

Supplementary data for:

Identification of gonadulin and insulin-like growth factor from migratory locusts and the importance of gonadulin for vitellogenesis in *Locusta migratoria*

Contents:

Sequence alignment of aIGFs from Hemimetabola	page 2
Sequence alignment of gonadulins from Hemimetabola	page 3
Coding and amino acid sequence for <i>Locusta</i> aIGF	page 4
Coding and amino acid sequence for <i>Schistocerca</i> aIGF	page 4
Coding and amino acid sequence for <i>Locusta</i> gonadulin	page 5
Coding and amino acid sequence for <i>Schistocerca</i> gonadulin	page 5
Coding and amino acid sequence for <i>Locusta</i> LGR3	page 6
Coding and amino acid sequence for <i>Schistocerca</i> LGR3	page 8
Coding and amino acid sequence for <i>Locusta</i> LGR5a	page 10
Coding and amino acid sequence for <i>Locusta</i> LGR5b	page 13
Coding and amino acid sequence for <i>Schistocerca</i> LGR5a	page 16
Coding and amino acid sequence for <i>Schistocerca</i> LGR5b	page 19

Pediculus	HYIPDDNKIKETNKKNETNSQRDKIQICGNALTTMIVEACDGVGSPDL---G---
Locusta	-----DEERRYCGKYLAEKLWELCRHRGGFNPE-----
Schistocerca	-----EQRLRVCGRELAETLSLLCRDRGGFNDP-----
Rhodnius	-----APLGGFKFCGKDLSDILAEEVCSGRG--YNVAFDKGS--
Periplaneta	-----SPLGRMQLCGSELANKLAEICAVYG--YNDPFRHAHYE
Timema	-----RRSCGSQADILSLVCAGRG--YNTPYAFNGEQ
Pediculus	-----HVSRRGSVQARITEDCCDRECPDYLQNF CGHTPLFTSKKTVRGR-LLNK
Locusta	-----PQTRPRSASQGGVARDCCRKGC SRQTLLSYCKSDNVLKPQPT-PRPTQACS
Schistocerca	-----PPPQRVARRGGVADDCCRLGCSLSTLLRYCKFDDVQPPRAHDDGD DACV
Rhodnius	-----HNNHRTKRGIVDECCRRFC TWTTL EAYCSPVSY S-----PTPSDKFS
Periplaneta	DSTYDSITPTRTRVKRGVADECCKTGCSQETLEQYCNBP LKS-----PDRSKVLK
Timema	--TEPSTPSKSHRVSRGITHECCKVGC SWKTMEEYCLPGEAE-----NKIFDV--
Pediculus	LNTRNRIAKGENGNDGGKND----KKNTQIEVRNN-----
Locusta	DDD-----EDGDELFSLPPLHR-----EDWCGTWQPAAEPPPGG
Schistocerca	VDD-----DDDELFDLQLLHG-----PEAWCGTWQPAKPAPPSG
Rhodnius	VRKRNELKEK-TQEIAGDTY--AVLGEPTRHQKRKLFAHSDIDPHWPETSL-----
Periplaneta	ISEDHSINHI-PQDDSAAS--AVL--TSEVRRSSIAREEKN-----
Timema	---ESLLNQI-QTDDSSKV---SPK---EKNYSRSSS-----
Pediculus	QIDYRK LMD-----VGNILESSYERYKKKAHIFGYTLIKKNLNPWKON---KINK
Locusta	EVECTCSRGGGSQQ-PDSGVRKSPRPPTROP RR---QPPRQOPROPMTTPASTPAPA
Schistocerca	EVECTCSRGGGGEQLENVVRKVPRRPQORQPR---QLPRQPARQPPRQPP--TPPA
Rhodnius	--RF-SSQIKA--SHNNVLHGSYPNNKA-----NLDEDKFP--RRVN
Periplaneta	--DL-VSKVRG-----HHDKKGRANNCRCR---RRRRRGKGDLEELE--RHLN
Timema	---K-KAKGHR-----KKKKKGRKGNRCRCR---RKQRKFD--PEKIE---QMLK
Pediculus	TWPSLOIGTISPEIDKFGGQPIVMIKKNKHSS-----
Locusta	TRRPVVRGTVTP---YFQGRPVV--LSPPHA---ORLE TSA-----
Schistocerca	TRRPVVRGTATP---YFAGRPAVAVLTTPPHT---ORQPATL-----
Rhodnius	KSEV CINHSM P-----VR-SFSTMNLR SFFKLAKNANAFQILV
Periplaneta	K-IAPVIGTINP---SYLGIEVILPPRIRKEEMSLQDYG TK-----
Timema	DAPVIEIGTVPP---PYLGQPVILPRVKEVLHHI-----

Fig. S1. Sequence alignment of locust aIGFs and long isoform aIGFs from a few other Hemimetabola. Note that they have an N-terminal insulin-like structure followed by a C-terminal tail that has two or four additional cysteine residues. Cysteine residues are indicated in red and other conserved amino acid residues are highlighted in black and conserved substitutions in grey. Underlined in blue is a sequence that was previously identified as partially conserved in insect aIGFs. Sequences described here on page 4 of these supplementary data and from Veenstra (2020b).

```

Rhodnius    ---SPCDKQYIKYLTLYSCTYPKRKISLFDILHLPLKEVNKRFETLLGKNSAKMF
Timema      ----ECDKARIMNYIMYSCSKKKRSPAD--HLIYP-----S
Locusta     ---NTCDGERILELMKNACVVRRRRAAPEARQAV-----
Schistocerca ---STCDGESILKLMRDACVVRRRDASPGERAAG-----
Periplaneta EKYENCSKKL-RQLILDSCNEPKNKRSA-----
Pediculus   ----CDTKWIRLVYMMSCGKKKRDSSTSSFNETLLR-----

Rhodnius    ENWELPNWNTIKNTTNSKFEIERLKTILRKNNRQKRKAQSGGYIHLGQMAKDF
Timema      ENWHLD-----LPDAPSH--NGGKLSEMLVVAMNPSH--PVLYEWMMEGEEPTIF
Locusta     -----HDQISQ-LRAQRLPQDLDDQFWDGLQELA-----
Schistocerca -----EEQLVL-PRAGRLPHGLHDQFWESTLELA-----
Periplaneta -----VFER-HGFN-MHSPHLPQDRSQQVTSSVLLGKILGVP
Pediculus   -----NMPSDFYGAVKYLK-ENDPQNPMFKDDQFLYRILEDGIHGFP

Rhodnius    DYWHFM-----QDETPFKATELMKLMWQCCTSD--IPCYVSNESRIC-----
Timema      DDLSKK-----TRSIFVYPEKAQRVIEQCCDKE--QYCDVNTELGACK-----
Locusta     -----GSEQKTVLARALRKSSKFHQLITACCR---RACTAKDERLLCGSPRKP
Schistocerca -----DSEEKTVLSRALRKSSKFHQLISVCCR---RTCTAKDERVLCGPPRKT
Periplaneta SQWTEEELSSHQINKQFRRNNQSVRNLIECCV---DGCTPNQIMGLCD-----
Pediculus   DQWEVDEINDDKINENHRRSS-KIDKLIEECCKVPPVRTCSEKTEKGAC-----

```

Fig. S2. Sequence alignment of locust gonadulin and those from a few other Hemimetabola. Cysteine residues are indicated in red and other conserved amino acid residues are highlighted in black and conserved substitutions in grey. Sequences described here on page 5 of these supplementary data and from Veenstra (2020b).

ATGCGCGTGCTGCTGGCGGTGACCGTCTTCTGCGCATGCGCCGTGTGGCTGCCCGCAGCG
GCGGACGAGGAGAGGCGTTACTGCGGCAAATACCTGGCGGAGAAGCTGTGGGAACTGTGC
CGGCACCGCGGGGGCTTCAACGAGCCGCCGAGACCCGCCCGCGGTACGCGAGCCAAGG
GGCGTGGCCCGCGACTGCTGCCGGAAGGCTGCTCGCGGCAGACGCTGCT**CAGCTACTGC**
AAGTCCGACAACGTGCTGAAGCCGACCGGCCGCCGCCGCCGCCACCGAGGCGTGCAGC
GACGACGACG**AGGACGGAGACGAGCTGTT**CAGCCTGCCGCCGCTGCACAGGGAGGACTGG
TGCGGCACGTGGCAGCCTGCAGCGGAGCCGCCTCCTGGTGGTGAAGTGGAGTGCACGTGT
TCCAGAGGTGGCGGCCAGCAGCCGATAGCGCGGTGCGCAAGAGCCCGCAGCCGCCGACT
CGTCAGCCTCGTCGCCAGCCGCCTCGTCAGCCGCCGACGACGCCCGCCTCGACGCCCGCG
CCCGCGACGCGGCGCCCCGTGTCAGAGGCACGGTGACGCCCTACTTCCAGGGCCGACCG
GTCGTCCTATCCCCCCTCACGCGCAGCGCCTGCCGACCTCCGCCTAG

MRVLLAVTVFCACAVWLPAAADEERRYCGKYLAEKLWELCRHRGGFNEPPQTRPRSASQG
GVARDCCRKGCSRQTLLSYCKSDNVLKPQPPPPRPTACSDDDDEDGDELFLPPLHREDW
CGTWQPAAEPPPGGEVCTCSRGGGQQPDSAVRKSPQPPTRRQPPRQPPTTPASTPA
PATRRPVVRGTVTPYFQGRPVVLSPPHAQRLPTSA*

ATGCGGCCGCTGCTGGCCGTGTTGTGCGTGCCCTGCGCCGGTGCCCTTCCTCTGTCCCCGG
GCGGCCGCCGAGCAGAGGCTGCGCGTCTGCGGCCGAGAGCTGGCCGAGACGCTGAGCCTG
CTCTGCAGGGACCGCGGAGGCTTCAACGACCCACCTCCGCCGCACCAGCGTGTGGCACGG
CGCGGCGGCGTGCCGACGACTGCTGCCGGCTGGGCTGCTCGCTCAGCACGCTGCTGCGC
TACTGCAAGTTCGACGACGTGGTGCAGCCGCCGCGGGCACACGACGACGGCGACGACGCC
TGCGTCGTCGACGACGACGACGACGACGAGTTGTTTCAGCCTGCAGTCTCTGCACGGGCCG
GAGGCGTGGTGCGGTACGTGGCAGCCGGCGAAGCCGGCGCCGCCTAGTGGTGAAGTGAG
TGCACGTGTTCCAGAGGCGGCGGCGGCGAGCAGCTGGAGAACGTGGTGCGCAAGGTCCCG
CGGAGGCCTCAGCGCCAGCGCCCTCGTCAGCTGCCTCGTCAGCCAGCTCGTCAGCCGCCT
CGTCAGCCGCCGACGACCCCCGCGACTCGGCGCCCCGTGCTCAGAGGCACGGCGACGCC
TACTTCGCGGGCCGGCCCGTGCCTGCTCCTCACCCCTCCGCACACTCAGCGCCAGCCA
GCAACACTGTAG

