

Public Abstract

First Name:Songjie

Middle Name:

Last Name:Wang

Adviser's First Name:Qisheng

Adviser's Last Name:Song

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:CHARACTERIZATION OF THE INSECT CUTICLE SCLEROTIZATION HORMONE BURSICON AND BURSICON-REGULATED GENES IN THE HOUSE FLY *MUSCA DOMESTICA*

Bursicon is a neurohormone that regulates the cuticle sclerotization and wing expansion process in insects. Bursicon is a heterodimeric cystine knot protein containing two subunits, burs alpha and burs beta, which are encoded by two genes, *burs alpha* and *burs beta*. In the current study, the *burs alpha* and *burs beta* genes were cloned from the house fly *Musca domestica*. The transcriptional profiles of burs alpha and burs beta genes were analyzed in the central nervous systems of *M. domestica*. Recombinant *M. domestica* bursicon heterodimer (r-bursicon) was expressed in mammalian 293 cells and insect Highfive™ cells, and was analyzed for bursicon function. Using the r-bursicon with a fly neck-ligation assay and the DNA microarray analysis, a panel of genes that is regulated by bursicon was identified from *M. domestica* and also the fruit fly *Drosophila melanogaster*. Two of these genes, *suppressor of hairless* and *pleckstrin homology*, were cloned and sequenced for further study in *M. domestica* (designated *mdSu(H)* and *mdPH*). The *mdSu(H)* is a transcription factor involved in an important signal transduction pathway, the Notch signaling pathway, and the *mdPH* is possibly responsible for regulating the G protein coupled receptor 2, which is proposed to be the receptor of bursicon. By studying *mdSu(H)* and *mdPH*, we have provided two excellent components that very likely involved in the bursicon regulated signal transduction pathway during the insect cuticle sclerotization and wing expansion process.