

**FUNCTIONAL ANALYSIS OF THE PROTEINS ENCODED BY THE NIMROD  
GENE CLUSTER IN *DROSOPHILA MELANOGASTER***

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**Introduction:** We have previously shown that the NimC1 receptor, a member of the Nimrod protein family, is involved in the phagocytosis of bacteria. We also found, that the *Drosophila melanogaster* genome encodes eleven additional proteins which show the characteristic domain structure of NimC1, and some of them, NimA, NimB1, NimB2 and NimC1, bind bacteria. Nine of these genes are located in the close genomic proximity of the *nimC1*, forming a gene cluster. Its orthologs, in the mouse Jedi/PEAR1 protein and in human the MEGF10 receptor also have closely related structural and functional features to NimC1. The arrangement of several other genes, near the *nim* genes has been conserved throughout 350 million years of the evolution. As it is suggestive that these genes have a concerted action in the homeostasis of the organism, we continued the analysis of the *nim*-cluster by analysis of the *vajk* family.

**Methods:** The proteins were expressed in a baculovirus system and antibodies were produced and used. Transgenic lines of *Drosophila* were constructed and used, in combination with biochemical and immunological analysis of the gene products.

**Results:** We found that the *vajk-1*, *-2*, and *-3* genes are located in the large intron of the *Ance-3* gene and *vajk-4* is situated outside of the region. The *in silico* analysis revealed that the *vajk* genes encode proteins which share similar structural properties; they contain N-terminal signal peptide, low complexity regions and at least 20% valine amino acids. Expression of *vajk-1* is confined to cuticle-associated structures both in the embryo and the pharate adult. Expression of *vajk-2* gene is increased after bacterial infection. The Vajk3 protein is expressed in embryonic and larval crystal cells, which are involved in melanization reactions. The Vajk4 protein showed an expression similar to Vajk1. Furthermore, silencing of the *vajk-1* and *vajk-2* genes resulted in wing-developmental abnormalities, possibly as a consequence of the abnormal cuticle development.

**Conclusion:** It is suggestive therefore that genes of the Nimrod cluster are involved in different facets of defense and may have a concerted action in maintaining the immune-homeostasis of the organism.

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