MRPLLAVLCVACAGAF LCPRAAAEQRLRVCGRELAETLSLLCRDRGGFNDPPPPHQRVAR
RGGVADDCCRLGCSLSTLLRYCKFDDVVQPPRAHDDGDDACVVDDDDDDDELFSLQLLHGP
EAWCGTWQPAKPAPPSGEVECTCSRGGGGEQLENVVRKVPRRPQRQRPRQLPRQPARQPP
RQPPTTPATRRPVVRGTATPYFAGRPVAVVLTTPHTOROPATL*

***Locusta migratoria* gonadulin coding sequence**

ATGCGCGCCCGGCTGACCGGCATTCGACTCGCAGTCGGCAACATGCAGCTCTACGTGGCA
GTCCTGGTGTTCGTGGGCGCGCTGTGCGCGTCGGCGGCGGCCAACACGTGCGACGGGGAG
CGCATCCTGGAGCTGATGAAGAACGCCTGCGTGGTGCGGCGCAAGCGCGAGGCGTCGCCA
GCGGCGCGACAGGCCGTCCACGACCAGATCTCCCAGCTGAGGGCGCAGCGCCTGCCCCAG
GACCTGGACGACCAGTTCTGGGACGGGCTGCAGGAGCTGGCGGGCTCGGAGCAGAAGACG
GTGCTGGCGCGCGCGCTGCGCAAGAGCTCCAAGTTCCACCAGCTGATCACC GCCTGCTGC
CGCAGGGCCTGCACCGCCAAGGACTTCCGCCTGCTCTGCGGCTCCCCGCGCAAGCCCTGA

Nucleotides highlighted in yellow correspond to primers used for transcript quantification.
Nucleotides in red indicate location of primers used for making dsGON.

***Locusta migratoria* gonadulin**

MRARLTGIRLAVGNMQLYVAVLVFVGALCASAAANTCDGERILELMKNACVVRKREASP
AARQAVHDQISQLRAQRLPQDLDDQFWDGLQELAGSEQKTVLARALRKSSKFHQLITACC
RRACTAKDFRLLCGSPRKP*

***Schistocerca gregaria* gonadulin coding sequence**

ATGTTTCGGCTCGCGGTGCAGCACGCATTACGCAGTCGGCGACATGCAGCTCCACGTGGCA
GTCCTGGTGTGTGTCGGCGTGCTGTGCGCCACGGCGGCGGCCAGCACGTGCGACGGCGAG
AGCATCCTGAAGCTGATGAGGGACGCGTGCGTGGTACGCCGGAGGCGCGACGCCTCGCCC
GGAGAGCGGGCGGCGGGGGAGGAGCAGCTTGTGCTGCCGCGCGCCGGGCGCCTGCCGCAC
GGCCTGCACGACCAGTTCTGGGAGAGCCTGCTGGAGCTGGCGGACTCCGAGGAGAAAACG
GTGCTGTCGCGCGCGCTGCGCAAGAGCTCCAAGTTCCACCAGCTGATCAGCGTCTGCTGC
CGGCGAACCTGCACCGCCAAGGACTTCCGCGTGCTGTGTGGGCCTCCACGCAAGACGTGA

***Schistocerca gregaria* gonadulin**

MFGSRCSTHYAVGDMQLHVAVLVCVGVLCATAAASTCDGESILKLMRDACVVRRRRDASP
GERAAGEEQLVLPRAGR LPHGLHDQFWESLLELADSEEKTVLSRALRKSSKFHQLISVCC
RRTCTAKDFRVLCGPPRKT*

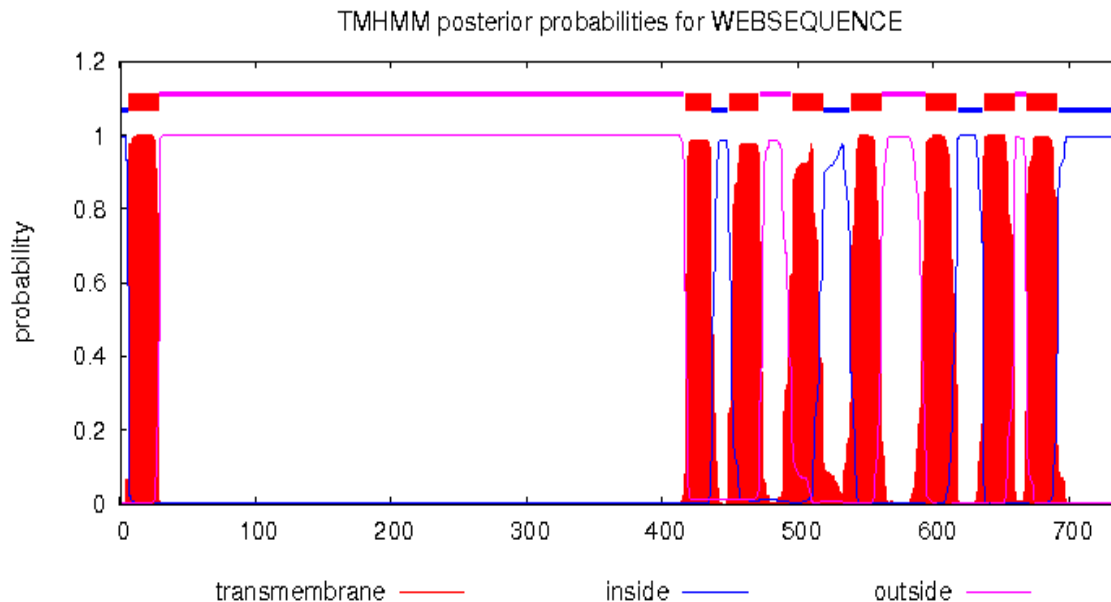
>Locusta migratoria LGR3 coding sequence

ATGCGGTGCGGCGGGCGCGCTGTGCGGGGCCGCCGCCGCCGCCCTGCCTGCTCGCC
GCCGCGCTGCTCTGGATCCTCGCGCAAGGAAGCTGCTCGCGGGGGAGCTTCGCCTGCACC
AACTCGTCGCTGTGCATCCCGCAGCACTACGCGTGCAACGGACACGCCGACTGCCCTGAC
GCCAGCGACGAGGACGTCTTCGTTTGTGCCGACTTCAACGGCTACTCGTTTCGTGAACGAG
ATGGTGGACAACCGGAGCGGCGCGGCGTCTGTGGTGGGGGAGGACCAGGAGGAGGAGGAG
GAAGAGCGGGAGGAGGCGTGCGGCGCGCCGGCCGCTGCTGGTGCCGCGGCCAAACCCTG
CGCTGCTCCGGGGAGCGCCTCACCGCCGTGCCACACGCACTCTCCACGCAGCACACCAAC
GTGATCCTGAACAACAACCTCAATACACGTGATCGCTGCTGATGCCTTCAGTAATTATTCA
TTAACCATCCTGAACTTGGATGACAATGGTCTCGAGTTTCTTCCACATGGACTCTTCGAT
GGACAGACACAACCTGGAAAGATTGTACCTGTGCGACAACGCGCTGGGCGGGGACAGCGTG
TCTCGGCTGTCTGGGCTGGGCGCGCTGCTCTGGCTGTTCTTGACGGCAACCGCCTGCAC
CACGTCCCGCTAAGTCATCTGGCCGGCCTGCGCAGCCTCATCTGGCTGGACTTATCACGG
AACGCGCTGACGTTGGAAGGTGAACAATTCCCAGAACTTCCTCGACTTAACTTCTAATG
TTGCAGGAGAATAATATCGAGTATATTGGTGAAAATCTGTTTGCCGGATTAAGAGGTCTT
ACGCAATTGAACCTAAGAAGAAATGCCATCCGATCGATAGATGTCAATGCTTTTAGGAAC
CAGAAACATCTGGAGCACTTGGACATATCAGAGAACCAGCTGACGACGCTGCAGAACAAA
GTCTTCTCACCACTGCACGCCCTCAGCAGACTGTCGCTTGGAACAATCCAGTCGCCTTC
ATACCAGGAGATTTATTTTCAAGACTTGACAAATCTTCAGTCACTAGACCTCAGAGCCATC
AACATAGAGAACATAGACACCACGATGTTACGCTACTGAAGAAGTTAGAGTTTGTGTAT
TTCAAGACATTCAATTACTGTAAATATGCTCCGACTGTTCCCAAATGCAAGCCTAATACA
GACGGCGTGTGCTGCTGAGCACCTGCTGTCTCGGCCGGAGCTGCGCGCGTCTGCTGTGG
GCGACCGCCGGCTGCACGGCGCTGGGCAACGCGCTGGTGCTGCTGGGCCGCGGACGCGCC
GCCGCCGTGCGCACCGACAACCGCGTCTGTCAGCCTCGTCTCGCAACCTCGCAGCGTCG
GACCTGCTGATGTCGGTGTACCTGGCGGTGATCGGGTGGCAGGACGTGCAGCTGCGGGGC
GTCTACCACCGCGCCGCGCACTCCTGGACCACCTCGTGGCTCTGCACGCTCGCCGGCATG
CTCGCCATGACCTCCTCAGAGGTGTCGGTGCTGATCATGGTGTTTCATGTCGGTGGAGCGG
TTCTCGCTGATCGCGCTGCCGCTGTCGCACAGCGCCAGCCTGGCCGTGCGCAGCGCCGCC
ACCGCGCTCGCCCTCATCTGGCTCGCCGGC**ATCAGCCTCGCCGTCATACC**AGCAATACAC
TACCGCGGCTCTGCAAGATACTACGGTATAAACAGCATGTGCTTCCCTCTGCACATTGAC
GACCCT**TTCTTCCACGGCTGGCAGTAT**TCCGCATTTATATTATTTGGAGTCAACATGACG
GGGCTGGTGGTGATGGCGGGCCTGTACACGGGCATGCTGGTGAGCATCGTGCGCACGCGG
CAGGCGACGCCCCGCGTCCCTGCGCGGGGAGCTGGAGTTCGCGGCGCGCTTCTTCTTCATC
GTGGTGACCGACGCCGCTGCTGGGCGCCGCTCATCACATTCCGCGCCCTCGCCATGTTT
AGTTCCACATTCCCAGCGAGGTGTACGCGTGGCTGGTGGTGCTGGTGCTGCCGGTGAAC
TCGGCGGTGAACCCCGCGCTGTACACGTTACGACGCCGCGCTACTGGGCGCGCCTCTGC
CGCCGCCGCCGCCGCGCAGCAGCCAGCCGGCCGCGCTGCCAGGCACCAGTACGCGCCCTGC
TCGCGCCTCTCCTCGCTGCCGCTCGTCAAGGTATGAACGAGGCAAAATGCTGA

Nucleotides highlighted in yellow correspond to primers used for transcript quantification.

