDEAHYASQNVRTNFQKKLLMVELSWMNTD
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>MsexGR4

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VSAFIGVCALMEHILSMMSAIGLHCAPSQYLRKYILNSHGFLLRINEYSLWFAIPIFILSKIST
MLWNFQDLMIIVISMGLTSRYNRLNMYVGHIIKIERKLSDSPKVRSDLHVHNEIWRRIRES
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RACTVVLAASNVMHSHKKALVFLYSCPKSGFNIE-

>MsexGR5

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FMFLRVAVKWPSLMKELYNCGLQYYIDPKTKSKCHWACYFILFLAIYIFIICISYLS SILNSII
KKIDSVYKNNYLPPSFWRSLREDYNRATQLVRSFDD SISGVVFISYANNMFFICLQLYYS LG
NGLKGRQNYFRTACPNYPSGPFGGYEASIIYITVAFIFSKFLAVSLITSDVHTSSMKAAPA
LYNIASSMYCEEIQRFLDQVHSDTVALSGFQFFVYV TREIILSVVGTIVTYELVMLQFGS-

>MsexGR6

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TAWPDLVQHVAKTEELYPNYDNKLTRTCQITCAV VLLLALSEHILLSLAFAGAIMCFPNKS
VYEGFARHFYPWFNCLPYSPLLGMITQFLHFQSTFIWNFSDFVICMSYYLTSRLDHV NK
KLAAAQ GKYLPEIFWKSTREEYCRATQLVRKVDEVISGIVFVSFANNLFFICLQLFNTLED

GIKGNGDCNSRSKKTTPLSGYEAATYFLFSLVYLISRSVAVSLIASQVNTASMPVAPILYDVP
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>MsexGR6.2

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NWNFVDLFIICMSLYLVSRLQVQVNRIVAVKGRYLPPSFWRMREDYNRAAHLVKVDDII
GSVIFISFASNLFICLQLLHTLADGIKPVPRCRVGVDPKRPLRGYEQAVYFVYSFLFLVARS
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SMFYY-

>MsexGR8

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>MsexGR9.1

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VVVTACAGVYGAPKMRIMLGFMEKVASVDNSIGCQYSGLTERKLCAILLAILFFTVLIA
DDFCFYALQATKVDREWDMVINYIGFYLLWYVVMILELQFAFTALSVHARFRAVNEALAL
TARQVAVPVDLPRCPPLNIYAIRVSPVVSQRSANVSLLDVSMPTKESTVIKRVSGEPLVV
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>MsexGR9.2

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VVVTACAGVYGAPKMRIMLGFMEKVASVDNSIGCQYSGLTERKLCAILLAILFFTVLIA
DDFCFYALQATKVDREWDMVINYIGFYLLWYVVMILELQFAFTALSVRARFRAVNEALAL
TARQVAVPVDLPRCPPLNIYAIRVSPVVSQRSANVSLLDVSMPTKESTVIKRVSGEPLAV
APCEAIRRLAVLYGTLCEVVHSIDDSYGLPLIVIIISTLLHLIITPYFLIMELIVSTNRIHFLVQ
FLWCGTHMLRMFVLVEPCHYTANEGKRTEGLICRLMTSTPSNGVLPVSRLELFSRQLMLQS
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>MsexGR10.1

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QKISSELKVSVKSPKTSNDRQYRYVIIALILFTIMIFDCFNIIYITLTKEHRVWVAAMYSCYY
CSYIITQLLEIQFILLAAAYILSALKLINSRLRNQLKKYNHYLFSPAKGEDAQTIRHLSLSYGA
VCEIIEKMNKSYSTVLLLIGSFLHLIVTLYIITNIFFKDIEYCMFEKIITPILQVWVCAFHT
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>MsexGR10.2

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QITSDLNASSKCPKSSDDRMYYCCVVFALIFLFTILFGDLLSYIYIAIEKEERVWVAVMYSGY
YCSNVITRLIKVQFMLTATYVLSALRLNSKLNKQKQYDQYHVTSAGESDAQTIRHLSLS
YGAVCKIIEIDKSYGTVLLLLLGMFLHLIVTLYYIINDIIGIDSTGYDKFETFTKPILQAIW
CAFHTWNLFMIIEP SHKTHEEVERTKELISQFMCTLRRLQMSDPLQMELEVFGKRLLLDCVA
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>MsexGR11A

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CILPVVYFIVLTLVLYERMNYVFLDHLIVFDVLQYISEIAMSICYLTQYFVYSLYLTHIYEL
FKRFYILLNEVKT KLDEKIVAGEKITDNINLKIIIEWAEMYGDLVKISKAFRKCFSGQNFKG
KGGGV TMMMTMFFDITYHLTAVTTAMLA AQRVQNGVPVLKRILASFYNILTAYPNRPELG
RIKNFSRMVAQNPLSTA EHRPPLKRATLFGPQLS SVHRRSYEYRRTSGTEVVLR YELYH
DPESPHLRPPIDPKDFKASNTPKEKIREKSVLEQVHHFFVRMRQFDLLLNGVGSNRMTT
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>MsexGR12

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ASVTYSVILSVVLTQDKINHEILLIWKIWKYR VISEYLVYYILVTILHIFFKRFNGSLDKT
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>MsexGR13

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SDNETLNAKKGSLIWIFIIFYNAIEICMILFKIMNSNEVTEYVNMIFYIISLVHDMEQIFFFT
LLRTIFTRLKLLRAHVRKTFRVNDAGTSDMKTDKIETLSNNAQLDIGSLHKVYELLHKCSE
QLNSIMSFPMMLMFTSGFSTLLKILVKIIQVQETMDPKIVTIAVIYLVVRCVKYTLVV
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>MsexGR14

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WKIIGFTIVLWVLRIGHMYLYCAKDWCYDIFSIFLISQFSTIALDVNGVWRCAIFDIIRYRLK
ILRIRLEESPENNFYLYVNKNKTLKENKIRLMLFIYRTIADVLAMISPELDATVSITFYLEPTL
LFVCGFLMLHTLQIILFLFTPFLIVEFY SIEVERILLFLIHKVIDETDPGTVDAKLFIKYIQR
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>MsexGR15

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CISTSKFHSIFLCVQIVILSTRLTGLVLIIFLMLYVRMKYLR RRRFERNTIPVNIHKNGVVSKT
REMRKCLIIYNNLLDNFSDIDQELQILTWFVFSDESLRFELEIALEYVERRPFNFVICRVFPV
DISMPISIVTLCITYVIIIQFAEI-

>MsexGR16

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SLTCLEIYFQSGFEYQMSCVCITVVSSNMICMIISIILYTCYVRMRLRRRFEETIPVNIINEV
GAMCKVREVRRLQHYHNLLDIMKDIDREFKYLVNIFKPCFSLSVMWQHDTLAKEEHL
PRSLDIFHDESVRFELQRALQYITIRPFYLLWGAVPLDVTFFVVKLITLCITYVIVALQIVKF
TGMI-

>MsexGR17

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HFKSHTNFNLNFFTINFVIIASRLTCLLVTTVLVVLVYVRMKYLRQRMERNTVPVNIISKNFIL
SKVREVRRLCLLYNTLLDSVADIDRELQCSVNIYILTRLNLTCLGYENHLQMFT-

>MsexGR18

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FIHYSGEDDEVYLLSYNIPLLNQRIDSFVSVVIFYTLLVRMKILRVRFERNPIVINVKNNV
MNNINEVRRCLLDYNNLLDNFHDIEEELQYLMAMIIIFCMPKLITLDVELIGSVLLETWDFS
KLMLQIEVTQGFILVCLPAVIADLLRHEVAKIKKTLRQAISCSDESRLYELELALDYVTRR
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>MsexGR19

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QYLDIKMFIFAITGVALRSLFVYCSFFDASCVRPLLARQLSIFLISFDLILIVYFFIFYTTY
WRLSNIVSIIDNSSTSIVFLQYLYKGLIDAIQTAKSAFDVVVSYINLLAFARGFARVKVFSRI
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>MsexGR20

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KLDIKIILCTLSIFMFDTVLAIMKYTLIDPNCEILKPLSLLIIVPIAIDFVLIVYFFLFYSVFCH
LRVFSLHLPKSDIVVSQTVYKEFVDITEKTRKVFDACCSQIKFRILSFVIKMAILTFAPVLA
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>MsexGR21

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FTQNLILHEESNVAKYVCALINFIMWFIGIIGRSPLLFFVAFVYTRVRLMPQTLQSNDFDCRI
LGQQHPRRYIQMYEAIMDGLEAIDGTVKLQTFNFCRRARPRGDPEAVPIPETQPVPVQLV
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>MsexGR22

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IEVSIVHREYTTLEHLNIFGLITWYVIIIIGRSPSLFVFALLYTRVRLMRQTLNNDDFDCRNQ
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>MsexGR23

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LGFIVLILREEYNLQQIYFSFIDFIMWLVVLIGRSPLLFFVALLYTRVRLMRQTLENNDFDC
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>MsexGR24

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>MsexGR25

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LINLFSMEYSVYMLISLLKNNRNLQYYKKTPLIDASACTYHPMRIRLVGYTCMMFLIRFS
SFMKVVFINGPYTKNELECWFSLDFDVFVFINIIGRSPLLFFVFLYTRVRLMRQTLESNDF
DCRILGLHHPRRYIQMYEAIMDGLEASNTDLKLEVIDISPIHGTKARIYRDREEIQKFLFL
KRNPFEYSLWRVPLNVCSLLSFFSFTVTTHAILQIQTWNI-

>MsexGR26

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FSRILILHEENNAKCVDALIDFIMWFSMIIGRSPLLFFVFLVYTRVRVMRQTLQSNDFDCR
ILGQHHPRRYIQMYEAIMDGLEAIDGTVKLQVTDILHICSTRDREEIQKFLFLKRNPFEYS
LWRVPLNVCSLLSYLSFTVTTHAILQIRTWTT-

>MsexGR27

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YLLIPITLARGEYTGPLYIYGLFYFLTWFIIIGRSPLLFFVALLYTRVRLMRQTLENNDFECD
ILGKHHPRRYIQMYEAIMDGLEASDGTMKLQVTVTRYFNWLYIYFRRLIFCIDERDREEIQ
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>MsexGR28

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NLAYKKGLTIYELYGFLKIVAWICIIMGRLPGLFVALLYSRVRLMRLKLENNDFDCRTLG
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>MsexGR29

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>MsexGR30

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ICALIFNSFFHVYIIGVKSPLISKWVPLLSHLMIVDDLEMIFVSVVFLMYKRVKYINKI
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>MsexGR31

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VIGKPEHYNAVFNFIICALIFNSFFHVYIIGVKSPLISKWVPLLSHLMIVDDLEMVIFV
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>MsexGR32

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LNEDLIEDEKINAIPSFLNEYRFLFSVGVLSQSARMLCTIYYYLSEELGIEVRFLNGFFDVI
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>MsexGR33

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HFMKYMLELNDHSRDFRENLSIIPFIVTVTGLTYKITMAVFIYTKHTYFMKFLPSFIAMFS
YYPYYTYIVMYHVLYNEMKVLQRKLRVGLTEDLTEDEKINVIQRFRSSSVPSVIRFLFKT
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GTFIISLLQFKY-

>MsexGR34

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EYVSKDILEEDFVKSFKLLIYIQMTL GSCR VYNKDRFLTSP TIFQKIYTILCIITITLYAVILND
YSWKYGKTSYLYYLITAVFLVDLITYICNMIQVRFLNGDANIDFFIHLQNM DRLMKIEHNG
TIWTTLRKINNVS LIYFIAGLFGYLIFAIYKGG LINWSYSSLVNSQLTLMLEIGNCSNFVAHFI
IRLYIVNYIMCNHLNPNKSKRPKVYLTVTGLKRWIRYTTAKTHNFALNDTEKYLKAIFDG
FKKFQEIYKFQCVFCFKIVIMSLITFEFVLTGVQNNLLKLA EIITVVMFSVINYLVALVLSVR
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>MsexGR35

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TNHRLMEFAERDV SLLKISNWKIVIALYSCSLGVYTS LHMYFHIPYIHTVFFDVI VLCFDM
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SIHDFY-

>MsexGR36

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PYFLQISFATCGENIRPKYIFALIDFIVWIIYIIGRSPVLFV FALLYSRVRLMRQTLESNDFDCR
ILGKHHPRRYIQMYEAIMDGLEACDGTVKLQTN IYRRFFCTDERDREEIQKLF LFLKRNPF
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>MsexGR37

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VCLVGYLCIMFFIRLSGFIKVLILHGEYNLQQIYFN FIDFIMWL VVLLGRSPLLFMFALLYTR
VRLMRQTLENNNFDCRN LGKHHPRWYIQMYETIIDMLEEDNDTVKLQYYFYMYIRRLDL
CVDERDREEIQKLF LFLKRNPF EYSLWRV VPLNVR SLLSLLSFTVT TTSIAIMQIHGWIA-

>MsexGR38

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FLKIFICHGELNLHQYIFSMDFIMWVTIVIGRSPLILVFALLYSRVRLMRQILESNDFFDCRN
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>MsexGR39

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>MsexGR40

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IKTIFIHRDKSVTEHHFAIDFIMWFTMLLGRSPLLFVFALLYSRVVMRQTLESNDFFDCRIL
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>MsexGR41

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KLILLFTGLWIVSSSFDMFAWVLSYGWRTPLVYSVAYIYLYIKIATMLDFTSHVIHAEVRLKI
IGDLVQVHYNDTECSTDIGDCIFNKNWLYANENSSTSKRKLHPDPIKSLPHPGHHEVKS
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>MsexGR42

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>MsexGR43

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>MS|comp636901_c0

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>MS|comp19407_c0

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>MS|comp82756_c0

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>MS|comp1687776_c0

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>MS|comp109140_c0

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>PxylGRP2a

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HALYHG VVVVDHVG PQAIIIFCTVLSQVFKIYLLGHIGSILKDEASKIGPALHDIPTDKQD
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>PxylGR22

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>PxylGR22-like

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>PxylGR24-like

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GRVLPVKLYKKALIISIIPLLSTASVIITHVTMVHFKLTQIIPYVFLEILTYILGGYWYLLCET
LSVCANILAEDFQQTLRHIGPAGKVAEYRALWLRLSKLARDTGIANCYTFTFVSLYLFLIIT
LSIYGLLSQISEGFGIKDIGLALTACCSIFLLFFICDEAHYASHNVRTHFQKKLLMVELSWM
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>PxyGR28b

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VSLMATTFFYCHYLYLLMDRYKHINEILSGVKEEATRKRVIDAATIILENDLNENARRAEDF
CERIRLSSKVHSMFLKATATVNEVFGMILLVTSLLPLSYIILNMFYFMEATSAGLAHDVKRY
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>PxyGR43a-like1

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>PxyGR43a-like2

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>PxyGR64a-like

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KVYYLTSVAWLCARACAVLAAAENVRSRTALGFYIYEPDRSYNVEVQRLEKQLTKDV
VALSGKGGFFYLNRGILLEVVSSIKEYELVLEFDKK-

>PxyGR64e-like

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>Pxy1GR64f-like1

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ST-

>Pxy1GR64f-like2

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>Pxy1GR64f-like3

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KSDNSDNDFPSVECCQRSIANKSSLEHNMYFAFSFTFLVKALLVSFLGARIHSNSLVPLSM
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>Pxy1GR64f-like4

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>Pxy1GR68a-like

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>TcasGRa

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MVMFYKRSNDLKTLLSNLESIQIYSIKPKERNNSNHWRSGLFALITGNVLFYPPLPSDVSY
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DEVTFSVQKIQELSHLHYKLANFTVKISGLFEITTTITAMVMWFGYVIDTMYLFIHIRSRQED
TDTLVVIYTFNLFYLCFCFYWLLVMVAMFSRTQQSANKTATFVHEIWNKYALKNEVDKRV
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>TcasGRb

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NFKESERNDYVSLQLVVFVFCYFIYLFVYIYYSVHEASIINFGYTALAKFMIFTSTCIYTNL
LRIIEADFSKLNHLLSGTENLDLVLPIYSQVFMCKKINKLYGHQLLLTIYLIWTIYEMYH
LAILWSCTSTNCPFLMLALS YTVIQEVMLFTILWNCQNTRVASEDFKAIWYSILIKKADS
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>TcasGRc

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AVLVLICLPFICFQFYGYQTFCKNFKSYQVPLVLGHKNIDNFVLPGTFSQHNQSWCYKK
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>TcasGR1

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IIFLSILIPHLLPVAAWTNGTEVAKFKNMWTRFQLKYYQVTGTPHFNLTILITYSLCVISW
AVGIGIMLAQYYLQADMILLWHTFGYYHILAMLNCLCSLWFINCTAKGRVAVWMCNNLH
KALESRNPAKILGAYRDLWVDLSHMMQQLGKAYSGMYSMYCLLILLTTIVASYGSVTEIM
DQGISFKEAGLFMIAFYCMTLLYIICNEGHHATRKMGPFRERLLNVNLSAVDQKTRQEV
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>TcasGR2

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IYSIIFIYLIPHFFIPFVGWGVAYEVCDYKNSWGGFQLHYYKITGKNLQFPLLSTLIIISLGC
LILAVVFLTLALSALLEGFTLYHTTAYLHIITMINMNCALWYINCRAVGNASTALAESFQNDV
DRNCSAYIIAHYRVLWLSLSDLLQKMGNAARTYSTYSLFMMANITVAVYGFTSEIVDHGI
RFSFKEIGLLVDSTYCLFLLVFCDCSHQASLNIARRVQVTLLQVNLSQVDPATRKEIDIFLV
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>TcasGR3

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VVMGYIGFIEWDKVEIVRSQEGRFEEAVIDYLFVYLLPIIINPLVLYEARKLANVVTDWV
NFERIYYKLTKKKLSVFFGNKPVILT VVPLLACGVMVVTHITMAHFIIQVVPYCYINCLI
YLIGGFWMQCDVVGKVASQLAEDFQMALKHVGPSSQVADYRSLWMLLSKLIRDVGN

SGYTVTFLCLYLFLIITLTIYGLLSQLQAGFSTKDIGLTINAGLAIFILYFICDEAHYASNCLRV
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VVLLQFQISIPPEASPTNSTTITTQTPN-

>TcasGR5

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VVLFIQVAADTVLFILNISTIIITARKKQQWNSLIKILKTVSNRNDKGDIFWFSPFLVANLAF
VTIVTYETVWWTQIMGAEFFKLYAVEYFQMYAQFIVYYLIYVFLNSILEGFQHLSKTMCKY
LKLPNRSNNFSLKKIRSEFCALAI FVDVFNDFIGWLILQSIGFTFLQLLSYMQHLIVGTGHTI
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>TcasGR5a-trehalose-like

MTEFWLEMRRDYDRLSHLCKELDDGISGLILMSFAYNLFEVISYLFHQLMMDSSQQNVAFY
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>TcasGR12

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VDYSLWKALIFQISNLQTTFFGGTFGDTFIILLSMAFATRMKQSRKIEALVKSHVKATTPWR
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GAVVTYELVLIQFNKLLNEFDETSVQQLEILHNNTYWLC-

>TcasGR26

MANCATA TLVCWGFVGFVHDMEIASFVSLGFTGSVDVVISSFDISDVLLSCLYFIVSMPF
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VNNYFAYVYSIVVLHELQYYQVVKMAQLRVSGINKTVKENIKKDTSRIKLEFIFDLIHC
YNNTTDAIETINSSFNKTVTLMLFSCYVHLVTCOPYQLFVMITSNETSILNYVYCLWVLLQIF
RLVLVVEVCHNCEEEIQNTRILVSQLLNCRLDKNVKKEANTFLFLMVKKKIKFSAYGLPK
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>TcasGR27

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HIMTMMYARILGLNKTLRDYFKNKTGFCEHEILVVTQSFNSINDSVEEINKCFYSTTTIIFS
CYIHLVISPYQLFVVVSSSTETSLFNYYVLLWISLHIMRVLTIVEVCQKCEENRKRTRSLVYQ
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VV-

>TcasGR-SG43a

MTITISKELFHVLSPVLYLSRFFCLQPLKWKTKTSAGNYIITKSRFYTIYTLAASCLLVITSITG
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HFVHLIQIRISVINKKLAKMVVTGLNSVTTLKKPHA EVEDLVKGYEKLIEATNSINYCYGF
PILVILGCLIHLLVTPYGLYSIIMSTGDSTSILSQTVMWTAHILRLFLIIEPCHECFIKTKETSQ
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>TcasGR-SG64b

MNILQMNYFVFLCSILVNIAFIKLATEWPQLMKAWLKIELLVGNLGMRRNFRKKLDFIFT
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LQTTFFGGTFGDTFIILLSMAFATRMKQSRKIEALVKSHVKATTPWRKIREEQCSLLYLCTL
LEQKISYLVLLSFCNSLYFVLVQLFSALKQMGDTLQKTYFFISFGILIFRIIFVLSAASINEES
RKILILLSTPSELYSVEVERLTNQINYKAMASGKNFFIITRGLILKVS NKH-

>TcasGR-SG64e

MTTTHSSLRFILIAAQIFGMFPVSGVAKKDPFLKFKWTSKRTIYSIIFALAAVVNTIIFLVH
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LEIVNIFSTISWTFMDLFIILVSL SARFKQVAKYIKFLVERNVLNKNWQRARQDYTRLT
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LVLVEYLKVESY-

>TcasGR-SG64f

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CGASVHSESSKVLPLLFVSSSSYNCEVERFIDQVIKNEIILT GKKFFKITKQLILQIAGAVT
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>TcasGR82

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PVSGLHIAVVGWPSVIFYVTGGMGVLWSVMWFYLIYDSPGQHPRISAKEKEILEQKIRNEIT
PQVRHIPWIKIFTSLPVVAIVVANASICFGFYIIFNHLPTYMSSVHNVEIEKNGWISSLPHLG
EFFREKFVISAYFISGRYITTVAVSYLGARMLHKNKFSTLTIRKFLSVVCSWSAVLLFGMEA
LFGYHYYVTNFVSITFFLFLSLSIPGMIVNILDISP AFSGTIIGFNQVIVCLSGITS AKVVAFFT
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EF-

>TcasGR87

MKEVPGWRNMKPLYL CNFLAVTPPHSLGNTVTPVSLRFKLYTIVHIFIIIALYAHSSYGRE
NFIYGSMNMTVAITDKIANFMLTFFNVSLRIILVFSKGVKVSFFNQGYELSKQEIFNCCSKK
SFRMNFAIFNLYMVLLLLFDAYLWISSVGVRMFQYYIGRSFTYYVCNTTIFLIFHSVLPIKR
FFTSLGIAFDNIMKNLICEIDGRHEFFLAEFKSAKTPPNKLN CYDLRRVRKNYNSICELVDA
FNNIYGLAMLEIIIVVITYVLNLTDLFLVYGMSKSRNIEGVSFGTNLVILCALWITLLLFTIL
LAYGCAGATSEAEKIAKICFYWLNEIPTMPVSIKDQTIKEELALLAQQSTSRTSKFS AAGFF
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>TcasGR93a-bitter-like

MVTKMVCQFSRNDLLRNSVSKPLFWYLIVQVAITGNKILGAVLTISPDAEVYLNVLVFNF
AELFSYNINILIFFYLIIFQNAYTSYFKAITRKNTYNDPKIVVQIFYKFYEISNNINETLQVPIL
LRIFTDFVFTISSMFYLSVFLYIPEL SFFVLAKMVLWLVN TLFAIFIMAYFFDQMTEKRNTI
METLEDLPSSHTLISKFHSSYKRKELLRLRLKHERFCFNVC GFFPLNNSFIYLMIAGIVTYT

TYLVQFGKAANAKQ-

>TcasGR97

MKNHFSKLMKNRRGRKTSKMMNGMTKQIQDVMPPGNRLKISLTLFAELTMSSQSLHSTL
ETLCFLNQLIGAPFSQTRHKLYPTYCKILLFTHLTTLLFTFCNIWWRCSNSQRISTKLIKTLN
YFFKVTIIMSTILNSMILKKKNVAQLIPTLKEAKVMLPDVKQKWSCFTHFDSIFVLFSIMTS
FIFHLTYKSGCYLIQDLLDDVEMVQSLIVLLTSLKFLELLSNYFDQTNNYFDIILKSEIFISD
MKMRRVNQLYRTLRYRILELWNNIYGVFLQLFLHIMVVLIDNLLSLVEEFKLGYSFSWKV
VIRSQTIAIYLVLALLSKIGYQISEKKYKTSKTVLNGLVEITLRGGKQSQLNLLLKLKTW
PNFVSASGYFRLDYGFFLSLLAAVVSIVILLQLS-