>*Locusta migratoria* LGR3

MRCGRGALCGAAAAACLLAAALLWILAQGSCSRGSFACTNSSLCIPQHYACNGHADCPD
ASDEDVFVCADFNYSFVNEMVDNASGAASVVGEDQEEEEEEEEEACGAPAACWCRGQTL
RCSGERLTAVPHALSTQHTNVILNNSIHVIAADAFSNYSLTILNDDNGLEFLPHGLFD
GQTQLERLYLSDNALGGDSVSRLSGLGALLWFLDGNRLHHVPLSHLAGLRSLIWLDLSR
NALTLEGEQFPELPRLKLLMLQENNIEYIGENLFAGLRGLTQLNLRRNAIRSIDVNAFRN
QKHLEHLDISENQLTTLQNKVFSPLHALSRLSLGNNPVAFIPGDLFQNLTNLQSLDLRAI
NIENIDTTMFTLLKKLEFVYFKTFNYCKYAPTVPKCKPNTDGVSSSEHLLSRPELRASLW
ATAGCTALGNALVLLGRGAAAVATDNRVVSLVVRNLAASDLLMSVYLAVIGWQDVQLRG
VYHRAAHSWTTSWLCTLAGMLAMTSSEVSVLIMVFMVERFSLIALPLSHSASLAVRSAA
TALALIWLAGISLAVIPAIHYRGSARYYGINSMCFPLHIDDPFFHGWQYSAFILFGVNMT
GLVVMAGLYTGMLVSIVRTRQATPASLRGELEFAARFFFIVVTDAACWAPLITFRALAMF
SFHIPSEVYAWLVVLVLPVNSAVNPALYTFTTPRYWARLCRRRRRSSQPAALPRHQYAPC
SRLSSLPLVKVMNEAKC*



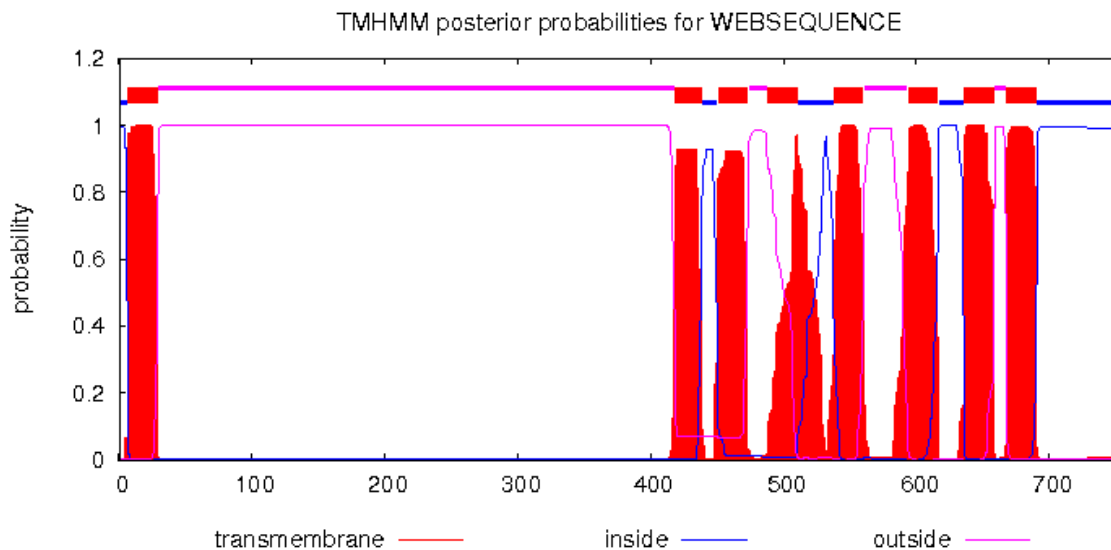
Prediction of Transmembrane regions of *Locusta migratoria* LGR3 as determined at:
<http://www.cbs.dtu.dk/services/TMHMM/>

>*Schistocerca gregaria* LGR3 coding sequence

ATGCGCTGCGGCCGAGGCGCGCTGTGCGGCGCGGCCGCTGCCTGCGCGCTGCTGCTC
GCCACGCTGCTCTGGATCCTCGCCCAAGGCAGCTGCTCCCGGGCCAGCTTCGCCTGCAGC
AACTCGTCGCTGTGCATCCCGCAGCGTTACATGTGTAACGGACACGCAGACTGCCCAGAT
GCCAGCGATGAAGACGTCTACGCTTGTGCTGACTTGAACGGCTACTCGTTTCGTGAACGAG
ATGGTGGGGAACGCGAGTGGTGTGCTGCGGTTGTCTGGAGGCGGAAGGCGAGGACGAGGAA
GAGGAAAACGAGGAGTCTTGCGGCGCGCGGGCCGCCTGCTGGTGCCTCGGGTCCGCGCTG
CGCTGCGCTGGCGTCGGGCTGTCCGCCGTGCCTACCGGCTTGTCAACAGACCTCACTCAC
ATGGTGCTGAACAACAATTCAATCCAAGTGATCGCTGCTGACGCCTTCAGTAATTATTCA
TTAAACGTCCTGAACCTGGATGAAAATGGTCTTGAGTTTCTTCCACCTGGACTATTTCGAT
GGGCAGACACAACCTGGAAAGATTGTACCTGTGCGACAACGCGCTGCGGGCCGACAGCGTG
CCGCAGCTGTCGCTGCTGTCTCGCTGCTGTGGCTCTTCCTGGACGGCAACCGCCTGCAC
CACGTTTCGCTGCAGCACTTGGCCGGCCTGCGCAGCCTCGTCTGGTTGGACTTGTCAAGG
AATGCGCTCACGTTGGAAGGTGAGAAATTTCCCGAGCTACCTCGACTGAAACTTCTAATG
CTGCAGGAGAATAACATAGAGCTGATTGGGGAGGATCTGCTTGCCGCGTTAAGAGGCCTT
ACACAATTGAACCTGAGAAGAAATGCCATCCGATCAATAGATGTTAATGCGTTTAGGAAC
CAGAAACATCTGGAGCACTTAGATATATCAGAGAACCAGCTCAAGACGCTACAGAACAGG
GTGTTCTTACCACTCGGGACCCTCAGCAGATTGTCCCTTGGAATAATCCAGTTACCTTC
ATACCAGGAGATTTATTCCAAAACCTTGACAAATCTTCAGTCATTAGACCTTCGGGCCATC
AACATAGAGAACATAGACACCACGATGTTACGTTACTGAAGAAATTAGATTTTGTGTAT
TTCAAGACGTTCAATTACTGTAAATATGCTCCGACTGTCCCAAATGCAAGCCGAGTACA
GACGGCGTGTGCTCGGCGGAGCACCTGCTGTGCGCGCCGGAGCTGCGCGCTTCTCTGTGG
GCGACGGCGGGCTGCACGGCGGTGGGCAACGCGCTCGTGCTGCTGGGCCGCGGGCAGGCC
GCCAGCGCCGCCGACAACCGCGTGTGTCAGCCTCGTGTCCGCAACCTCGCAGCTTCTGAC
TTGCTGATGTGCGGTGTACCTGGCGGTGATTGGGTGGCAGGACGTGCAGCTGCGGGGCGTC
TACCACCGCGCTGCGCACTCCTGGACCACCTCCTGGCTCTGCACTCTCTCCGGCATGCTC
GCCATGACGTCCTCAGAGGTTTCAGTGCTGATAATGGTGTTTCATGTCGCTGGAGCGGTTT
ATTCTGATCGCGCTGCCGCTGTCTCACAGCACAGCTTGGCCGTGAGGAGCGCCGCTGCC
ACGCTGGCCCTCATCTGGATCGCAGGCATCAGTTTGGCTATCATTCCAGCAATACACTAT
CGCGGATCGACAAGATACTATGGCATAAACAGCATGTGCTTTCCTCTGCATATTGACGAT
CCTTTCTTCTTGGCTGGCAGTATTCTGCATTTATATTATTTGGGATCAACATGACAGGG
TTGGTGGTGATGGCAGCGCTGTACACAGGCATGTTTCATAAGCATCGTACGAACGCGCCAC
GCAACGCCCCGTCTCGATGCAGGGTGAGCTGGAGTTCGCGGCTCGCTTCTTCTTCATTGTG
GTCACTGACGCCGCCTGCTGGGCGCCACTCATCTTTCAGAGCCCTCGCCATGTTTCAGC
TTCCACATTCCCAGTTACGAGGTGTACGCGTGGCTGGTGGTGTGCTGGTGTGCTGCCGGTGAAC
TCTGCGGTGAACCCGGCGCTGTACACGTTACACGCGCGCTACTGGGCGCGCCTGTGC
GGGCTGGTGTGCGACCGTGTGAGCCGCCGCGCAGCCCCGAGACCCAGGGACTCAGTCGC
CAGCAGTACGCACAGTGCTCGCATCTCACGTGCTGCCGCTCGTCAAAGTAAGCACCACA
CAACTTCTTCTCTTTTGTAAATATTGTTGCAGAAGCATAA

>*Schistocerca gregaria* LGR3

MRCGRGALCGAAAAACALLLATLLWILAQGSCSRASFACSNSSLCIPQRYMCNGHADCPD
 ASDEDVYACADLNGYSFVNEMVGNASGAADVLEAEGEDEEEENEESCAGARAACWCLGSAL
 RCAGVGLSAVPTGLSPDLTHMVLNNSIQVIAADAFSNYSNLVNLNDENGLEFLPPGLFD
 GQTQLERLYLSDNALRADSVPLSLLSSLLWFLDGNRLHHVRLQHLAGLRSLVWLDLSR
 NALTLEGEKFPELPRLKLLMLQENNIELIGEDLLAALRGLTQLNLRRNAIRSIDVNAFRN
 QKHLEHLDISENQLKTLQNRVFLPLGTLSRLSLGNNPVTFIPGDLFQNLTNLQSLDLRAI
 NIENIDTTMFTLLKKLDFVYFKTFNYCKYAPTVPKCKPSTDGVSSAEHLLSRPELRASLW
 ATAGCTAVGNALVLLGRGQAASAADNRVVSLLVVRNLAASDLLMSVYLAVIGWQDVQLRGV
 YHRAAHSWTTSWLCTLSGMLAMTSSEVSVLIMVFMSLERFILIALPLSHSTSLAVRSAAA
 TLALIWIAGISLAIIPAIHYRGSTRYYGINSMCFPLHIDDPFFLGWQYSAFILFGINMTG
 LVVMAALYTGMFISIVRTRHATPVSMQGELEFAARFFFIVVTDAACWAPLITFRALAMFS
 FHIPSYEVYAWLVVLVLPVNSAVNPALYTFTTPRYWARLCGLVCDRRSRRRSPETQGLSR
 QQYAQCCHLTSLPLVKVSTTQLLLFCNIVAEA*



Transmembrane regions of *Schistocerca gregaria* LGR3 as determined at:
<http://www.cbs.dtu.dk/services/TMHMM/>

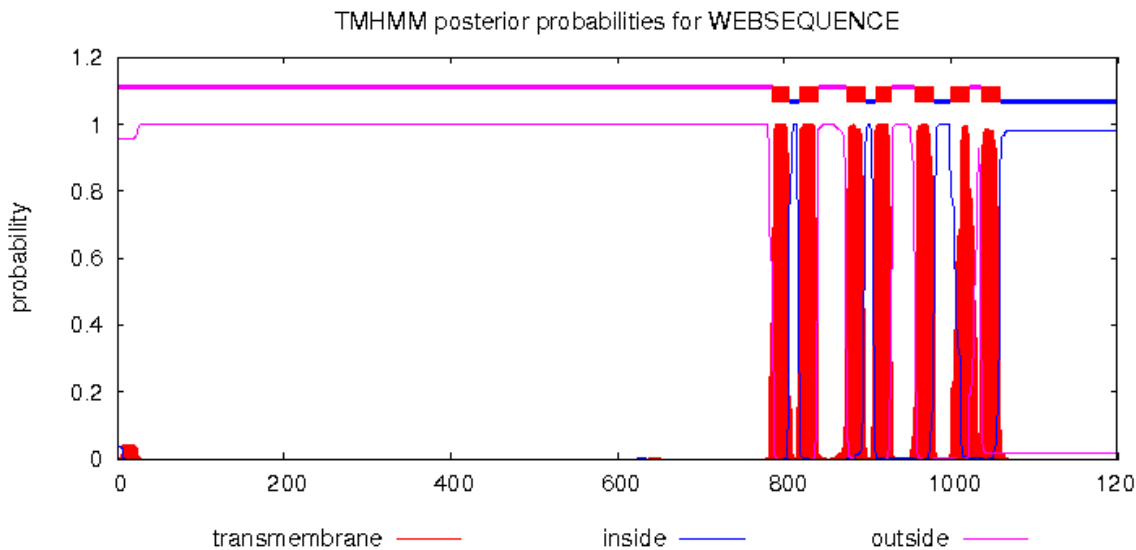
>Locusta migratoria LGR5a coding sequence

ATGCCTCATTACTGCAGGACCGTTTGCCTTTGTCTGCTGATGCTCTTGTTGAGCGCACCT
TTCTCCGAAGCCGCTGAAATCGAAAGAGAGTCGACGGCAGCAGAGCCGTCCCGCTGGCAG
TGCAGCAGCACGCAGGAGCAGCCCGGGCGGCAGGAGGTGAGCTGCGGCGACGGCTGGTGC
GTGGCCGAGGGCGCTCTCTGCAACGGGGTGCCCGACTGCGCCGGCGGCCAGGACGAGGCC
GTCCACCACTGCGGTTGCCTTCCAAATGAATTCCGGTGACAGTAATTCTGTCATCGACCTG
GTGAGGCGCTGCGATCGCGAGGTGCGACTGCCCGACCGGCGAAGACGAAGACGACTGTGAG
TCGTTTCGTGTGCCAGTGACCCACTTCAAGTGCGCCAACCCTTCTGCGTGCCCGAGGAC
GCTGTCTGCAACTTCGAGGACGACTGCGGCGACGGGTGCGACGAGCTAAGCTGCTCGCAT
CGATCTTGCTGGAATTCAGAGTTCGGTGCGACAACGGAGAGTGCATGCGTCCTGGCTTC
GTATGTGACGGCATCGTCGACTGCAAGGACGCCAGCGACGAAGCTTATTGCTCACCAGCC
GAATTTTCGCTCTGCGGAGACGGAACGCGCGTCCACAAGTTTTTTTGGTGTGACGGGTGG
CCACACTGCCACGACAACCACGCCGATGAACTCAATTGCAGTGAGTGCAATGGAGCGGGC
GAGTACCTCTGCCCCGAATGGTCGCTGCATCAGGCGTGCCAACGTCTGCGACTCATACTGC
GACTGCGTGCCCACTGCCAGAGGGCAACCGTGTGCGGACGAGGTGGACTGTGGCAGCAAA
TACGTCAAGCAGCACGGTGTAACTCTCTGCATACCGGGTGAACATTATCATGTTTTCTG
CCGTCCACCAAGAAGTACCGAGACGAACGTTGCATCTCATCAGACTTCATATGTGACGGC
TACAATGATTGTCAACCGGTAGATTTCATCTCCGATGAATTTGGCTGTGACATGCTTACA
TCCAGCTACCCAGAAGATGTGTTCAACTGTTCTGAGGGTCGAGGTATTCTGTGTCACTT
GTGTGTGATTTCAAGCGAGACTGCCTGAATGGAGAAGATGAACAGTTCTGTGGAAAAAGA
GATTGCTCAGTAAAAGAATACACTTGTGCCAGTGGGCAATGTATTCCATTGGAACAGGTC
TGCGACCTCAATTTTGATTGTTGGGATAAGACTGATGAAATGAATTGCTCAAATCTGAGG
TGTTCTGAAGGGTACCAGAGATGTAGATATAGTGGTCAATGTATTCTGCAGCTCGATGG
TGTGATTACAGTGTGGACTGCTTTGATGGCAGCGATGAAGAGGAATGTGAATCTGTTGAG
CGAGATTGCCGATCTGATGAATTCGCTGCAATAGTGGTCAGTGCATATTTGCTGACCTA
CAGTGCTTCAAGCCTGGTACTGAACACACTGCATGTGCTGATGGATCACATCTAATTAAC
TGTGATAATTGGACATGTCCTGACGGGACTTTCAAATGTAGAAATGGTCCTTGCCTGAAT
ATGTCATTATTGTGCAATAAGAAGATTGACTGCAAAGATACTTGGGTGGATGAAGATCAT
TGTCCATTTGAGTGCTGTGGTGACAATCGCTGCTTCTGTCTGGATACAAAAATTAAGTGC
AGTAGCCTTGAGCTGAGGGATCTCCCATATGGAATTGAAGTTCAAATAAATCGCTTCTAC
ATGGCCAATAACTTGCTGAACTATTCACTCAATGTTGATACCTTCTCAAACTAGACCGG
CTGTTATACTTGATCTGACAAACAACAGTATTTTCATGGCTACCTCCACTGATGTTTCGT
AATCTATGGCGACTGCACATCCTAACTTGCGAATAACAAGCTATCTGTAATTAGCAAT
GGTACATTCTTTGGATTACCCAACCTTGGAACACTTCATCTCCATGGTAACAACATTGAG
AGCTTAGAGCCAATGGGCTTCTATGGTCTCTCTTCACTGAAAGCACTTGATCTTAGACAT
CAAAGGATAAGCAACATTTCCCGTGGTGCTTTTCAATTGGACTGCGCAACTTGGTGACACTT
GACCTGTCAGACAACAGTATAACACATCTGGAAGATGGAACGTTGATTGGAATGCCCAAA
CTAGAAACACTGGATCTAAGTGGTAACACCATTAACCATTTGGCAACAGTGTCTTCAAG
ACTGTAAGATCACTAAAGAGATTAACTGATGAATATAGATTCTGCTGCTTGGCAGAG
CATGTTAGTGTGTGCAAGCCACCACCTGATGAGTTTTCTCATGTGAAGATCTTATGTCT
AAGTTGGTGCTTCGTGTCTGTGTGTGGATCTTGGGGATCATGGCAACTTTGGGAAATACA
CTGGTTATTATCTGGAGAATGTGTTTCAGGCATCCTAATAAGGTTTCATTCTTTCCTTATC
ACCAATCTTGCCATAGGTGATTTATTAATGGGAGTTTACCTTCTCATAATTGGAAGTGCT
GATACTTACTACCGTGGAGTTTATTCAGTTCATGATCAGAACTGGAGAAGTAGTGGATTG
TGCCATACAGCAGGATTTTTGAGCACCTTTTCCAGTGAATTTTCAGTGTACACATTAAGT
GTTATTGCCTTGGATCGATTTTTGGTGATACTATTTCCATTTTCATGTGAGAACAATGAAA

ATGACAAAACTAGATTATTGATGGCAGGAGGTTGGTTGGGTGCTGCCCTTTTGTGAGGT
TTACCTTTTATACACATCAGCTACTTTAAGAATTTTATGGAAGATCTGGAGTTTGCCTT
GCACTTCATATAACTCCACAGAAATATCATGGATGGGAATATTCAGTGTTTGTATTCCTC
TTTTTGAATTTAGCATCTTTCTCAGTTATTGCTGTTGGCTATACTTCAATGTTTGTGATA
GCAAAGACAACCTCAACAAGCAACACAAATAAATCAGAAAACTGCCGAGTCAGCTGTAATT
GCACGCCGCATGACTCTGATTGTTGCAACAGATGCAGCTTGCTGGATGCCTATCATATTC
TTGGGAATATTGTCTTTAGCAGGAACAACAGTCCCTCCACAGGTTTTTGCCTGGATAGCA
GTATTTGTTCTACCACTAAATGCAGCTATCAATCCTATTCTTTACACAATATCAACTACA
CCTTTCCTGGAGCCTACTTTGAAACAATTGAATACTTTGAAGAGATCATGCAGGCTGTCT
CTTACAACAGAACAGCACCACACATATTCCTTTGTTACAGCCTCAGAACACCAACATGAT
TTTAACCCCAAGTGCCCAACAATTTATTATTGACACTGGGTATTCTGTTGGAACGGCAAA
GTCAAAAAGAAACAACAACAAAATTGTTCTGATTCCAGTGAAGAGGATGGAGAACATACC
TGTAACGCCAACAGCATCTGCACCTCACTTCTCAGAACTATCACACAGAAGCATCATGT
CATCACTCGCACCCACCGACTGAGTTGTTTATATCCACATCACTCTGCAATCTTAACACT
AATGCACATGCTCAGGTTGAACTTCTACCGCTGCAACAAATGGCTGTGGATAAATGA