>TcasGR117

MCLAIIIMNNKLNMLVVKSMQLRIKMEEKLVEKFLNSLQIYLQHNQIFGFVTFTCTRSNF
RSSKLLILYNILQVLFVSFVSYWLYLVLEADDMLPIYKNTYLILFADFAYLETTWICTLLK
KDKLLELFKRLIHFDTKCQENSTVIDYKRHKRLLCYLLARYVALALVILFSEILVIVSEQE
WSFSTGLLVMIENSALSYSKASEIVMLRSRFAILNKQIRFLNQYLRLKPEGRISNRRVFISFS
KICYLHQHLSKSVKLFNEVFGVSLVLVFGNSFLSIVLALFRTAELQASQIKWTRIAMAL
ASVPIFDSIHLCDVCYSTIGTVSKAGELIHQIQTEDHDIIDEIEMFSLQIANEQVEFNAAGFF
PINYTLVFSIIGGATTYIIILIQLSATLNE-

>TcasGR118

MRNVPSYCFVTILFDSVNKLGTVQIVNPYSVKQYVMQQQVKNFRHSVRSVFFLSEIFGLV
NLKYRETYFRLSKTKTCTLVLTALVYCSLAIFVLCELLIEGTTILINVPSLIIHVSTSAVAT
VWINSVINRWKFIEFIRKVFLEFDVKCVSNYTKQQSKIHLIVRSVFTTYLMFDYCTVLRVQ
RFNNYQSLAHYLRVFFTVFNVVHCYLASELVLMKRNRFVTLNVQLTKLTKNCATKAQSV
VLGRICLHHHLSKLVTRFNEIFGLGLLLMFGVSFLLITQTIFIICVIVQSEQIAWLHLLYIFLV
GIMYAADVFIYCHVCCSTIHEVSKAGELIHKIETNDHEIIDKIEMFSLQILNERAGFSAAGFF
PIDYSLVFSFLGGVTTYIIILLQLSSVPPV-

>TcasGR125

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KTPPQTEVIKLADVYKPKLSNYTALSRSSTEDIEIQFRAEIGVTNVVGFTWLLRPEASEEAR
KIIADIEILQSLEYVQAIDKQKFLLEKCRIDEARIKLVACTRGQHVNNWHVARKHRLTA
SRFGMVLSACSRRRFPFSLFKNLAEGYSLDRVAAVQWGKTHEKTALREFEATNLKVQET
GFWLEESGFLGASPDGLVEEDGILEIKCPYKYRDTDSLSEALKDKKYFYWRDENEDINLN
SNHNYYHQVQGMHITGRINVKSSSNMIKFSKVKS YFTTHHDTLHNIY TSMKPVYAICKL
IGLNTLRIGRKGELKQHKSDYFYFSFYITSYTLLSVYSLFRIATNENNSLVINKRLIFIECFVM
MALTIVTLFTFLARGTLIKSFDMLSHVDVSIKAGFRLEYKQLLKRSYLIISFVLFSLARV
PVMLMTISADFIQQIMLFVSALIKAFSKYQFVVLVLQLQHRFGKINRTMRSFFSDNKQDDK
IPQISDNLYILCRLHYKLTSMQKINSAFSVQLLVSIGVSLFDVLFQAYYLYYVATGKASFV
TVPMIVCPIVWLMDEVVEIYLLVYACASTCEQANDTPSILHELNNYFHMDLENNVQSYS
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>TcasGR153

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YDLNSQYGFTAILIYERCFIKCKTTQKHTFRYFKQNNDFDGNPRNLMQGGKHHKLKLQHS
DATSHNARIFHQSLNLLLDGNTVVDITLNLQIFQHSSKPFASACWLAWGFLKSYEILH
VTISCHLASQQANIVGRKVHKVLIRTQNDEIEEKLLMFSKQVQHSSFKFTLCGLFNIDAGL

LFNMIGSSTTFIVIMIQQFETITPTICVSNKKAMF-

>TcasGR154

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IYRKHFLYEVCMLFGVLAAILGRSIVTHIYMGRNIFLTENETHFALFFPLFVSYLVQINFVLLI
TLVHERFALINRLLDNFNEEKVKHNYLSLKPPYEYQTKYNQAKIELLMELHDFLTDVGNK
LNDFSFIQILSCLTSQFLTEVFTIFYLYYESLILKNKIAALVWLMWSIWTTLEIFYVTVNCHL
TTKEAKNTGIAIHKVLMNESDPDAKRKLMVFSQQVNHRSLQFTACGLFYIDATLIFTIVGA
AATYLLIMLQFQEGIEAQCSNNTLLN-

>TcasGR164

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MRMGKPKPATSTELIVEIGDIIYMSVSLIDAFLLSLFSITKRTKMVQFLQKFANFEKMKMQQLD
LPLDLANEYTRAKVCVLFIAIATAISLIISYVIIDILFLGNVTFEDIGAEIVAYVYPLVTMMTM
VMQFCTLCLLTRQKFRWINLKLQIRKQWQGNKTTYYSNKIKFVSPKETTKAITLEKLIY
FLEQFRRRHYELCSLTENLNRIFNVQILFTCLNLFITITFTVYFYFISNSDAKIRSPVLYSTYY
ALNGFINVSALFGLVWAASQTKNEVKSEPKTSLKTNIERRSGKLGADVKSQFKQFQF
PDNAFLVPTFAKQCRIFRLSCVVGAITTYLVIVIQQFYQN-

>TcasGR166

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VLILLGALTYHAIFDLISFKDSLQQLRYFEEVFSLLSCCSVIFGCIFALKVIEVFKNIEEV
DVAFRSLAVWVPYKHLVYVNIHLGLVTVATLVTIIFASYQYGTKTYSLFIVFMTVILPY
FINLLMELQYCHYLNILRVRYQLLNEYLETLVQETNRTSVEGWTDVSNVKRKSKEISKLPK
SMLAISDPVFIVDQVAALHIKLTDTAHMINYAFCVQQLLRITVAFISIVTALFLVAINFNKSSS
EENEGKTTQLDYFFTFWAFSNACEVMAIVWITSETCEEANTCPRILHKIRNNTTNTNLQDT
IEIYSLQMYHNRLYFTVCGLFPLDYTLTYTIVAGVTTYLVILIQFNNSDFVQRNSTEFDNATE
SY-

>TcasGR168

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FYFVDALTSIGTALSLVISITIFIQRSRDLKLLQLKEIKIDSVHRKTRSKANHYLRILITIF
YYFLFIPFESEPLFYTLFFIYPGIILLFDHIFLSDILEIICNEFEQINREIKYQTTSHRIIFKTKKIN
DEEINDKMOVRAEQLSLCHCDLTALTNICHHFETIIVAMITSFNVTSTVYFLIYFLARSYE
ANLFLVFGNNFAFLSFYVFWLLILEMFTRTEKEANITGRYIHDIWNKFEANGNMTKKLR
HLQVLSIRFLNKNLEFRARNFFRLDWSFCHTMIAAITTYVILVQFHI-

6.IRs

>BmorIR7d.1

FNLPLKLTILSLFLGIILLNMLRKTIFFNIRVVCNITPPKRNSLFYAWLLFLGLPLEKFSSRK
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FYENWTSVDMQKAYKLLDEIMEEKTDFVLALNKDILHHA AEHIGSKRIQVIDNCIVNSPI
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CFFLLIIGYGISILYFVLEVVCCHKIDKTNQRIDLRVDQE-

>BmorIR7d.2

MSPRNLSDASHFCEENSNEITTAALNIALHNFKWRILTYVFFNATFLCNLNIFLKTYNKGV
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STSTFLSLIVLWIWYCFILRTFYQVWLINSLQGKFYLDGFEKIDEAIEAGYDIGGGIFLKEYF
VDYPYIYNNWKETVSLNVTLHEISEGSNFIAATIYDLAKSLTNFEKINVHFLAEKVVVSPSV
LFFNKNSPLVAPINELLQQLTESGFVEKISRNYFTHNVTNWKRQKHLNLSHYAY-

>BmorIR7d.3

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WCAPPRREIYAWAKVLLPFLTNITPFLVLAFTVFVITIVLVKRSKLGHIKSNKNVFLQSFMI
LGQGVKFKETKSSVINSFFVAWLWFLIVRIAYQGDVNLGLQKKIYEPFESVEQALQELDG
YGGTELFREYYAGSPIADNYQVIKIGDLPRYIRDVIAGKRFLIATDILMHQYAKKFQILQEP
LTHSPTCLFMRPGWPVSRRVDVIIIIRAIEAGLVQKIYDFHYTVRLRRHEKEEETGTRPLGM
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>BmorIR8a

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VLRTEVWLSIVAALVLTGFMIWLEKYSYSAKNNPGAYPYPCRDFTLKESEFWFALTSFTP
QGGGEAPKALSGRTLVAAYWLFVVLMLATFTANLAAFLTVERMQTPVSSLEQLARQSRIN
YTVVEGSSTHQYFINMKFAEDTLYRVWKEITLNATSDQAQYRVWDYPIREQYGHILLAIN
ASGPVADAETGFKQVNDHTDADFADFIHDSAEIKYEVTRNCNLTEVGELFAEQPYAIAVQQG
SRLQEDISRALLELQKERFLEQLTSKYWNETLRQSCSDADESEGITLES LGGVFIATLFLGLG
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>BmorIR21a

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LYTDGLGASKPVVLSWSHGKFSRNVNLFPPKMTGGYAGHRVVAAANQPPFVFRIF
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TSKRAVLHISNECFVPGVTIGFPNNSLYTAKLNNDLRRMVQSGIVDKIVDEVREWRWEMQRSS
NGKLLSAVGGSLKVSAAEEKGLTLEDTQGMFLLLAAGFLIAATALISEWIGGFSKLCRFRK
KKNTLVNSSTKEDSINMPPTDSKDFKTETESVLHFCSRSTSPGSNESLDGQIINVTEESIEIH

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>BmorIR25a

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ALALPTISGSFGQTGDLRQWRSLNANQTKFLLQVMPPADILPESIRAIIVTKQDITNAAIFDE
LFVMDHKYKSLQNIPTRHVITPVKSFNKEDIKTLRSLRELDIVNFFIVGSLRTIKNVLDA
ADENQYFGRKTAWFAFSLDKGDITCGCKDATIVYMRPTDAKSRDRLGKIKTTYSMNGEP
EITSAFYFDLSLRTFLAVKSLDSDGKWPNNMKYITCDDYDGKNTPNRTLCLKLAFQEVKE
TPTYAPFYIPGDDPMNGRSYMEFSTDLSAVTVKDGASIGSKALGTWKAGLNSPLSLTSDS
NMSDYSAQLVYRVVTVQPFIRDDNAPKGFKGYCIDLIEIRQIVKFDYEVTLSPDGNFG
TMDENGNWNGIIEKELIEKRADIALTSLSVMAERENVVDFTVPYYDLVGITIMMKLPRTPTS
LFKFLTVLENDVWLSILAAFFTSFLMWVFDKWSPYSYQNNREKYKDDEEKREFTLKECL
WFCMTSLTPQGGGEAPKNLSGRLAATWWLFGFIIIASYTANLAAFLTVSRLDTPIESLDDL
SKQYKIQYAPLNGSAAMTYFERMAAIEVRFYEIWKEMSLNDSLSDVERAKLAVWDYPVS
DKYSKMWQAMKEAGLPNSIEEAVQVRVDSKSSSEGFALWGDATDVRYVLTSCDLQMV
GDEFSRKPYAIAVQQGSPLKDQFNAILQLLNRRRLEKLEKENWWNNPKAMKCEKQDD
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>BmorIR40a

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RFLNTMVEAMRVAVITNPRESVFRYYNQATPNRLNHLNWNWAFRLYKSPLLPSADKV
YKNFRGRVFDVPVLHAPPWHFVKYNNSSINVTGGRDDKLLKLIANKLNFRYRYDPPD
RSQSGIINGNTFKGTLGLIWKRQADFFLGDVTMTWERLQAVEFSFLTADSGAFLTHAPA
KLSETLAIIRPFRWEVWPLVCATLITGPALWVIAAPSLWQRKRDQMGLLNCCWFTVT
LFLRQSSTKEPSSTHKARLVTVLISLGATYVIGDMYSANLTSLLARPAKEPIGTLPALAEA
MREHGYELVVESHSSLSILENGTGVYGR LAKLMKRQVRVQVHNVEAGVRLVLNRRRVA
VLGGRETLYYDTERFGSHNFHLSEKLYTRYSAIAFQIGSPYLETINNVMTLFEAGILGKM
TTDEYKNLPEQSRSEPVTESENLSTEKTGETAAVTQIQNETSKGLEPVS LTM LGAFCLL
GIGHLLAGVTLLIEIQLYRRARKRALPPQTRNPTNTFKAKAKKCILRGWRRIKAAAILAIDR
ALAPDRGID-