>*Locusta migratoria* LGR5a

MPHYCRTVCLCLMLLLSAPFSEAAEIERESTAAEPSRWQCSSTQEQPGRQEVSCGDGWC
 VAEGALCNGVPDCAGGQDEAVHHCGCLPNEFRCSNSCIDLVRRCDREVDCPTGEDEDDCE
 SFVCPVTHFKCANHFCVPEDAVCNFEDDCGDGSDDELSCSHRSCWNSEFRCDNGECMRPGF
 VCDGIVDCKDASDEAYCSPAEFRLCGDGTRVHKFFWCDGWPHCHDNHADELNCSECNGAG
 EYLCPNGRCIRRANVCDSYCDCVPTARGQPCADEVDCGSKYVKQHGVSLCIPGETLSCFL
 PSTKKYRDERCISDFICDGYNDCHNGRFISDEFCDMLTSSYPEDVFNCSEGRGIPVSL
 VCDFKRDCLNGEDEQFCGKRDCSVKEYTCASGQCIPLEQVCDLNFDCWDKTDEMNCNLNR
 CSEGYQRCRYSGQCIPAARWCDYSVDCFDGSDEEECESVQRDCRSDEFRCNSGQCIFADL
 QCFKPGTEHTACADGSHLINCDNWTCPDGTFKCRNGPCLNMSLLCNKKIDCKDTWVDEDH
 CPFECCGDNRCFCLDTKINCSSLRLDLPYGIEVQINRFYMANLLNYSLNVDTFSKLDR
 LLYLDLTNNSISWLPPLMFRNLWRLHILNLQNNKLSVISNGTFFGLPNLGLTLHLHGNNIQ
 SLEPMGFYGLSSLKALDLRHQRISNISRGAFIGLRNLVTLDSLSDNSITHLEDGTLIGMPK
 LETDLSGNTIKTIGNSVFKTVRSLKRLTTDEYRFCCLAQHVSVCCKPPPDEFSSCEDLMS
 NLVLRVCVWILGIMATLGNTLVIIWRMCFRHPNKVHSFLITNLAIGDLLMGVYLLIIGSA
 DTYIRGVYSVHDQNWRSGLCHTAGFLSTFSSEFSVYTLTVIALDRFLVILFPFHVRTMK
 MTKTRLLMAGGWLGAALLSGLPFIHISYFKNFYGRSGVCLALHITPQKYHGWESVVFVL
 FLNLASFVIAVGYTSMFVIAKTTQATQINQKTAESAIVARRMTLIVATDAACWMPPIIF
 LGILSLAGTTVPPQVFAWIAVFLPLNAAINPILYTISTTPFLEPTLKQLNTLKRSCRLS
 LTTEQHHTYSFVTASEHQHDFNPSAQQFIIDTGYSVGNGKVKKKQQQNCSDSSEEDGEHT
 CKRQQHLHLTSQNYHTEASCHHSHPPTELFISTSLCNLNTNAHAQVELLPLQQMAVDK*



Transmembrane regions of *Locusta migratoria* LGR5a as determined at:

<http://www.cbs.dtu.dk/services/TMHMM/>

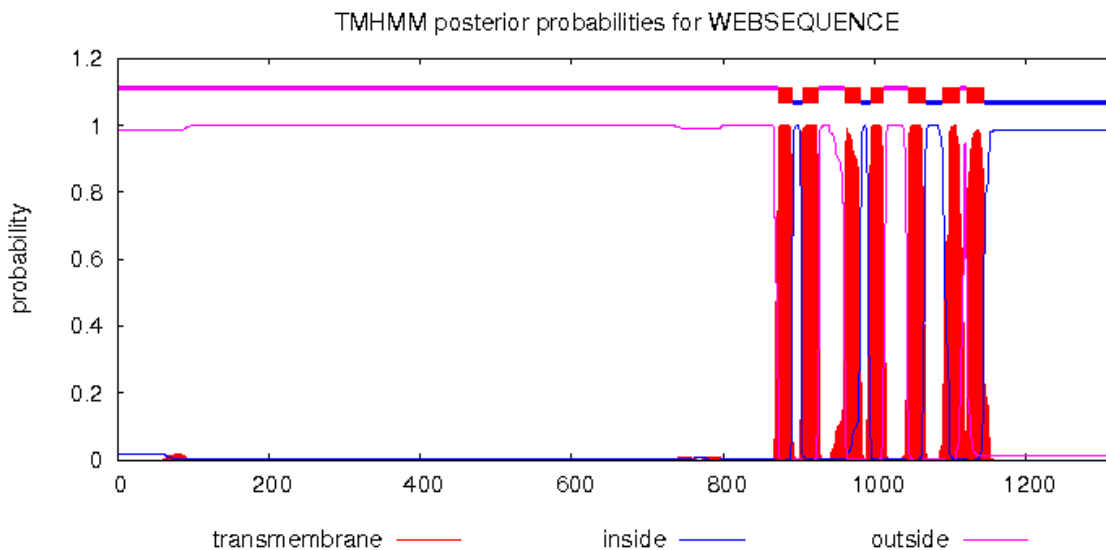
>***Locusta migratoria* LGR5b coding sequence** Note: incomplet 5'-end

GCGTCGCTGGCGGCGGCGGCCGCGTTCGCGGCGCCGCGGCTCAGTGCCTCCGCGGCTGT
GCGCCGCCCCCAGACGCTCCTGCTGACGCTGCCGAAGCCGCGGACACGGACTCCAACGC
CAGCGCGCGGACTCGCTGTTGGTGGCGCACCAGCTACGAGGTGTGACTGGCGCTACGCAC
TCCACCAGGTCCTTGCGGCGAGTGGTTGGGGAAGAGTCCGCAGCGGCGCTGTCCGCCATG
TGGCTGGTGTGCTGGCGCTGCTGCTGACGACGTGACGACGCGCGCGGGCGCCACCACCGCC
ACAGGCGGTGACCACGGCAACGACAGCACCGGCGTTCGAGGGGCCACGTGGTGGCCGTGC
AACGCGACGGCGCCCGGCGAGGAGGGAGGCGTGGGCGGCGTGGGCGGCGGGCAGGCGGCC
TTCAGCTGCGGCGGCGGCCGCTGCGTGGCGGCGCGCGCCCTCTGCAACGGCGTGCCGGAC
TGCCCCGCGGCGAGGACGAGAGCGTGCACCACTGCGGTTGCCTCCCAAATGAGTTCCGG
TGCAGTAACTCCTGCATAGACCTGGTGCGGCGCTGTGATCGCGAACCCTGACCCTGAT
CAGGAGGACGAACTGGCTGTGAATCCTTCGTGTGTCTGTGACGATTTCAAGTGTGCC
AACCCTACTGCGTGCCGGAGGATGCCGTGTGTAACCTTCGAGGACGACTGTGGCGATGGG
TCGGATGAACAGAATTGTTGCGACCGGACGTGCTGGAACCTCGAGTTCCGGTGCGACAAC
GGGGAGTGCATCCGGCCCGGCTACGTCTGCGACGGCCTCGTCGACTGCAAGGACGCCAGC
GACGAGGCGCACTGCGCTCCAGATTTCTTCGGGTGTGCGGCGACGGCAGCCGGGTGCAC
CAGTTCTTCTGGTGCAGACTGGACGCACTGCGCCGATAACCACGCCGACGAGCTCAAC
TGTACGGCTTGCAGCGGCGCCGACGAGTTCCGGTGCCCCAACGGGCGGTGCATCCGCAGG
GCCAACCTGTGCGACTCCTACTGCGACTGCGTGCCACCGGCCGCGGGCAGGGCTGCGCC
GACGAGGCGGGCTGCCACCACACCTACCTGCTCAGCCACGGAGTGAGCTTGTGCACGCCT
GGCAAGACGCTGGTGTGCACGCCGCACCCCGGACGCCGCGACGACCGCTGCATCGCGCCG
CGCTACATCTGCGACGGACACAACGACTGCCACAACGGCAACTACGTCTCCGACGAGCTG
GGCTGCCTGCCGTGCGCCGGGCTGGTGTGCGGCCAGTGGTTCTCGTGCTCGGAGGGCCGC
ATGGTGCCCCAGGAGACTCGCTGCGACTTCAAGTGGGACTGCCTGCTGGGCGAGGACGAG
CACGGCTGCGAACGGGTGCCGTGTTCTGAACGTGAATTCACATGCAGCAATGGCCAGTGT
ATTCCGATTGAAAGCCGTTGTGATCTAAAATTTGATTGCTGGGACAAGAGCGATGAATTT
AACTGCAAGGAGGCGCCGTGCCCGGCGGGCCACCTGCGGTGTGCGACAGCGCGCAGTGC
GTGCCGAGAGCCTGGTGGTGCAGCTTCTACCTCGACTGTCCCGACGGCTCCGACGAGACC
AGCTGCGAGGGCCGCGGGCGGGAGTGCGGCGCTGAGGAGTTCCGCTGCCAGAGCGGGCAG
TGCGTGCCGCGCCCGCCACGTCTGCTTCAAGTCCGGCCAGGACCGCAGCGGCTGCGCCGAC
GGCTCACACCTGCTGCACTGCGAAAATGTGACGTGCCCCGACAACACATTTAAATGCAGA
AACGGGCGGTGCCTCAACATGTGCTGCGCTGTAAACGCCGTCTTGACTGTAAAGACACC
TGGGTTGATGAAGACGGCTGCACGTTCCAGTGCTCCACGGAACCTCGCTGTGTGTGCCAC
GACACCAAAATCAACTGCACGAGCCTTGAGCTGAAACAGTTCCCGGCAGAAATTGAATTC
CAGATAAATCGCTTCTACATGGCAAATAATTTGTTGAATGAAACACTCAACGAAGATTCC
TTTTCGAAATTGGATCGACTTGTTTACTTAGATTTGAGGAACAACAGCATATCTAGGCTT
CCCGCCATGATATTCCGTAATCTCTGGAGACTACATATTCTCAATCTGCAAGATAACCGT
ATATCCGTTATAAATAATGGTAGCTTCTTCGGATTACCGGATTTGCGCACTCTCCATCTA
CAAGGCAACGGCATAGAAGTCTTAGAGCCAATGGCGTTTTACGGACTGTCATCGATTACC
ACCTTGGATCTGAAGCACCAGAGGATACGTAACGTATCTCGCAACGCTTTCGTTGGCCTC
AGAAGTCTTGTTGCGCTTGACCTGTCTTCAACAACATATTCTACCTTGACGACGGATCG
TTGAATGGAATGCCTAACTGGAACACTAGATCTCAGTAATAATTTTATCAAGTACGTT
GGAAACAACGTGTTTAGAAGTGTAACGTGATTGAAACACTGGTGACGGACGAGTTCCGC
TTCTGCTGCGTGGCGCGGCACGCCGCGCGCTGCTGCCCCGCGCCCGACGAGTTCTCGTCG
TGCGAGGACCTCATGTCCAACCTGGTGTGCGCGTCTGCGTCTGGGTGCTCGGCGTCGTC
GCCACCGCCGGCAACGCGCTCGTCATCGCCTGGCGCATGCGCTTCAAGCACTCCAACCAG