>BmorIR41a

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IGSVVEGRSDFGIAALYSWYEEWKAMDFSVS VRS AVICLVPAPRVLESWELPFLPFKSI
WIAVVITFVYASIGLTIAQGCSSNKALLIVFGTIIQSQYIVSDSWRIRSVIGWLLVSSLILVSA
YGAGLASTFTVPQYEPSIDTVQDLLNSRMEWGANHEAWTFLALSSEPVAKKLIKQFKIYS
FEELQRRSFLRKMAFSLEELPAGTFAIGEYLSKEAVQDMQLMLEFFYFDHCVAMLHKNSP
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>BmorIR64a

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LSNSVWYCVIAFLVFASTVFFMLKFNIDEIERAETSQSLAFLFAWSAICQQGMSLRRLNSLA
LKVVVVFVTFVCSITLYQYYNATVVSTLLKESPITIRTLKDLLQSDLKVGVEDVAYVKDYFA
HTKDPIAITMYEKKIVTGNRNFFDPEYGMVSLVKKGGYAFHVDTVYSYGIMKKTFTEREI
CEIHDVTMYPPQKMGAVLKKNSPYRNYFAIGIRRLWETGLMQRMKHIWDEPKPPCVRTQ
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>BmorIR68a

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VLXITGTIFYGLARYQTYLHGLKRQEEMKPKVYSKPVGLYLFGEIINSILYTYGMLLVVSLP
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>BmorIR75d

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LKQVDEYGVELNGSFTGTVGLLQGRAELGVASMFMRSDRWRVLFHSSATVALLNAFML
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>BmorIR75p

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CLILIMEMLVFKM-

>BmorIR75q.1

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VSDVTILVISAISQQGSSNELKGTLAGRAVLFLFLFLYISYSANIVALLQSNKQIRTLQD
LLNSNLNIXDGKPLFQTATEPIRKAIYETKVAPKGSKANFMSIEEGVKKLQKSPFAFNMNIG
TGYKIIERYFEEHEKCGLQEINYIESSIPWMSKRNSPFREIYKLGFLKLEHGITDRENRL
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>BmorIR75q.2

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EEGVKKMRKGLFAFHMETGVGYKFGYKFKYKESKCGLKEIQYLQVIDPWLAVRKNTPYK
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>BmorIR76b

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>BmorIR87a

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>BmorIR93a

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>BmorIR143

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>DplelGR1

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>DplelGR2

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>DplelGR4

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>DplelGR5

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>DplelGR6

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>DplelGR8

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>DmelGluRIIC

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>DmelGluRIIA

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>DmelGluRIIB

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>DmelClumsy

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>DmelGluRIID

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>DmelGluRIIE

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>DmelCG5621

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>DmelCG9935

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>DmelCG11155

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>DmelGlu-R1

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>DmelGlu-R1B

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>DmelNmdar2

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>DmelNmdar1

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>DmelIR8a

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>DmelIR25a

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>DmelIR21a

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>DmelIR31a

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>DmelIR40a

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>DmelIR64a

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>DmelIR75a

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>DmelIR75b

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>DmelIR75c

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>DmelIR75d

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>DmelIR76a

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>DmelIR76b

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>DmelIR84a

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>DmelIR92a

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>DmelIR93a

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>DmelIR7a

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>DmelIR7b

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>DmelIR7c

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>DmelIR7d

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>DmelIR7e

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>DmelIR7f

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>DmelIR7g

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>DmelIR10a

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>DmelIR11a

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>DmelIR20a

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>DmelIR41a

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>DmelIR47a

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>DmelIR47b

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>DmelIR48a

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>DmelIR48b

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FVYSTEYLGLLKSMLISEVFEKQIDTFEALVESNITLMVDPYDKILFAKYNMPEILSPIMELV
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>DmelIR48c

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FLVELFA-

>DmelIR51a

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>DmelIR51b

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>DmelIR52a

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>DmelIR52b

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RRHLPYRHLFDEHMMQQHEFGFVNYWMSHSFFDMVRLGLTSLKDLSRPLAYTPSLLMD
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>DmelIR52c

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>DmelIR52d

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>DmelIR54a

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>DmelIR56a

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>DmelIR56b

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>DmelIR56c

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>DmelIR56d

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>DmelIR56e

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>DmelIR60a

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RINKMRPQFPETAIVLTTEHLKGPFFILVVGSCWAALTFIGELIHRWRTQLVSTSEQQDRS
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>DmelIR60b

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>DmelIR60c

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>DmelIR60d

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>DmelIR60e

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KAYRDGLNQSYIYIYEDRLELILMQQYLLKTPRFNMIRQAVGFTLESYCVSNSLPYLAMT
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>DmelIR60f

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>DmelIR62a

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>DmelIR67a

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>DmelIR67b

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>DmelIR67c

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>DmelIR68a

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>DmelIR68b

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>DmelIR87a

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>DmelIR94d

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>DmelIR94e

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K-

>DmelIR94f

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>DmelIR100a

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>HmeIIIR7d2

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>HmeIIIR7d3

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FYLYRKYNSTTFAEGIRRAALS RNFVVASRKA EYMDQELGKGAGLIYCFPESDNLKYK
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>HmeIIIR93a

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SWWRALAADTWGATYREKTYETKRNVTISIVIEHVVELLNVGWWRPIDGIKFEDVLFPHIVH
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KTYTWSISKGSFLEMQLKSSDEPKYKALVKGAEVTGGINVEGSLVSGSEILNRVRNQRH
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>HmeIIIR143a

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>iGluR1

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GSFMQQGSDVVPRLSGRIVGTVWWFFALILVCSYTANLAAYLIVERIAEPALSTVSYSPNI
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>iGluR2

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>iGluR3

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>iGluR4

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>iGluR5

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VKNGLMAFIWDSRLEFEAAQDCELVTAGELFGRSGYGVGLQKGSWADLVTLAILDF
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>iGluR6

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>iGluR7

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ERVLKSKNTYAFFMESSTIEYKLRNCKLKKVGGELDSKDYGIAMPANSPFRTDINRAILR
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QAKAIENFMNLEKAV-

>iGluR8

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LCRTYWIWVAVLFQASVHVDSRPGFTARFMTNMWAMFAVVFLAIYTANLAAFMITREEY
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>IR1

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LYNYTSSVVSWLLNAAAPSIGNLDGLINSDFELIFEDIGYTRGWLANPGFYYSGFNNV
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>IR1.2

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RWIGSYEKNSKVVSTSLYFREQDVSPVIRGLSTVYERIDVINPPLTSIETRYYYRIPTMGPG
KFENQFLRPLSTTAWWSVIGVSTLCAGLLLLSALLEQRPSSVQYAVFSVVASLCQQFFQDID
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GYTRSWLQSPSYFNKRNAPIEDELQKKVFNKKKNAPLLEPLVQGIKMOVQKGGYAYHT
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>IR2

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DRKSDAEMKILEHFS DREGRPLIDIVDECFMNYFLSYITRSGFPFFEEIQIFTQRLLLEAGLPT
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F-

>IR7d.1

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DSGHFANNWTGSLGDIYNNHSHASVCSAPITSGKYGNFQISFTYYSMDIVWATRLPAQQ
APWQKLLHPLNIYIRIILLLMFICIIIFMN-

>IR7d.2

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REKNGTWMGSLADVDDL ANFSMTSAAITL TRFTDFQISSGYSTSKV VVWVSESAQVQNV
ALKLLHP-

>IR7d.3

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>IR8a

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FAEQPYAIAVQQGSR LQEELSRALLELQKERFLEQLAGKYWNESARQACPD ADESEGITLE
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>IR21a

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VFITLMSTALPRYRAILGPFHWHVWVALTFTYLFGMFPLAFSDKHTLRHLLHNSGEIENMF
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>IR25a

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VWLSILAAYFFTSFLMWVFDK WSPYSYQNNREKYKEDEEKREFTLKECLWFCMTSLTPQ
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NLGLTFKPKF-

>IR41a

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FP HDLTNLYGKVVRVACFTYKPYALLDIDPAIEPLGRDGV EIRIVDEL CRWINCTVEIVKED
VDQWGEIYANESGGIGVIGSVVEDRADIATALYSWYEEYRVMDFSVAGVRTAITCIA PPR
LLSSWEMPLMPFTWYMWLAVVFTYFYASTGLLTAQGCSTTTY PFFNVFGMMIGQSQYES
RASWRIRGVTGWLLIAGLILSCAYGAGLASTFTVPRYEPSIDTVQDIVDREMEWGATHDA
WIFSLTLSTEPLVKQLVSQFRIHSFDELKRKSYTRSMAYSIEKLPAGNFAIGEYITQEAVLDM
MLMLEDFYEQCVMMRKSSPYTEKVSQLVGRLHQSGLLLAWETQVALKHLNYKVQVE
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>IR60a

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FLNTWITVLGFVSYLHPVKESLRVFFVFLNIY CMLFSTAYQTKLFEVL TNPSY EYQIQTVEE
LVESGLKFGGFEELHDLFYNSTDPFDYRIGDQWTDITNITEAMIDVAVHRNFSL LCSRLELA
HISGITPELSDSVGNKYKYTFTDNVFSVPIETIALRGFPFMMEFSTTITIFKQSG LNEGLRQH
FAHFNERRRARQLRALLKEKSDVNPLSSEHLQGGFLALALGYVSGTLALIVEVILNCNYV
QNKFENFKRRVNPLS-

>IR64a

INRESTSTKLLIFITFMYAVTLYQYYNATIVSS LLEAPRNIRTLKDLLSDLKAGAHDIVYN
YDYFKRTTDPVAIELYHKKVVTATQHNYFPAEK CMDLVRGGYAIHIDTSVAFLIKATFNE
REICDTTLVQMYPLQRMGVVMRKNTQYREHVANAIRRFSEAGLPQRLRSVDDEPMPECA
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>IR68a

GMLLVVSLPRLPMGWSIRLLTGWYWLYCILLVVSYRASMTAILANPAPRVTIDTLKELVDS
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ISVVRKNSFMDPKQNTANNTTEVTGRKDTQRNLHIMTDCVNVNIPISIGFHKNSPLKPLADI
YMWRVVEVGLVEKWLNDAMYQIRTLETSEDEVKALMNLKKLYGAFIALAIGYLSAICLI
GELIHWIIIVKRDPNFDKYALHLYLHKNKKH-

>IR75d

MGIGREQFVWRVGLPASAYRCVIMISSISSFSSSSSGGCLAASAAMDVYGVSHNGSFDGL
VGRLQRNDAEVGLASIFIRPDRMQVADYISETCVLLCAFIRQPARSASVSNVFLAPFSAGV
WAASAGVAAAAALLLVALRAVLQRTRQRDDLALFTLPETLTFALGTLCQQGFHTTPGVTS
VRLVMFSTLLASLVFTAYS AKIVAILQTPSDALRTIDDLTRS-

>IR75p

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SYRYGYKVDGQWSGMIADLYSNKADVGTNCVIFRDRFDVVTYTDLVAPMRMLFIFRQPP
LAYVANVFYLPFSTRVWVTIAVCTAIATVTLYLASKVELVLTAKSTQQQLDGGICDALLT
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KITLAANDVDYNHFVFNQSKPLHTSIRDRVFPENGKARLYSLADGVERIRKGLFALHSVA
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FLVSKPHCTTKMSSFSSVGLMDMRPVLILMLYGVAVSVTIVIGEIAVYKLMNRYKRSSKVQ
LIKVMK-

>IR75p.1

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WVPGQKRSPFKDLFKINFLKIRESGVQANIHQRLTVPRPRCSGHVSTFSSVGITDMYPAML
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>IR75p.2

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TPGYVFSYRWGYKVNGKWSGMIDDIHSGRAELGTNCVVS DIERLDVVAYTDRLAPFRVR
FVFRQPPLPYVANIFSMPFSKNVWIAMSVCAVLSTATVYLA AKWEAKEGKGTQLDSIGD
AMLLTFS AIGQQGCVM EPRRLSGRMMVFLFTALMALYAAYSANIVVLLQAPSDSIRSLP
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QSALSKRLQVPKPHCTSKMSSFSSVGLMDMKPVLILMLYGVCLSVTIAAAEILVFKLSEHR
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>IR75q.2

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RAISNIDVLLDSEVLVLRVDDVYEMHFIYKISPNNTWQTEFYGTWNAKHRFQKSPRFEP
TSLRRLDIDGYEISICYVLTNNESVNHLSDGLDDHIDTITKVNFPPTNHLLEDLFLNAKRKYIF

ANTWGYRVNGSWNGMTGYLVRGEVEVGGSPMFFTFERSIVDYIASPTPTRSKFVFQQPK
LSYENNLFLLPFNNTTVWYSTIALVFIIYLVLLLVTKWWEWKKTQDLLETREKDAGVLRANV
VDIIVLIFGAACQQGSPSELKGLGRVVMLVFLALMFLYTSYSANIVALLQSSSSHKTLED
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FHMETGVGYKFGVGYFNEGEKCGLREIQYLQVIDPWLAVRKNTPFREMFKIGTKRIQEHG
LQYRENRLMYEKRPKCTGGGSNFVSVSMVDCYPAVLILSYGAIVALFLLALEILAHKKENI
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>IR76b

MAGIELIISSICNATFCDVPIYGGADKGEVLTPEVINFKSLMQDVNGKNLKVTTYNNTPLS
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VVAPNAFMKKQRAFAYPVGSKLKSFLDPVLTQIFQAGILDFLKRSDLPSTKICPLDLQSKD
RKLNRNSDLIMTYLVMVAGSATAVAVFAAEIFIKRYSVKVNKTCKTKDRNKKSKIGKKSTR
YDDSRPPPYDSLFGKNPRFNVETTRTKIINGREYYVFETGNGDRKLIPARAPSSFLYRSDK-

>IR87a

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NNTIYEFEKQHDMPSPDMKGCPLVAYAVIAEPYVMPVPGKITNSSFDDAYEFAKGGGINLV
KIISQFTNMSLITRTSDILENWGVVYQNGTATGAFEVLRNESADLVIGNVEVTRILRKWFHP
TVNYLQDEMTEFLPKAGQAPTWDNLVIFQWTTWVATFFSLVIMGLVFHFVYREHTNAT
KWPTNSLLMTFSMLLGGWASFEKSPTRILIFAWLFCFSINMGISYESFLRSFLMHPREFEQ
ISTEADLIQSRPLGGREIYRSYFETNNASSFYLYREYNSTTFSEGVRRALERNFAVSSRR
QAVYQDQKLGKGAPLIYCFPESNNMYKYGVAILTRRWFPMLERFNNIIRSVEENGLIDKW
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RLR-

>IR93a

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GFWRPIDAVRFDDVLFPHIHHGFRGKELPIITFHNPPWTILERNESGAIVKYSGLIFDIVNQL
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PGINYTMPVSIQPYAFMIARPRESRALLFLLPFTTDTWLCLGLAVILMGPTLYIIHRMSPYY
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GNLVAFLTFPKQEVPTTVAELLENRALYTWSITKGSYMEMELKNSDEPKYIALLKGAEM
VTTSVGMGGTMTSGSALLQRVRFHRHVIIDWKLRLSYLMRADRLESDNCFALSAAEFFD
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>HassIR93a

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AELENRALYTWSITKGSYMEMELKNSDEPKYIALLKGAEMVTTSVGMGGTMTSGSALL
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>HassIR75d

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PQGERAYHSVVDGIARVRTGLFAFQVESSGYDIIRQTFTEREKCSLKEIEAFKLPLVAVPM
RKNSGYRELFATRLRWQREVGLMSRERR-

>HassIR87a

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GASFEPKSPT-

>HassIR76b

MAGIELIISSICNATFCDVOPYGGADKGEVLTPEVINFKSLMQDVNGKNLKVTTYNNTPLS
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FMILLSAFYTANLTAFLTLKFTLAIENPRDLYQKNFRWVASAGSSVEHIVKTEGEDLYYLS
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VVAPNAFMKKQRAFAYPVGSKLKNLFDPAQTQIFQAGILDFLKRSDLPSTKICPLDLQSKD
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>HassIR75q.2

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IALVFIIYLVLVLLVTKWEWKKTQDLIETREKDAGVLRANVVDIIVLIFGAACQQGSPSELKG
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>HassIR75q.1

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VFLAFLYTSYSANIVALLQSTSNQIRTLSDLLNSKLELGVEDVLYNRYFSPAQSASDPIK
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YYQNAKWLCGKNSPFSEMFKVGYIRIQEHGLTDRENRLTYAKKPVCSVMGSSFDVSH
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>HassIR75p.2

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>HassIR75p.1

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WLAIFICVLGCSIFLYIASKWEASMGMHPLQLDGSWADVLLMIGAVLQQGCTLEPRYAAG
RCVTLILFLALTILYAAYSANIVVLLRAPSSSVRSLPDLNLSPLKLGASDFEYNR-

>HassIR75p

NGKPRLYSLADGVERIRKGLFALHSVAEPVYRQIEATFLESEKCDIATVDYLVTFDSFTPVR
KGSPYLELIRVVHKQIRESGIQSAIRKRFLVSK-

>HassIR68a

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>HassIR60a

LKFGGFEELHDLFYNSTDPFDYRIGDQWTDITNITEAMIDVAVHRNFSLLCSRLELAHISGI
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NERRRARQLRALLKEKSDVNPLSSKHLQGGFLALALGYVSGTLALIVEVIVNCDYVQNKF
AQCKRRVNLLS-

>HassIR64a

VVMRKNTQYREHVAYALRRFSEVGLPQRLRSVDPEMPECAHTPDSSVFCVGIREFSTPL
LVLALGMLVS-

>HassIR41a

VSQFRIHSFDELKRKSFTRSMAYSIEKLPAGNFAIGEYITQEAVLDMMLMLEDFYYEQCVV
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PLNLDNVVGIFIVYAIG-

>HassIR40a

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PVLPPTDKVYHNRFRIFEVPVLHAPPWHFVKYNNNDNTT-

>HassIR31a

FDVETTWELEYLKSKKTSKFYQELERGVELIQQGNTAFHSEYNQIYPHFKTFSDDHIC
KLQHVDTIPETLTWVTSTKNG-

>HassIR25a

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IVVGNRTDAKSFLENVCRKYNDMLLAKKTPHVVLDFMTGTVGSETIKSFTEALGLPTISGS
FGQVGDRLRQWRTLQANQTRFLLQVMPADILPEAIRAVVTKQDITNAAIIFDEFFVMDHK
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GRKTAWFALSLEKGDISCGCKNATIVHMRPTPDANSRDLGKIKTTYSMNGEPEITSAYFYF
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QDDPMNGRSYMEFSTDLLAITVKDGASISSHSLGSKAGLSSNLTLDPNNMSNYSAQLV
YRIVTVEQKPFIRDDKAPKGFKGICYDLIEEIRQIVKFDYEIILAPDGNFGTMDENGNWNG
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VWLSILAAFFTSFLMWVFDKWSYQNNREKYKEDEEKREFTLKECLWFCMTSLTPQ
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LNGSAAMTYFQRMANIEEKFYEIWKEMSLNDSLKEVERAKLAVWDYPVSDKYSKMWQ
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AVQQGSPLKDQFNAILQLLNKRKLEKLKEIWWNNNPETMKCEKQDDQSDGISIQNIGGV
FIVIFMGIGLACVTLGVEYWWYKWRKRPVVGDTVQVEPAKSTRNNVDKQGEFTFRGR
NLGLTFKPKF-

>HassIR21a

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AELEYIVQANFTATKSKRAALHISNECFAPFGITIGFPNNSVYSEKMSLDIRMIQSGIIDKIA
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GGFTRRCRFQRKNDTPISVNSREHLIPTPKTDIGSEIKIIGDTESKLHFDSRPSTAASRDTEG
QIINV-

>HassIR8a

QEQLTHEISKALKLAESGKSDVKLDDAIVVLDRETEEESYRMLCSSLSKGVSMIIDL
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GASNIRVWVHAGLTRDSAKALKTMRPEPSFYVIVGENGFIMDTYRRAVKEKLVRRDFRW
NLILTDYSTLELSQLVLPVILQADPGECCKLMKREDCSCPADFQRKQYILNALIQYIAEVY
SKLDRDLPMTTSINCEEPEATMNSTRDLRFQFAEDTEISNETLFYWMDRSGLFLRSRFI
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YDDDQPLYEGYCIDLIARLSETMS-

>HassIR7d.3

MIRVLRILVVQLLLRNCYASSKLIETAVNISITTYNLHFTTTVIWKQNESECVTGFLQSYPG
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NSEISSFIEVTARNDQADLILISENDAGEVTLSTFFPYSEGVCNGYTPVFLKYGDELWPKKF
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FIVPDKTNFTYLHLLVYILFVIVAMLVKCKPQMTSATNRILYQSFILLGQSAKFVTKSWLL
NSLFLVLIWFCFFFRIDYQADLVDALQTLDELPFESIEEAVTKVEGYGGVEVVVDYKDY
TPLERNYKVIPMNELKNYIRRIVEGENFILATDIALVKQLEPYVQILKKRISATGACFYMRP
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>HassIR7d.2

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>HassIR7d.1

EDPVSELGTLAAKVAFYNFWEFRFMTVVMYNTVQAIGLNTFLMHYEKSVVVKLGRFLPAR
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>HassIR2

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MPVVGFDTGVCVEKCHNVSIHTRLRANNLGTCIGFNTHVVSYNDFKHLRNLKLFEDRT
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HHFFRIFLAIALWCFFVINFTSQATIISFFTAVKRGKEVDTFEDVVAAGYPLEAMASPDILP
DTEEKFRINSRLVNEVDIYGCVDRLKTDPRRFCLLDCSVGRYIKRNKLNDRGEQYLHIAE
QDRIHSHYLAMVFSEHSPMTERFSKYMMILCEAGLIRKWEQYRYTDIKDDVTTKPLAFDD
LSGIFQVFCFMVGNTLIFFLELVASRIKTCQNIKIPHGLPKRNIE-

>HassIR1.2

GTKRISTARKVTLVTGLSCVLLYNYTSSVVSWLLNGPPPSINSLKELLESPELIYEDIGY
TRSWLQSPSYYYNKRNAAIIEDELQKKVFNKKNAPLLEPLVQGIKMVKGGYAYHTEV
DSANALISR-

>HassIR1.1

NLDGLINSDFELIFEDIGYTRGWLDNPGFFYYSGFKNVKEDELDRDKKVTAKKRTVPVLQT
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>HassIR8

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GEQLWEEIGTWNYSYPRERLIKDIVWPGGLHTPPQGVPEKFHMRTIFLEPPYINLAPPDP
VSGRCSLDRGVICRVAPEVEVAGLEAGAAHGNSSLYQCCSGFCIDLLQQLAEQLGFTYELV
RVEDGRWGTLHHGKWNGLIADLVNKKTDMVLTSLIINS DREAVVDFSVPFMETGVAIVVA
KRTGIISPTAFLEPFDTASWMLVGAVAIQAAATFSIFFFEWLSPSGFCSTGNN SKRVPQNRFS
LCRTYWIVWAVLFQASVHVDSRGTARFMTNMWAMFAVVFLAIYTANLAAFMITREEY
HELGLDDPRIARPLTQRPLKFGTVPWSHTDATLAKYFTEPHAYMARYNRSTVSAGVTC
VLTGELDAFIYDGTVLDYLVSQDEDCRLLTVGAWYAMSGYGLAFTRNSKYVSMFNKRLL
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>HassIR7

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GLLRVQKILAEVSLQSQIHMYKLDPEGDNRKIFKALRKFQVSRFLDCHSDHILHYLAEAD
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>HassIR6

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>HassIR5

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>HassIR4

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>HassIR1

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>MsexIR1

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FK-

>MsexIR3

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>MsexIR4

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>MsexIR7d

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>MsexIR8a

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>MsexIR41a

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>MsexIR64a

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VN-

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AVCEVWKSARKVAVDERKEEASLCEMASELSALKCPSSGGSNGGAGGARDGAGSPYL
HYGFNTKSQLH-

>PxylIRk2-1

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DFTKPFMNLGIGILFKVPTSQPTRLFSFLNPLAIEIWLYVLAAYILVSFTLVMARFSPYEW
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TANLAAFLTVERTVLPIQSAADLAAQNQVQYGTNLGGSTMTFFRDSNIDIYQKMWHHMS
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>PxylIRk2-2

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VDERVYF-

>PxyIIRk2-like1

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EIVTPQTGTFRKLPNGSWDGVVGDLMRGETEFAVSALMTAEREEVIDFVAPYFEQTGIL
IVIRKPTRKTSLFKFMVLRTEVWLSIVAALILTGFMIWLLDKYSPYSARNNPEAYPYPCRE
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>PxyIIRk2-like2