GTGCACTCGTTCCTGATCACCAACCTGGCCATCGGCGACCTGTTTCATGGGCTCGTACCTG
CTGATCATCGCGGCGGCGGACGCGCACTACCGCGGCGTCTACTCGGTGCACGACCGCGAC
TGGCGCTCCAGCGCGCTCTGCAACCTGGCCGGCTTCATCTCCACCTTCTCCAGCGAGTTC
TCCGTCTACACGCTCACAGTGATCACGCTGGACCGCTTCCTGGTGATAATCTTCCCGTTC
CGCATCCGGAGGCTGGAGATGTCCAAGACGCGCGTGCTCATGGCCGCCGGCTGGGCCGTG
GCCGCTTTCCTGTCCGGGCTGCCGCTCTTCCGGATAGACTACTTCCGGAATTTCTACGGG
AGATCCGGCGTTTTGCTTAGCCCTGCACATAACTCCCGACAAGCCGAACGGATGGGAGTAC
TCCGTATTTGTATTCCTGTTCTGAACCTGGCGTCGTTCTCGGCGATCGCGCTGGGCTAC
GCCTGGATGTACTGGGTGGCGCGGTCGACGCAGCGCGCGGCCGCCACCAGCACCGCCGG
CCCGACTCGGCCACCATGGCGCGCCGCATGACGCTCATCGTGGCCACCGACGCCGCTGC
TGGATGCCCATCATCCTGCTCGGCCTGCTCTCGCTCGCCGGCATCACCGTGCCGCCGCGAG
GTGTTTCGCGTGGGTGGCGGTGTTTCGTGCTGCCGCTGAACGCGGCGGTGAACCCGGTGCTG
TACACCATCTCGACGGCGCCGTTTCCTGACGCCGGCGCGCCGCGGCCTGCGCGCCTTCAAG
CGCTCCTGGAAGCTGTCGCTCACCGCCGACCAGCGCAGGACCTTCTCCTCCTCGCTGGGT
TCGTCCCACCTGCACAACTGCAACCTGTGCGACGTGAACTGCCCCGCTAGACGTCAACATC
TTCATGGAGAACGGCGGCGGCGTTGCCACCCCCGCGGAACGAACCGAGTTCGCTGGCGGG
AGCTCCAATAACGGGTTCGACGCACTTCGCGCTCTTCTCGCTCACCAGACGGCAGCCGCGAG
GCGTCACACGATCACCGGTGGTGCTCCCGGCCTGCGGCGCAGCAGCGGCACGGCAGCAGC
GGCGACTGGCGCTTCGGTTCGGTGGCGCGAGCAGCAGCCTCAGCAGTCGCTGGCGGCCGTC
GACACGGCTGTCTCTGCGCGCGGCGAGGTCATCCCCCTGCGCCAGGTGGCCGCCGCCGCC
CCCGCTGCCGCCCTGCGAATGACTCCCGCCGCCGCCGCTCCGCGAGCTGTACGACTGA

>***Locusta migratoria* LGR5b** Note: incomplete N-terminus

ASLAAAAGVAAPPAQCVRGCAPPPDAPADAAEAADHGLQRQRADSLVLAHQLRGVTGATH
STRSLAAVVGEESAAAALSAMWLVLALLTTSTTRAGATTATGGDHGNDSTGVGGPTWWPC
NATAPGEEGGVGGVGGGQAAFSCGGGRCVAARALCNGVPDCPAGEDES VHHCGCLPNEFR
CSNSCIDLVRRCDREPNC PDQEDETGCESFVCPVTHFKCANHYCVPEDAVCNFEDDCGDG
SDEQNC SHRTCWNSEFRCDNGECIRPGYVCDGLVDCKDASDEAHCAPDFFRVCGDGSRVH
QFFWCDDWTHCADNHADELNCTACDGADEFRCPNGRCIRANLCDSYCDCVPTGRGQGCA
DEAGCHHTYLLSHGVSLCTPGKTLVCTPHPGSRDDRCIAPRYICDGHNDCHNGNYVSDEL
GCLPSAGLVSGQWFSCSEGRMVPQETRCDFKWDCLLGEDEHGCERVPCSEREFTCSNGQC
IPIESRCDLKFDCWDKSDDEFNCKEAPCPAGHLRCRDSAQCVPRWWCDFYLD CPDGSDET
SCEGRGRECGAEFRCSGQCVPRRHVCFKSGQDRSGCADGSHLLHCENVTC PDNTFKCR
NGPCLNMSLRCAVLDCDKTWVDEDGCTFQCSTEPRCVCHDTKINCTSLELKQFP AEIEF
QINRFYMANLLNETLNEDSFSKLDRLVYLDLRNNSISRLPAMIFRNLWRLHILNLQDNR
ISVINNGSFFGLPDLRTLHLQNGIEVLEPMAFYGLSSITTLDLKHQRIRNVSRNAFVGL
RSLVALDLSFNNIFYLADGSLNGMPKLETLDLSNNFIKYVGNNVFRSVTALKTLVTDEFR
FCCVARHAARCLPAPDEFSSCEDLMSNLVLRVCVWVLGVVATAGNALVIAWRMRFKHSNQ
VHSFLITNLAIGDLFMGSYLLIIAAADAHYRGVYSVHDRDWRSSALCNLAGFISTFSSEF
SVYTLTVITLDRFLVIIFFRIRREMSKTRVLMAAGWAVAAFLSGLPLFRIDYFRNFYG
RSGVCLALHITPDKPNGWEYSVFVFLFLNLASFSAIALGYAWMYWVARSTQRAARHQHRR
PDSATMARRMTLIVATDAACWMPiILLGLLSLAGITVPPQVFAWVAVFVLPLNAAVNPVL
YTISTAPFLTPARRGLRAFKRSWKLSTADQRRTFSSSLGSSHLHNCNLCDVNCPLDVNI
FMENGGGVATPAERTEFAGGSSNNGSQHFALFSLTRRQPQASHDHRWCSRPA AQQRHGSS
GDWRFGRWREQPPQQSLAAVDTA VSARGEVIPLRQVAAAAPAAAPANDSRRRLRELYD*



Transmembrane regions of *Locusta migratoria* LGR5b as determined at:
<http://www.cbs.dtu.dk/services/TMHMM/>

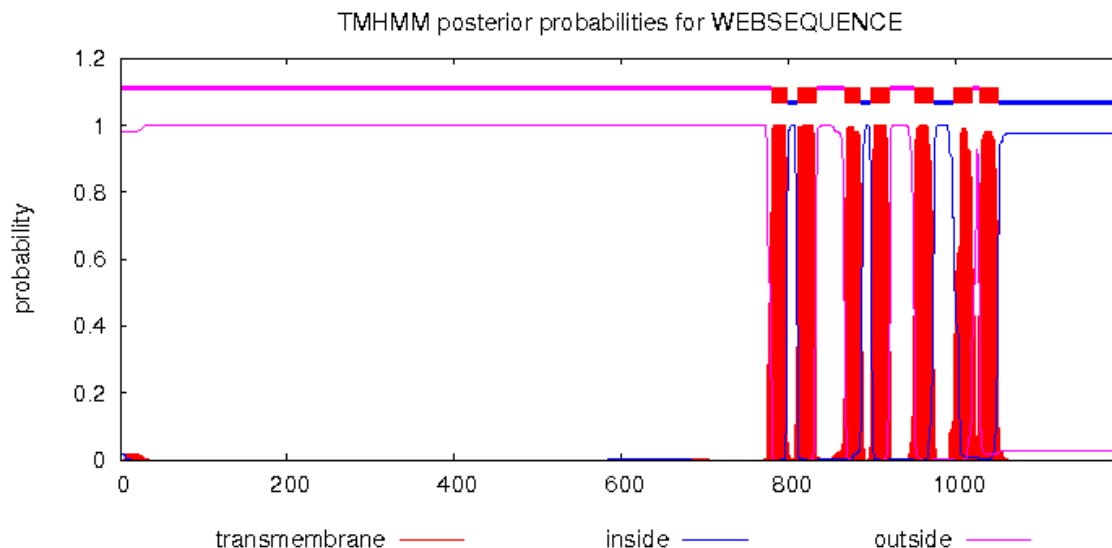
>*Schistocerca gregaria* LGR5a coding sequence