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>PxyIIRk2-like3

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>PxyIIRk2-like4

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>PxyIIRk2-like5

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A-

>PxyIIRk2-like7

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>PxyIIRk2-like8

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DAVILYTAALTALGLEEGAASVCTKDDSWSYGSSVINYIRTMELDSLTLGLIKFDEEDGFRSDF
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>PxyIIRk2-like9

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AGAYFGVSVLLFILGRFAADEWQNPYPCIEPETLDNQFTMANSFWFTLGSLLTQGSEIAPI
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>PxyIIRk3-like1

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KKVAVEPQELSCDNYDSWAYGSSLLNFMRTNKINGITRQLLFDGFGQRTNINLEIMELTPA
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>PxylIRk3-like2

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DNYDSWAYGSSLLNFMRTNKINGITRQLLFDGFGQRTNINLEIMELTPAGNQSIGEFNNGLL
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LTVEKNVLPFTNVEELYRHKSISYGAKKDGSTINFFRDSKNEIYQKMYSKMKSNPGLVLT
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LLTLKERGDIQKLKDIWWKEKRGGGKCGVKRDEEQKQLTLRNMVGA FVVLGVGCLLGL
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RMRSYD-

>TcasIR40a

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GSSASENGTFKGVGLIWKRQAEFFIGDVALSHERANYVEFSFITLADSGAFITHAPSKLNE
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LLKQTGKEPSSSHKARFFIILSISSTYVINDMYSANLTSLLAKPGREKAINNLNQLEKAMAT
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GRETLLFDIQRFGASNFHLSEKLN TAYS AIALQLGCPYIEEINKILMAIFEAGIITKMTENEY
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LEYLE-

>TcasIR21a

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NKNALYSKIIDQGVLAQVQSGIVDKIKNDVEWETMRSASGKLLAANSYGKSLKALTVDD
RALTLDDTQGMFLLLIGFLLGGASLLSEWMGGCLHLCKGKRNQSATSISQSNYRSHEVPT
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PEEELSEENGKK-

>TcasIR76b

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>TcasIR93a

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>TcasIR64a.1

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ASYKIFLRPLSRTVWICIVLMMVLLMLFLKVVFSREKRLQKRNLDSSWSFLFLFTLGAF
CQQGATCHPQLSSRTLSIFVFLFCILTYQFYASIVSYLLIDPPRKINNLKDLSDSNLRAGIE
DILIDRNYFVQTTDPVAIELFNKKIKFSNNNSGFYEPWDGLDLVKQGGFAFHVETSTAYPIIE
ETFTNEEICELEEVQMYRTQPMHTNLQKNSPFREMMNYCMLHLVENGLMYRLRKYWDA
RKPMCIESA KFTFN VGLKEFSSGLIVLSYGILISLGLLLREVIVHKK-

>TcasIR64a.2

MSPPLPFMILLSVLTQTHALLDINLIENYFTEKSIKSATVFGCFRKTEQLNLVKIFSRGSSPIS
VLNLNQAGVYQSIKSNHQIGVVLGDGDCPESESFLITVSPGFTHIAPNVVFISVRSTETXFD
VKHHWLILSKSIQFLEKIKNAVVNINADIHVAVQSGTNWTIFDVYNPASEHGGSLKYTRVG
FYSRGRGYNAAQTNEAKYWRRKDMTGVTFTKTMVLLVPFEGPLEDYLHNDNDRNINTFN
RFQNKLLRFCRDYYNYSMIVELGSSWGYPPNGSFDGMVGAMEKKLIDFGSSPIFVREDR
ARVIDYGRNTWSWKAGFLFRSPKSRTSIEIFLKPLSTSIWLITGVLATASIVILKMVTTFERN
RYHSTSETSWLSLFLTLGALCQQGSPWVPKMACGRITASIFLLSLIYQFYSASIVSHLLM
KPTNKIRNLKDLTDSSLKVGCEDIYNKDLFAHTTDDKVLKDLYAKKIYGKNGTSHFFPPEK
GLDLVRQGGYAFHIEVARAYPIIETTFPDNAICELREVKLFKNTDLYNTMQKGTFFRDMLE
SCFQRLAEQGILDREKKHWHPRKPECIQSSQAFVTFHVGLDEFYPALLVLLIGIVISLTVLV
VEKQIHIAREKMEREKGVVF-

>TcasIR64a.3

FQLRVLMERLFFLSVLAVIYTTNCTDNHDIITSYIKEKSVKYATVFGCFTKKEKINLVKIIISH
ICPISVFDINRLNIENRMESRHFHTGIILDGDCPSAEKFLINCGRSYLFDVKHHWLIVASSEKI
REKFNNVILNINADINVIIEKPSNWSIIDVYNPASQHGGLNFTRVGFYNKHDGYKIKYTG
VKYWNRKNTLGVTFKSMVVVYTKTXKNSAYTIFQLPVPFEGTLQHYLDSDDNDRDVNTF
NRFHSLISFCRDYYNFSLDIEVSKSWGYNEDGTFDGMVGALEKIIDFGSSPLFLREDR
ARVIDYGRNTWILRSLIKQQFRIISNWGFSAAFIFRNPKVRTSLEIFLRPLSSVWLITGLLAI
VSIILKLATSFERRRYVYDVETSWSISVIFTLGAFCQQGSPSTPKMACGRIATFFIFLLSVLIY
QFYSASLVSHLLNKPLTKIKNVRDLLSPLKAGCEDILYDRDYFLHTTDDKVAKELYAKKIL
GKSNSSNFHTPEAGLKLVAEGGYAFHVETATAYPIIESTFQDQAVCELREVPLFRTQPMHAN
FQKKSPFRDMFDTCFQRLAEHGLLVRERKHWHPKPECIQSSKSIRFNVGLDDFYPALVIL
LVGIVASLLILVIEKEFRILTENPA-

>TcasIR75q.1

SFLGTILTUYKQLAEKKIVLNVLTNHWKINQTKLSQHTFLVGDITLCPQFNSSLSHVSKFFC
YQNSQQTGLQIITSSXKWLVDQNSTVNTNDLLLDNSNFAVASQISNGRFHLKLCYKRAPNE
TIKFNEIGVFSNGFEYYNHFIPTNRSDLSGVNITVSYVVTKPDYPFVDEYRFRHLEAFSK
LSYAMVYPMLEMLNCTKKFIQRSSWGYKGANETQFVGGMFGDIQNGTAEIGGTVSFYTV
DRMSVVDYLSVTTPSDLKFILRAPPLSYVNNLFTLPFDTKVWYCLYFIVGVTVLILYVIVR
CESTYENALERNNIDNIKPKFFDVVMLQIEAITQQGSENEPKTMSGRIAVFVFLVLMFLY
TSYSANIVLLQSTSANINTLQDLLNSKITLGVEDVVYSHHYFETQTEFTRKSIYEKKVAPK
NQKSNFMTTEMGIEKMKDEFFAFHVETTAGYKQIMDTFQEHEKCGLEIDYLNVLVPSITI
RKNSPYKEIVKVNFRKIYESGIRHRQLNRIYKPKPHCVGKGGSFKSVGIVDIYFSVEIFAIG
CFMALWLLLLLEVLFKKKIKFLVQ-

>TcasIR75q.2

MKILIVFICLLINETTQNNFTDNLIVNTFNFIKILNVPVKISAHICWTRGKFDSSLMKLYXTV
LANTIHFIKISISDKYNTNLIKNSPKYANPEHQLFIIDLKCNDSLSVLQQAEEKFLKFKSPFK
WLLLGNSESLPNLYFGTDSQIFVTEPRSQLDDIKTIYKYSMPVPRFVQHSFDRFYTNTKRT
NLMGTTIKISYVITNLDLNLHLDYRLQELKKKLYHFLICRNSHIDAINKLNILVHNLM
FLNASRQFTMQPTWGYKNSTTGLYSGMAGDLQKGLADLGGTPLFFTPDRIDIIDYIAATP
TYMKFIFRAPPLSYVTNVFTLPFDSAVWHYCFVMVAVVVVCIVIVVWEWKETKFEED
THSHIDTLRPNIFDVVMFEIGAITQQGTNAEPKSNSGRIITIFSFLTLMFLYTSYSANIVALLQ
STSDSIKNLEDLLNSRIKLGVEDIVYAHYFENAQEPVRKAIYQQKVAPKGQKPNFMTAE
GIRKVQQGFFAFHVELSTGYKIIGEVFQEGEKCGLEIEYVNLIEPWLATQKKSPYKEVMK

IGMRKMHETGVQNREIRKIYTRKPQCHSGGSNFGSVGLIDCYSAFLTFGVGI AFAFLLFVM
ELIVRRYFIRREKERLK-

>TcasIR75s

IVLPMINDLIEHFNKTQIILAYLCDKNGTNLLLRNNNTNFRRLSGSEPLFXKKLYQVNVL
SPNSRDMPYPTPPAFLTYVLDAGCSNTKQLLLLVPVITHXLIFGNNILKASEQKQFATPFKW
IVYYNNPVELSFFIDEYFTKTNILVDSVTLATINPTSGTFDLNKIYKRKINGSIIHENIGIWGR
GLGVTDTGYEKITYKRRRNLTKTVLKSCIVITNNDLSLNHLTDKRDHIDSIKVNYYVLVQH
LSDTINASLEYSVRGTWGYKDNKSQWSGMIGELTRNEADIGGTALFLTSDRIRVIDYIAMI
TPTRSKFIFRQPKLSYVANVFTLPFDASVWASVCGLLVIIAGLLYVVVRWEWKKKDYVQV
VVFFAFWVDFPSSVFCRTNRTSRKFTILGSXVFITFGALCQQGSSSVPFSPGRITLIFLLVSL
MFLYTSYSANIVALLQSSSSSIQTLQDILNSRLDVGVDNTVFNHFYFPNATEPIIRAIYQQK
VAPPGQKPKFYPIEEGIRKMRQGLFAFHVETGPGYKVFSEIFREDEKCGLQEIQYLQVPDP
WLAIQKNSSYKMKLVGLRLLQENGIQEREVGLIYTKKQPCLARGSSSISVGLVDCYPAA
VVLAGGIGAALAVLILEIYVHQRFVGFLL-

>TcasIR8a

MVISENLDKTTANRLKAIRPIPNNFAIVATSSNMEELLQTALDENLVTLPERWNLVFLDFQY
QQFDKKRLKNMPINLLHMDEEICCRFLQSEKCECPHDFNLQENFLSLATNTLAKILKTMTM
ENLLRADLNCDDSRYSRTRFRYELLQEQVDSNDLVFKENFGLHVNINGVIETGDEKVAE
YNYKTGVTVLDGKKVEPITPFFRIGITHALPWSYKETDSSGNTYWTGYCVDFTEELSKLM
GFGYEFVEPKSGTFGKKRDGVWDGVVGDLATGETDLAITALIMTADREEVIDYVAPYFEQ
TGITIVMRKPVRKTSLFKFMVTLKLEVWLSIVGALIVTGFMVWFLDKYSPYSARNKKAY
PYPTREFTLKESFWFALTSFTPQGGGEAPKALSGRTLVAAYWLFVVLMLATFTANLAAFLT
VERMQTPVQSLEQLAKQSRINYTVVKDSATHKYFINMKHAEDTLYRMWKELTLNASTDD
TQYRVWDYPIREQYGHILLAINDSNPVANASEGFRIVNEHTDADFAFIHDSSEIKYEISKNC
NLTEVGEVFAERPYAVAVQGGSHLQDEISKILNLQKDRFFEQLQAKYWNHSGKGCPTT
DDNEGITLES LGGVFIATLFGALAMITLVGEVLYYRRKSKIQNSETKKPKTVQTSENWKT
DTLMPVSLINKDKQSVTIGTEFKPVNRNRDLSEFGHITLYPRARNRITQTSNE-