ATGACTGACCTCTGCAGCGCCGTTCTGCTCTTCTCCTGCTACTGCTCTTGTTGGGTGCATCC
TGCTCCGAGGCCGCTGACACAGGAAGCCAGTCTACTACGGCCGTGGAAGCGTCGCGCTGG
CTGTGCAACAACACGCAGGTGGAGCCTGGAGGGCGGGAGGTGAGCTGCGGCGACGGCTGG
TGCGTGGCGGAGAGTGCTCTGTGCAACGGCGTCCCGGACTGCGCCGGCGGCGAGGACGAG
GGCGTGCCGCACTGCGGATGCCTGCCCAATGAGTTCGGTGCAGTAATTCGTGCATCGAC
CTCGTGACGCGCTGCGACCGCGACGTGATTGCCCGAACGGCGAAGATGAGGACGGCTGC
GAGTCATTCTGCTGCCAGTGACGCACTTCAAATGCGCCAACCACTTCTGTGTGCCTGAG
GACGCCGTCTGCAACTTCGGAGACGACTGCGGTGACGGCTCGGACGAACAAAGCTGCTCG
CACCGGTCTTGCTGGAAGTCGGAGTTCGGTGTGACAACGGAGAGTGCATCCGTCCTGGC
TTCGTGTGCGACGGCGTCGTGCGACTGCAAGGACGCCAGCGACGAGGTGCACTGTACACCA
GCCGAGTTCGCGATTTGTGGCGACGGAACGCGAGTTCACAAGTTCCTTCTGGTGTGATGGT
TGGCCGCACTGCCACGACAACCACGCCGACGAACTCAACTGCACCGAGTGCAGAGGTGAG
GACGAATATCTCTGTCCAAACGGCCGCTGCATCAGGCGCGCCAATGTCTGCGACTCATAC
TGCGATTGCGTTCGGGCTTCAGAGGGCAACCATGCGCCGACGAGGTGGACTGCGCAGGC
AGATATCTCAAGGAGTACGGAGTCAGTGTCTGCACACCAGGTGAAACATTGTCGTGTGTT
CTGCCATCCAACAAGAAGCACCGAGAGGAACGTTGTATCTCATCAGACTTTATATGTGAC
GGCTATAATGACTGTCATAACGGAAGATATATCTCCGATGAATTTGGGTGTGAAGATCTG
TTCAATTGTTCTGAGGGACGTGCTATACCCCTGTCCCTCGTGTGTGATTTCAAACGAGAC
TGTCTGAATGGAGAAGATGAACAGTTCGTGTGAAAAAAGAGTTGCTCAGTAAAAGAATTC
ACTTGTGCTAATGGACAATGTATTCCATTGGAGCTGGTCTGTGATCTGAGTTTTGATTGT
TGGGATAAGACTGATGAAATGAACTGCACAAATCAGAAGTGTCTCAAGGATATCGGAAA
TGTAAGATACAATGGTCAGTGCATCCCTTTAACTTGGTGGTGTGATTACAGTATAGACTGC
TTTGATGGCAGTGATGAAGAGGAATGTGAATCTGCACAGCATGCTTGCAAATCCAATGAA
TTTCGCTGCAACAATGGTCAATGTGTACCTGCTGACCTACGGTGTTCAAATCCGGTATT
GATCATGCTGCATGTGCTGATGGATCTCATCTGTTTAACTGTGATAACTGGACGTGCCCT
GATGGGACTTTCAAATGTAGAAATGGTCCTTGCTGAACAATTCTTTAGTGTGCAATAGG
AACATTGATTGCAAAGATACTTGGGTGGATGAAGATCACTGCCCATTTGAATGCTGTAGT
GACAGTCGCTGTTTCTGTCTGGACACAAAAATTAAGTGCAGTACTCTTGGCCTGAAGACT
CTCCAGATGGAATTGAAATTCAAATAAATCGCTTCTACATGGCCAATAACTTGCTGAAC
TACTCACTCAATGTTGATACCTTCTCAAACTAGACCGGCTGTTATACTTGGATCTGAGA
AACAACAGTATTTTCATGGCTACCTCCAATGATGTTTCGTAATCTGTGGCGACTGCACATC
CTCAATTTACAGAATAACAACCTTATCTGTAATTAGCAATGGTACATTCTTTGGATTACCT
AACTTGGAACTTCATCTACATGGTAACAACATCCAGAGCTTAGAGCCAATGGCCTTT
TATGGTCTCTCTTCACTGAAAGCACTTGATCTTAAACGCCAAAGGATAAGCAACATTTCC
CATGGTGTCTTTCATTGGGCTACGTAGCTTAGTGACACTTGACATGTCATACAACCTGTATA
GCTTATCTAACAGATGGAACACTGATTGGAATGCCAAGCTGGAGACACTGGATCTGAGT
GGTAACAGCATTAGAACTGTTGGCAGTACTGTCTTCAAGAGTGTAAGGTCCCTGAAGAGA
TTAACAACCTGATGAATACAGATTCTGCTGCTTGGCACGACATGTTAGTGTCTGCATGCCA
CCACCTGATGAGTTTTCTTCATGTGAAGATCTTATGTCTAATTTGGTACTTCGTGTATGT
GTATGGATCCTTGGCATCGTGGCAACTTTAGGAAACACATTGGTCATTGTGTGGAGAAAG
TGTTTCAGGCATCCTAATAAGGTTTATTGTTCTTATCACCATCTTGCTATAGGAGAT
TTATTAATGGGAGTTTACCTTCTCATAATTGGAAGTGCTGATACTTACTACCGTGGAGTT
TATTCGTTTCATGATCGTGACTGGAGAAGTAGTGGATTGTGTCATACTGCAGGATTTCTT
AGCACCTTCTCTAGTGAATTCTCAGTGTATACACTCACTGTTATTGCTTTGGATAGATTCT
TTGGTGATACTATTTCCATTTTCATGTGAGGACAATGAAAATGACAAAAACCCGAATATTG

ATAGCAGGAGGATGGTTGGGTGCTGCATTTTTATCAGGTCTACCGTTTATACACATCAGC
TATTTTAAGAATTTTTATGGAAGATCTGGAGTTTGCCTTGCACTTCACATAACACCACAG
AAATATAATGGATGGGAATATTCAGTGTTTGTATTCCTCTTCTTGAATCTGGCATCATTC
TCTGTTATTGCTGTTGGGTATACGTCAATGTTTGTGATAGCGAGGACAACCTCAACAAGCA
GCACAAATGAATCAGAAAACCTGCTGAGTCAGCAGTGATTGCCCCGCCGAATGACTCTTATT
GTTGCTACAGATGCAGCTTGCTGGATGCCTATCATATGCTTGGGGATACTGTCTTTGGCA
GGAACGACAGTCCCTCCACAGGTTTACGCATGGATAGCTGTATTTGTTCTACCACTAAAC
GCAGCTATCAATCCTATTCTTTACACAATATCAACTACACCTTTCCTAGAACCAACTCTA
AAAGGACTGAAGACTTTGAAGAGGTCATGTAGGCTGTCGCTTACAACTGAACAGCACCAC
ACATACTCATCTGTTACAGCCTCTGAACATCAACATGATTATAATTTCCATGGCCATCCA
TTTATGATTGATGCTGGTCATTCAATTGGAAACGACAAATACAAAAAGAAACAACAAGAA
AATTGTAATGATACCAGTGAAGAGGACGGAGAACATTTCTTTTCTGCCAGTGAATGCCAA
CAGCATCTACACCTCACTTCTAAGAACTGTCACACAGAAGCAATGTGTCATTCTCCCCA
TCAGCTGAGTTGGTGATGTCCAACTCACACTTCAATGAGAGATGTACTTACCCTGACATC
CAAGTTCAGGTTGAACTTCTACCATTGCAACAAATGCCTGTGGATATGTGA

>*Schistocerca gregaria* LGR5a

MTDLCSAVRLLLLLLLLLGASCSEAADTGSQSTTAVEASRWLCNNTQVEPGGREVSCGDGW
CVAESALCNGVPDCAGGEDEGVPHCGCLPNEFRCSNSCIDLVQRCDRDVDCPNGEDEDGC
ESFVCPVTHFKCANHFCVPEDAVCNFGDDCGDGSDEQSCSHRSCWKSEFRCDNGECIRPG
FVCDGVVDCKDASDEVHCTPAEFRICGDGTRVHKFFWCDGWPHCHDNHADELNCTECRGQ
DEYLCPNGRCIRANVCDSDYCDVCPASRGQPCADEVDCAGRYLKEYGVSVCPTPGETLSCV
LPSNKKHREERCISDFICDGYNDCHNGRYISDEFGCEDLFNCSEGRAIPLSLVCDFKRD
CLNGEDEQFCGKKSCSVKEFTCANGQCIPLLELVCDSLFDWCWKTDEMCTNQCSCQGYRK
CRYNGQCIPLTWCDYSIDCFDGSDEEECESAQHACKSNEFRCNNGQCVPADLRCFKSGI
DHAACADGSHLFNCDNWTCPDGTFCRNGPCLNNSLVNIDCKDTWVDEDHCPFECCS
DSRCFCLDTKINCSTLGLKTLPDGIEIQINRFYMANLLNYSLVNVTFSKLDRLLYDLR
NNSISWLPMMFRNLWRLHILNLQNNLSVISNGTFFGLPKLGTLLHLHGNNIQSLEPMAF
YGLSSLKALDLKRQRISNISHGAFIGRLSLVTLDMSYNCIAYLTDGTLIGMPKLETLDLS
GNSIRTVGSTVFKSVRSLKRLTTDEYRFFCLARHVSVCMPPPDEFSSCEDLMSNLVLRVC
VWILGIVATLGNTLVIVWRKCFRHPNKHVSFLITNLAIGDLLMGVYLLIIGSADTYIRGV
YSVHDRDWRSSGLCHTAGFLSTFSSEFSVYTLTVIALDRFLVILFPFHVRTMKMTKTRIL
IAGGWLGAFLSGLPFIHISYFKNFYGRSGVCLALHITPQKYNWEYSVFVFLNLASF
SVIAGYTSMFVIARTTQAAAQMNQKTAESAIAARRMTLIVATDAACWMPPIICLGILSLA
GTTVPPQVYAWIAVFLPLNAAINPILYTISTTPFLEPTLKGLKTLKRSCRLSLTTEQHH
TYSSVTASEHQHDYNFHGHFPMIDAGHSIGNDKYKKKQQENCNDTSEEDGEHFFSASECQ
QHLHLTSKNCHTEAMCHSSPSAELVMSNSHFNERCTYPDIVQVVELLPLQMPVDM*



Transmembrane regions of *Schistocerca gregaria* LGR5a as determined at:

<http://www.cbs.dtu.dk/services/TMHMM/>

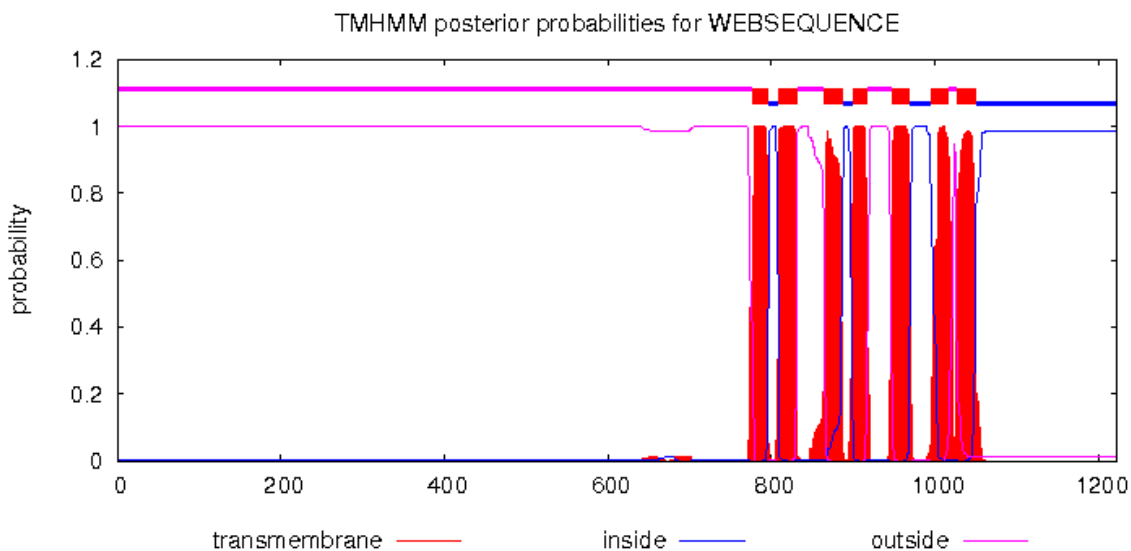
>*Schistocerca gregaria* LGR5b coding sequence

ATGTGGCGCCTGCTGCTGCTGACTTTGGCCACGAGAGCGGCTGCGCTCACCGCCAGTGGG
GGTGACCACGGCAACGACAGCGCTGGCGGCGGAGGGCCGACGTGGTGGTCGTGCAACGCG
ACGTCGCCCGGCGAGGAGGGGCGCGCCACGGAGGCGGCGGCCGTGTTACAGCTGCGGCGGC
GGCTGGTGGTGGCGGAGCGAGCTCTCTGCAACGGCGTCCCCGACTGCCCCGCGGGCGAG
GACGAGAGCGTCCACCAGTGC GGTTGCCTCCCAAATGAATTCCGGTGCAGTAACTCTTGC
ATCGACCTGGTACGACGCTGTGATCGCGAACCCTAACTGCCCTGATCAGGAGGACGAAACC
GGCTGTGAGTCCTTCGTGTGTCTGTGACGCACTTCAAGTGTGCCAATCACTACTGCGTC
CCAGAGGACGCGGTGTGCAACTTTGAGGACGACTGTGGTGTGGATCCGACGAACAAAAT
TGCTCGCACCGGACATGCTGGAACCTCGGAGTTCGGGTGCGACAACGGGGAGTGCATCCGG
CCCGGCTACGTCTGCGACGGCGTCTGTCGACTGCAAGGACGCCAGCGACGAGGCGCACTGC
ACGCCAGATTTCTTCCGGATATGCGGCGACGGGACTCGCGTCCACCCTTCTTCTGGTGT
GACGACTGGACGCACTGCGCTGATAACCACGCGGACGAGCTGAACTGTACAGCCTGCGAC
GGCGCCGACATGTTCCGCTGTCCGAACGGTCGCTGCATCCGTGCGGCCAACCTGTGTGAC
TCGTA CTGCGACTGCGCGCCCACCGAACGCGGCCAGGGGTGCGCCGACGAGGCGGGCTGC
CAGCACAGCTACCTCCAGAGGCACGGTATGAGCGTGTGCACGCCGGGGAAGAGCTTACTT
TGCATCCCGCACCCCGGCAGCAGGGAGGATCGCTGCATCGCCCCGAGTACATCTGCGAC
GGCCACAACGACTGCCACAACGGGAACTACGTCTCGGACGAGCTGGGCTGCCTGGCTGAC
GTGCTCCGAGGGCCGCATGATCCCGCAGGAGCTGCGCTGCGACTTCAAGTGGGATTGCCT
GCTGGGCGAGGACGAGCAGGGTTGCAACGGATCCCGTGTTCTAAAAACGAATTCACGTGC
AGCAATGGCCAATGTATCCCTATAGAAAGCCAATGTGATTTGAGATTTGACTGCTGGGAC
AAGAGTGACGAATTTAACTGCAAGGAGGCGCCGTGCCCGCCGGGCCAGCTCAAGTGCGCG
GGCAGCGGGCAGTGCGTGCCGCGGGCCTGGTGGTGGCGACTTCTACCTCGACTGCCCGGAC
GGCTCGGACGAGCTCAGCTGCGTGGGCGCGGGCGGGAATGCGGCCGCGACGAGTTCCGC
TGCCTGAGCGGCCAGTGCGTGCCCCGCACCGACGTCTGCTTCAAGTCCGGCCACGAGCGC
AGCGGCTGCGCCGACGGCTCCACCTGCTGCACTGCGAGAATGTGACGTGCCCAGAGGAC
ACATTTAAATGCAGAAACGGCCCGTGCTCAACATGTCACTGCGCTGCAACGCCTTCTCTG
GACTGCAAGGACACTTGGGTTGACGAAGACGGCTGCACGTTCCAGTGCTCCACGGAACCT
CGATGCGTGTGCCACGACACAAAAATCAACTGCACCAGCCTTGGTCTGACGGAGCTCCCG
GCGGTCATTGAATTTTCAGATAAATCGCTTTTATATGGCAAATAATTTGTTGAATGAGACA
CTTAATGAAGATTCATTTTCGAAACTGGACCGACTTGTCTATCTAGATCTGAGGAACAAT
AGTATATCTAGACTTCCCGCCACGATATTCCGCAACCTCTGGCGACTACACATTCTCAAC
TTACAAGATAACCATATCTCCGTTATAAACAACGGTAGCTTCTTCGGGTTGCCAGATTTG
CGCACACTGCATCTACAAGGTAACGGAATAGAAGTCTTAGAACCAATGGCTTTTTACGGA
CTCTCGTCGATTACTACGTTGGATCTGAAACACCAGAGGATACGCAACATATCTCGCAAC
GCCTTCGTAGGACTCAGAAGTCTCGTCGCCCTTGACCTGTCTTTCAACCACATATTCTAC
CTTGACAGATGGAGCTTTGAATGGAATGCCTAACTGGAAACATTAGACCTGAGTAACAAT
TTCATCAAGAACGTTGGAAACAACGTATTTAGAAGCGTAACTGCATTAAAAACACTGGTG
ACGGACGAGTTCGGTTCTGCTGCGTGGCGCGGCACGCGGCGCGCTGCCTGCCGGCGCCC
GACGAGTTCTCGTCGTGCGAGGACCTCATGTCCAACCTGGTGTGCTGCGCGTCTGCGTGTGG
GTGCTCGGCGTCTGTCGCCACCGCCGGAACGCGCTCGTCATCGCCTGGCGCATGCGCTTC
AAGCACTCCAACCAGGTGCACTCGTTCCTGATCACGAACCTGGCGATCGGCGACCTGTTC
ATGGGGTCGTACCTGCTGATCATCGCGGCGGCCGACGCACACTACCGGGGCGTGTACTCG
GTGCACGACCGCGACTGGCGCTCCAGCGCCCTCTGCAGCCTCGCCGGCTTCATCTCCACC
TTCTCCAGCGAGTTTTCCGTCTACACGCTCACAGTGATCACGCTGGACCGTTTTCTGGTG

ATAATATTTCCGTTCCGGATCCGGAGGCTGGAAATGTCCAAGACCCGCATGCTGATGGCG
GCGGGCTGGGCGGTTGCAGCGTTCCTGTCCGGCTTGCCGCTCTTCAGGATAGACTACTTC
AGAAATTTCTACGGGAGATCCGGTGTTCCTAGCCCTGCACATAACTCCAGACAAGCCG
AGCGGATGGGAGTACTCCGTGTTTGTATTCCTATTCCTGAACCTGGCGTCGTTCTCGGTG
ATCGCGCTGGGCTACGTGTGGATGTACGCGGTGGCGCGCACACGCAGCGCGCCGTCCAG
CAGCAGCACAAGCGGCCGACTCGGCCACCATGGCGCGCCGCATGACGCTCATCGTGGCC
ACCGACGCCGCCTGCTGGATGCCCATCATCCTGCTCGGCCTGCTCTCGCTCGCGGGCATC
ACCGTCCCACCGCAGGTGTTTCGCTTGGGTGGCGGTTTTTCGTGCTGCCGCTGAACGCGGCG
GTCAACCCGGTACTGTACACCATCTCGACGGCGCCCTTCCTGACGCCGGCCCCGGCGCGGC
CTGCGAGCCTTCAAGCGCTCCTGGAAGCTGTGCTCACCGCAGACCAGAGGAGGACCTTC
TCTTCTTCGCTGGGTTCGACCCACGTCCACAACCTGCAACCTGTGCGACGTAAACTGCCCCG
CTTGACGTCAACATCTTCATGGAGAACGGCGGGGGCGTTGCCACCGCTCCGGAGCGTAGC
GATCTCGCTGGCGGGGGCGACAGTAACGACTCGCAGCACTTCGCCCTCTTCTCGCTCACC
AGACGCCAGCCGCAGGCGGCACACGATCACCGCTGGTGCTCTCGGTCATCCCAGCAGCGC
GCTAGCGGCGACTTGCGTTCGGGCCGATGGCGGGGGCGCCACCGTCAGCAGCTACACCTG
CAGCCGTCGCTGGCGTCGGTCGACACAGCTGTCTCTGCTCGCGGCGAGGTCATCCCCCTG
CGGCAGGTGGCCGGGCCCCCGCGGCTGACTCCCGCCGCCGCCCTCCGCGAGCTG
TACGACTGA

>*Schistocerca gregaria* LGR5b

MWRLLLLTATRAAALTASGGDHGND SAGGGGPTWWSNATSPGEEGRATEAAAVFSCGG
 GWCVAERALCNGVPDCPAGEDESVHQCGCLPNEFRCSNSCIDLVRRCDREPNC PDQEDET
 GCESFVCPVTHFKCANHYCVPEDAVCNFEDDCGDGSD EQNC SHRTCWNSEFRCDNGECIR
 PGYVCDGVVDCKDASDEAHCTPDFFRICGDGTRVHRFFWCDDWTHCADNHADELNCTACD
 GADMFRCPNGRCIRRANLCDSYCDAPTERGQGCAD EAGCQHSYLQRHGMSVCTPGKSLL
 CIPHPGSREDRCIAPEYICDGHNDCHNGNYVSD ELGCLADVLRGPHDPAGAALRLQVGLP
 AGRGRAGLQRI PCSKNEFTCSNGQCIPIESQCDLRFDCWDKSDEFNCKEAPCPPGQLKCA
 GSGQCVPRAWCDFYLD CPDGSDELSCVGRGRECGRDEF RCLSGQCVPRTDVCFKSGHER
 SGCADGSHLLHCENVTCPEDTFKCRNGPCLNMSLR CN AFLDCKDTWVDE DGCTFQCSTEP
 RCVCHDTKINCTSLGLTELPVIEFQINRFYMAN NLLNETLNEDSFSKLDRLVYLDLRNN
 SISRLPATIFRNLWRLHILNLQDNHISVINNGSFFGLPDLRTLHLQNGIEVLEPMAFYG
 LSSITTLDLKHQRIRNISRNAFVGLRSLVALDLSFNHIFYLADGALNGMPKLETLDLSNN
 FIKNVGNNVFRSVTALKTLVTDEFRC CVARHAARCLPAPDEFSSCEDLMSNLVLRVCVW
 VLGVVATAGNALVIAWRMRFKHSNQVHSFLITNLAIGDLFMGSYLLIIAAADAHYRGVYS
 VHDRDWRSSALCSLAGFISTFSSEFSVYTLTVITLDRFLVIIFFRIRRLEMSKTRMLMA
 AGWAAAFSLGSLPLFRIDYFRNFYGRSGVCLALHITPDKPSGWEYSVFVFLFLNLASFVS
 IALGYVWMYAVARTTQRAVQQQHKRPDSATMARRMTLIVATDAACWMP IILLGLLSLAGI
 TVPPQVFAWVAVFVLPLNAAVNPVLYTISTAPFLTPARRGLRAFKRSWKLSLTADQRRTF
 SSSLGSTHVHNCNLCDVNCPLDVNIFMENG GGVATAPERSDLAGGDSNDSQHFALFSLT
 RRQPQAAHDHRWCSRSSQQRASGDLRSGRWRGRHRQQLHLQPSLASVDTAVSARGEVIPL
 RQVAGPAPAADSRRRRLRELYD*



Transmembrane regions of *Schistocerca gregaria* LGR5b as determined at:
<http://www.cbs.dtu.dk/services/TMHMM/>