>TcasIR25a

MASSSAIYRIAIYSRIATAHLNYSDFLNNVLTEHKMLKLVAFIFYCTNLANGQTTQINIVL
FVNEEGLVAEKAVDVATNYIKKNNKLGVNADPVKVVGNRTDASGLLDSLCSYNEMIA
NSMNPHLVLDTTMTGLASETVKSFTAALGLPTISASFGQEGDLRQWRNIDENEKEYLVQIS
PPADVPEIIRSLVLSKNVTNAAILFDDSFVMDHKYKSLQNVATRHHVIAPIKEADKIGDQL
RQLRKLDIVNFFILGSFENIKRVLDAADSVGFFNRKFSWHAITQDKGELKCNCRNATITLA
KPLIDAQYQDRLGLIKTSYQLNAEPEIAAAFYFDLALYSFLAVKEMIADGVWKRNNATNYI
TCDDFDGKNTPRRAGLNLKKYFSKEVSETPTYGPISIVSNGYSFMFTMQISAVGVRESSS
DKSVPLGSWKAGYDNNLTLVDPQIMKNYTADVYRVVTVEQKPFIIKDETAPKGYKGYCI
DLIQRISEILNFDYEITPVGDQKFGNMDENGKWNGVVRELMEKRADIGLGSMSVMAERE
NVIDFTVPYYDLVGITILMKLPKTPTSLFKFLT VLENEVWLCILAAYFFTSFLMWVDRWS
PYSYQNNREKYKDDEEKREFNLKECLWFCMTSLTPQGGGEAPKNLSGRLVAATWWLFGF
IIASYTANLAAFLT VSRDLTPIESLDDLSKQYKIQYAPLNGSSTMTYFERMANIEAKFYEIW
KDMSLNDLSEVERAKLAVWDYPVSDKYTKMWQAMKEAGLPNTLDEAVKRVKDSRSSS
EGFAYLGDATDIRYLEITSCDLQMVGEEFSRKPYAIAVQQGSPLKDQFNAILQLNRRELE
RLKEKWWSKNPEAKKCDKQEDQSDGISIQNIGGVFIVFVIGLACITLAFEYWWYKYRK
GGKVVDVQAKHSDVATKINDGFHAKINKLYPRSRF-

>TcasIR144

MQVSKILLSSLLLNRDETSKCLDAIFKQPVVVLRGVPKNLQNFDAWKPETYLILAPNATV
LEQMLEKWTSTIESFNPRAKFWLLTHWHEIKPKTLTILAKFYIVNVAIVTRTGQVFTYYPYK
YENIAQPDTKPVLLGQCDNVPSFPDKLPKFWRNNTTVQVLTCKLLPYVDCSDLDQGLTQI
FDLVQEFLKFKVRRIFDKSFKFLAKINGSYSASFRLQEREVDMAMGSFRSVGSTQFRDF
EFSTNHMEDKLVVVPKARPMVHWVRLVKIFEPSFWGLLVVLTVMARVFEKMARFTD
EPMGIYRKSGFRVAVLILIGSYLKKTPKRFEMRIIFIFWIYFCMVLNIVFNSNLTNVFFGTFN
TFQVNSFDDIISNLEMGLTDDVMHILSQEQNWPEITSTKVISSCAFGPAACLNRITFQRNLV
CCWGERSIKFRMAKFYTTQVHYVDDHLLFFYLLFYFVKGYPIVPQISKMIVQLKSAGFVQ
FIKSKVDKLEPRQGNELTTKILTLKRLEGPFYFLLVGVVGGIMIFGYEVVTYERKRRKKVR
QEVTKILKKKKMRQNEKVKILEI-

>TcasIR41a.1

TKMLFNNFCINILVNFIIINNYHKNSRCLLIFTDGDYKGEIPTVRIKATNGSFNSYLIFNYH
GCQSVIIYTSNVTALLIKFETEIRLKMERFNERKFLIVPQNPSDFDKFFNLKQLYFISDLLLL
LPTHNDTIFDLKTHKYVGVIDNNEPVLLDRWFSQNSFLFGKNLYPNKLQNQLGRPLKM
ATFTYEPYSIIGNVFEQFFENDFILQGKSVGEHHGSELMSAVQFALKYNMTPVPVINEKDY
WGDIFPNWSGNLLGNLVDDKADVGFSAlyTWEFCYHFLELSKPLVRTGITCLVPAPKLS
ERWLTPLFSYSSYLWFCIILTLVIAIFVLSLVFCYNHNKTLNLNYPLKRKTTYIHFLESAVTI
VLKPVFQQSLTLRELPIEIASKLLMGLVLLLALFLTSSYGSGLATVMTIPTYENAINTVEDFA
NSGLDWGATQDAWIMSIQNAEEQRYVKIVSKFHPISEEELFQFSKSGKFGFSIERLPFEDYA
IGDYIKEDVIDNFHLMKEDLYWEQCVIMLRKNSVLLPALDLFILKIFEAGLISHWQNEAVD
LYMNPKVQRAVKFYRQGQEHVVKLQWSHVKGPFALLLIGLCISFIIFILELTLKKRNQF-

>TcasIR41a.2

TLGCLTMTNLNVLLQILLKTYFLNTRCIFLFTDSTIDLQVETPIVYFKVSNTLNPSLIFQHHG
CQNILIHENASDIFVQFENLIRLNNERFNERKYIVTGHNSLKILLTKQLEYVSDLLLVPK
QTGHYELITHVYRHQNRSKINEPVLLDVWYSQNHFRQENDLFPNKLNTQNQRVLKIGTL
SYEPYSVIGKLTVNXPYYLNLGKDDYSFDGTETSLVYEFVHKYNLTPSFTIMGDDLWGD
VYANWTGIGLFGSVLNDEIDIGYAAVYTWEEYKFM DYTKTLIRSGVTCLVPAPQLAAGW
VTPLRSFSLGMWIALVIVLLSNTIVLNLFYRNQKYHXNQLFQILLFNAFSKRFFIDSLTTAI
KLYVQQPLTLTLKRGLLKYFIVTNMIMVLFISSYSSGLSSVMTVPRYGKSIQTVKDLASSH
LNWTGTTDAWIFSLRQVEEANYENIKNRFFVVKQNDLVTASKQYNFGFSVERLPYGHYA
VGPYIQRDVICNYRIMQEDLYWGQCTFLLRKNVLLPLLDKILRVFEAGLEAYWENQVK
CFGRKNMNLRFGLCLPIHGHVCPKRHYVLYTTYXEHDTIKLTWEHVEGAFVAVLVGYA
ASIFTFVIELILDKVRS-

>TcasIR68a

MIKNLLPYKCVVLISDDIYGGTFTKSWYRRFGPFITFVIRVDEYEDLLSPFEETQACLDTA
KNEGCQMYLILLSNALQVSRLRFGDKYRVINTRAKFVLLYDNRLFDKPLFYLWKRIINVI
FIRRYSGQKSDTKKNMPWYEITVPFPTQITSILIPRRLDIWTKSKFRKGIDLFRDKTSDLRN
QTLKVAAFSHIPGTTKSLQEK TARTVIGNFSGTEVEILQTVSAAMNFHCELYEPVNVVDVL
WGGKQSSGKYTGLVGEMVSTNADIALGDLYTPYILDMDLSIPYNTECLTFLTPESLTDN
SWKTLILPFKYFRPAMWA AVLVCLLICGAVFHALARFHETISQNKSVLEIHTKRKKIILSI
CPEIEKLDNLKYTKMREQYKPPRFEGQSIGLYQFSEPFNSVLYTYSMLLLVSLPKLPTGWS
LRMLTGWYWLYCLLLV VAYRASMTAILARPTPRVTIDTLQELVNSRLKCGGWGEINRQFF
KSSLDPITKLIGENFELVND SNEAVDRVAQGVFAFYENSYYLKEALVKRQLRFQIARTTQN

QSEREMRDIAREDRLHIMTDCVIKMPISIGLQKNSPIKPRVDKYIRRVLEAGLIKKWLQD
VMASILNAEVQSTQEEMKAIMNMKKFFGAIVALFIGYFISVVVLIVENYVFHFFVKRNPY
NKYTRSIHHVKKAE-

>TcasIR100l

MPRKLFLWIFFLLVSCYGNLSETHLQFLKRYFVSANSVAISMLQTHHQEVKIRDLAEVISR
KLNSIGTPVVVHENHKSGLNIIMIVWSLKILRQFLDSLVPPEEKGTYYIIILEQDCATVHSD
FAQILEQFWCEHNVLVVVQNPCSGGTFYLFPLFEHRDNFWGSCKSWDFNEQMPNKLNRN
LNQFPLKISLFLYNPTLIAKLPKGLKTNPRYHNLSASKGYGGLDGFLRELVDYFNFDPVIV
ENLEEYGRVLPNGTAFGSLGDVVNQRVHFSINSRFLMDYGTKEIEYTFPYISDEICMLVPKS
LKVPTWKTLLKCFNTLSWVLIFVSLCSTFAWYFVGPSKNLHKLWQIYCFIVGIPQKIEPS
FSQFVFLLSCTFFNVITIFGIIQGSYFTEFATTSFYDPIDTLEELYESNLPVATHFWFLLDGDT
DLMTKLKTHKIEATGDCLEQTARQRNIATLGRKSESDLIIRTKYTSRDGTPLVHIVEECHTS
LYLCGIVPKGSHFLAPFNQIITRLEGGFTTKWYRDVFDGIIESEKPLDETVSFNSLNMND
LQTAFHILTIGHLFSIMVLIGEVIKKGHNKLLT-

>TcasIR100

KVTIIILIMMCLSLPKIQTCPKINHLKEHFKQVKSARIMILQNEIIVTDWLIMELIKDNKITV
TVQKAIRNFEPFNTSNLTRFEALEFNDTIPTLQTDSTCGHLIIVKNEERLYQYLKSDPGFLIL
NPRHFYAIAMELFKTNVLEFWSLQVSNILLDCDTSYTVLPFNGTTIRINAYTQRKLLR
NFHNYFLQVSMQPKPPTAIVKFPKPLRENPIYKDLVPPFDYAGLDGCLLKVLQRLNMKY
VIVGNGQKYGTVLKNGTTTGLAWIASNKVQISTNGRFLMTYGTNKLEFTVPYSSDQVC
AVVPKALKIPKIIMLAKSLTPSSWFMIFLIYVICVLIYTLMGSTGSTWTLYAIFHGFPVKIVPT
SRQSFFLTSCMLFSIIIMTIIEGSFFKTFTTTTTYYKDINTLEELDESELPIAETFFSFTNDKSRIM
TSLKRKKLVINRDDILEQVARKRNIKLERKRDIKVRLEKTEFLDEEGESRLHVVEECFTTF
YIGFIVPKNSIFLPTFNNVIRRFESGLTQKWYGDVEFSIFLEKIFKLENNIKHHSFSFDNIVSA
LCVLFIGLSLALLVFFWEVTKXKQITLIYVSLIYCIISRH-

>TcasIR100j

LTLVQVVICLLEVSHYDNEKFNVDYQHFTLVRYLTLTFLNDGVHRIDLNNLVVDLMSRLN
FSMMIKEKRLGKNSTTFQESDPFQGHIMVVYDVKVLLAFLEESTEVPKARGSFALFTSL
KCPHYETNHALKQLWTNHGTANLIAFCDNIVYHPFSKNDSTWGATLDYSPATETPNLF
RNFNGYLLRVSLFKRPPTALKQVPSYISNPIYRDLKPGDFAGLDGTLRFLSNYLNFTVVI
DESHPTHGRVLKNGTITGSLSDVVS HRVDFSANDWFLIDYQTPEIEPTVPFSYDQVCPVVS
KALKVPQWKAFFIFDLTSWVLIFFMWLCCVFVWHVLPFRDLSTIWEICSVLFGNPVNV
VPLSNQHMFGLGSCMVLNIIIMGIIQGSVFTDFTTTTFHKDINTLEELDEAGLKIASSAWYLD
FDTTDLIKRLKTKQIRNYIGSYKDTAFKRGMAVLGRKQDVEHMKVEFVAEDGSPLLHVT
SECLQTFLVSLFPGSPFLPTFNNVITRLEAGLTVKWYQDVTSTGTMLQQMKNFANRRP
TGLFSLNDAKLAFYALFVGYIASFVTFLEILTKNHHNNVHNHVDVLKAQHGGVQVQVDQ-

>TcasIR100n

DTFWIVYQTHFLLDYTLHILETEDHKFELRQFTQNILKRVNKGYSVFLSVRITKSSLNKRN
KSYHFPSTAYAPSQNLAKLSDDQEFYKAKRLSTDSKHGFALIVWDLTTLHLFLDQDYRTIV
PEGRGTYAIQVVSQKQCDVKNEIAFTLQRLWTEYQVINVVAQTPCSCDKTHIFYHPFVKRE
GFWGLATSHTLQIKGDSRLISNTLSDFNGFPLRISIFPRTPTAMQTLPKLLHYNPIYRNLTW
SKGFAGLDGLVATLAEYFNFEVVLVGSLEDDFGKVLPNGTTVGLADITERRAVYNAN
ERLVAYFNLDQIDFTVPYTREDICLVVPKAAKIPKWILFQSLDPQSWCFTLFAYVSCFMF
WYNIGPSRSLPKVSWQMFSSFLGIPTKSFARKLDQVFLFLPCMIFSVVMLGVVQGSFFTKL

TLFSFYQDVNTLEEMADLELPIGAFIWNLIRDDSDVIRRLKSKSVKPPDNIFDMIAAHRNIA
TIETRARAQLLIGSKYVDDDDGFLLHIVNECLTTFLNANIVPKGSALLTVFNAVLGKLFESG
LTRKWNNDVVDSLIAEKMISVNRKRVRTKSFSLYDAQGAFFVILVGYACSVFVFLCEIVLK
XDKICYLALIINKT-

>TcasIR100e

DDFWRVTKNHFLVNSLTIQVLQTEEHQYDLNQYTVTLLKRLNSLNLVLRMMEKFLSG
RNFPKHSVTNHTFSTTKPKFDPIGGEELTQLKRLSSDSSKGYFIVIWDVESLHNFLDEDFQV
VVPEARAXYMIHFAFTYSTEACKIVKLQVSSVLRWLWIDNNVFNIIAQTSCLCDLEVYVHR
PFVKRGGFWGLTNSYQMSEIVENPRIIANPLINFNQFPLKIGIFPRPPTVIETLPKLLTDSPIY
KNLSFSKGFAGVDGLVLGTLAECLNFDTTVITSKPNISYGYIYKNGTATGAIADVIDRRMVF
SANSRFLLIYNTDQLEFTVPYTAEKMCLAVPKALKVYKWSSMFRFCFNKLTWVSIICSGIC
TIFWYLLKWQKLV TALATIAQFLLGVPANVRPNVPQMLFLNSCMGFNIVIMGIIQGFLFQS
FTTTSFYPDINTIEEMVDSSELPLRSSIFYFLRIDNSSLIHKLKSRTMAAPPNVYDLVAFHRNIA
TTDIKSHVDFMVRSLYDEDEGWPLIHTVDECDEFFLIANIVPKGS AFLTVFN NVITKLEGG
LTQKWYEDVINSILENWINLNRNKS KTHAFSLYDLQVAFYVIIMGCAVAILVFAEIVHKR
RNXNNCCNNHHKNIIFAA-

>TcasIR100f

DDFWVIFSTHFLATSLTFITVQTNQYDLRLLAQAIISMDKQVMTRRHVILHNYAEN
INFNVVFKTGTKKNARDFVTDLLAKTKKLASDSREGFVIITWNVNVLQKFLAQHISEINPR
TRATYLFILISSSDSLR KIKHCLHFLWHKYDILNIVVHVLGCGTTTTLIYRPFCKTKNSWGEI
TAHQIEEIVQQPLLLTNSLQDLNQYPLQVSLFARDPTALTQLPKLLQNNPIYKNLASFYGLD
GSMLSTMAKILNFEVVIVENHDRLPFGRVWPNGTASGTLGDVNNRRVALSSNSRILADYN
TQEIEFTVAYNGDSICVAVPKSLKVPKWRVLFECFDAASWLLTSLVFIVCLCFWYCVALKN
FARILWDVYSFLMGIPTRIVPSRQYFFLSSCMVFNVIILQLLQGWLFATAFTKTVFYPDLDLTL
EVLEKTNLPVATNMWFLFKDNSEVIQKLSRRGIGKTPNSLDLVAYSARNICVLDKRQDLELY
SQAQFVGPDGLSLLHIVNQCLTSVLLNIVPKGSPFLPVFNDIMSRLFESGFTKKWYSVV
TSRVTEKMVSLGRKERNFSFKIKDLQAAFYVMMAGCVFSLFVFGELVTHXVFMNKSS
QSKSHRFLNCNYGV-

>TcasIR100g

TLFKIAEVTFFMVTMHEEFLSLLFGNYYHTNLYQTVKIQEKFARTNNKTGAWYENVALDQ
KLDPPIDQNWQRVKLRSDSFEGFIIIVWDPQTLQFLNQNFSLVPRARATYFLLFVFSIY
ENCKLVNHILKRFWSEFSVLNIIAQTPYCCNKVYIHRPFVKTNSWGVTSYTLTEVTQNL
ALITNPLLDLNQFPLRIALFEKNPTAIRKLPKALQNNPIYRNLSRSKGFAGSDGFLLSAMVE
YLNFDPLIDETLEPMNFGHVL PNGTVCGVLAEVVHKRTDYAGNCRMLTYFGTDGYEFTA
PYSSEKIAMVVV PKAGKVPWRSLFNCFNALSWSLIFSAIVSTVFWCFLRRSQHLKRASWE
MFAHFVGI PCRVVPSRGQFMFLTACMMFNIIILGIIQGSFFTDFTTTSYYPDLNTLEQVLDN
LPIMAFARLLRTNSSPILQKLEQRSIPYEDNVYELVALYRNVAALDRRLDLELEIKTKYSG
RDGVSPLHIVDES LVTFLTSLV PKGSPFLVFNHVIRSMFEAGLTAKWYDDVVTSIIIEHK
HKTPSFGVKYRPFTLQDVQAAFYVIAFGYSCSVFVFWCEIIVKFSKGKIKHFHYFVLI-

7.SNMPs

>ApisSNMP1

MLNKKILESLSLNPRSNMRQMWSHPPLSADFKIYLFNVTNPIEAQKGEKVIIKEIGPYVYH
EWKEKENLIDDIDADTVFEFSKNTFVFDDEMSTLPLTGDEIIVMPHLAMIGMVTMTKMMKP
AALGLVNKAIPYLYPDQTSAFMMGTANDIMWNGLDINCTSEEFASVAICSQIRQNSLHK
ISKDHFKFSLFGVKNGTIESNRYTVKRGYTPATEVGVQVIRFNDKHKMDVGPATSATRYTG
QTPQYFNRSSRRTPTWPSFSGDICRSLTPDYVQETKYNGLNVEYSAMLVKPEEKCYCLN
KKKCLKPGALDLTNCSGAPIIATLPHFYKSEYLNNDGLSPQVEKHKIQMYFEPMTGTPL
LGYKRLQFNIFLKRESKINVMKTLNEDEKLIPLFWVEEGIALNKTWTNQIKNKLYLPITIM
KYVKYIFVVFGIVFIILAVVVNYNSVKTMEITPKY-

>AaegSNMP1

MLIKNRKNLMLKPGTQMRGMFEKIPFPLDFKLYLFHVTNPDPVVMKGGKPHVREIGPYFFE
EWKEYDTPVDNEEDTLTFTLKNWIFRPDLTKPLTGDEMITIPHPLILGALLMVQRDREA
MMPLVSKGMDIIMNPLTTGFLTTRVMDLLFDGILIDCSSQEFSKALCSGLESEGAVMPFN
ETHFKFSMFGLKNGTDAGRWWVYRGVKNIMDLGRVVSFNDETEMIDIYDGDENRYIGT
DSTIFPPFLTTKDKLWAWSPICRSIGAEYGGKSKYAGLPMSFFKLDGFDARNEPEHHCFCR
DPPDICPPKGTIDLAPCLGAPIIGSKPHFYDSDPKLLAAVDGLTPNEKDHDVYIHFQLLSGTP
VSAAKRLMFSMEIEPIRDHAVLGNLPTVILPLFWAEEGASLNKTWTNQLKYTLFLGLRFNT
AVKWLTHIIGTIGTIVGGFMHYKRTTKTVNVPVQSVNGSSAKGNGAGMTVVGHQPDSKG
GSVTPVIPSAKDLLQNSRNLPVIEGLDRPQKVTVTEMQERY*-

>AaegSNMP2

MMVMNTELQRDTPQFKRWEAVPQPLDFKVYIFNVTNPYEVQMGRPRVVEVGPYVYFQ
YCHKDNIRFSRDRSKVHFSQQQMYVFDAESSYPLTENDQLTVLNMHMNSILQIIDTQAKE
TITNFRSDVNNTLEKIPVVRVIKRIEKTTPIQSILQLAEDETYDSLRLINAELNRIFGRPDSM
FLRTTPREFLFEGVPFCVNVIGIAKAICKEIEKRNTKTIRVQPDGSMKFSFFNHKNMTNDGT
YTINTGIKEPALTQMIEYWNGRNTLDRWINQSAGSSSKCNKIVGTDGSGYPPFREGVERMT
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>AcorSNMP1

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>AgamSNMP1

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>AgamSNMP2

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>AmelSNMP1

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>AmelSNMP2

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>BmorSNMP1

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>BmorSNMP2

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>CbowSNMP1

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>CbowSNMP2

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>CbowSNMP3

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TNTTRTLTLDGEYGCLKDGVTDLKTCIGSSILVSFPHLLYGDEEYLDVIGLNPEKSKHETTVI
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>CbowSNMP4

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>CquiSNMP1a

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>CquiSNMP1b

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>CquiSNMP1c

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>CquiSNMP2

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>DmelSNMP1

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>DmelSNMP2

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GIPGYRYSIGENFINDIGPEHDNECFVDKLANVIKRKNGCLYAGALDLTTCLDAPVILTLP
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>HarmSNMP1

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DSDPALLSKVKGLNPDVTQH GIEIDYEPITGTPMVAKQRIQFNIQLLKTDKLDFKDLSDI
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>HarmSNMP2

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>HassSNMP1

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>MsexSNMP1

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>MsexSNMP2

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>PxylSNMP1

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SFKPWYQKKSFYRGITTHRYIANIGDFANDPELNCFCGDCPPKGLMDLMKCMKAPMYA
SMPHFLDSDPELLKNVKGLNPDVNEHGIEIDFEPISGTPMVANQRVQFNMQLLKHDKVEL
LNNLPDTIVPLFWIDEGLALNKTFFVNMLKFQLFYPPKAVGVIKWLLVTFGGFGLIGCTIYH
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>PxylSNMP1-like

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SSEYDKFSNLILPLFWAEYNQEGLPDYIRLTIYVMVVLPVSKALLSFFLLCGCYLIAKQI
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>PxylSNMP2-like

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GSLTEDDVLTVLNFSYMGALLSVFEIMPGLIPMINQALGVMFQDLTDPFLRVKARDLFFDG
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VSQLGHIVSYKGKTSMNTWGDKYCGQLNGSDSSIFPPIDRIRVPERLYTFEPDICRGVVVLS
TVAYVGNQTLNNEKFEHSPHLSFQSSQKLECEPRRLHKNAIHHSSLSNCPRNWSANHDGC
LLMGLLTLMPQCQAPVIASLPHFYLA SEELLEFFDGGVKPDKEKHNTYVYLDPVTGVILE
GVRRLQFNLELRNMKGVPQLENVPTGLFPLLWIEEGAILPQSVIDELQHSHTLLSYVEAVR
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>PxylSNMP3

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QYDTQYSGVPAYRFAANDWFLSNREGCFCLNVTAGVTAPDGCLLHGAQEMYSIEPTLG
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>TcasSNMP2

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KLLFDGFSFCNKNTSPGICGLVNDLCAIAATKRNSDLVLPDYSLIFSYLNYKRKPDDGKYTV
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CFGVPVLFSPHFLWADNKYLSAVEGLNPVEEKHKTYLVVEPNTGTPKGMKRIQLNGVI
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>TcasSNMP1a

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VGRILEYDNKKEMEVWPTKECNQYKGTGTVFPPYLTKEEGLASYAPDLCRSLVAVYSG
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ESDES YVKG VVGLNPNKKDHGIQILFESTTGGPVKAAKRLQFNMPLEPNPKLPIFANLNT
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>TcasSNMP1b

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AVNKALPVIFKENS SIYLTAKVREILFDGVLINCNVKDFSANAVCSQFKGQPAMVEVEKNI
YSFSLGSRNGSIPTRITIRGVKNAADIGRVVTIDNKTDLVWPEPECNAFRGTDGWVFP
SFLEKEDGIWTVASDLCRSFKAQYVEDLKFHGVVVRKYFADLGDMSNPAEKCFCAPEK
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QRRIQFNLQLMPIPKVAMMKT VPEALHPILWIEEGVELEGFLLKKVTSVFTLLKLMTFVRY
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KNA-

>TcasSNMP1c

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GMINCTSRDTAMAVCTIRTIGISKDYKYAGNGTTRITVRGIKSNGKVAVDNVTKSDWSNC
NYKGTG DWISGRKTIWMHATT CNIHADV GATSNGAVNKY YSDNICTNCSGIDVTKCTAI
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>TcasSNMP1

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VGWTYSSDCRNMHVVTSHGVAKY YADGDMSSNDKCYCKTCKGMMDTRCMGVYIATHR
VDKVRRTVRGKITDHIVRVIIGTAKRMNIVKKISMKTAHIWIAIVGKMIKVVVAKVDVVK
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