

**Cím:** ROLE OF DROSOPHILA NIMROD CLUSTER IN THE INNATE IMMUNITY  
**Szerző:** Zsámboki János  
**További szerzők:** Gyöngyi Cinege, Gábor Csordás, Viktor Honti, István Andó, Éva Kurucz  
**Munkahely:** Institute of Genetics, Biological Research Centre of the Hungarian Academy of Sciences

The Nimrod gene cluster is located on the second chromosome of *Drosophila melanogaster* and it is composed of the *nimrod A, B, C*, the *vajk*, the *ance* (angiotensin converting enzyme) and *cenG* (centaurin gamma) gene families. Similar gene composition across distantly related arthropod species indicates that the Nimrod gene cluster is a fundamental component of the innate immune response, since it remained intact since 300-350 million years.

Previously we identified NimC1 as a *Drosophila* blood cell specific transmembrane protein, which is involved in the phagocytosis of microorganisms. Nimrod proteins encoded by the *nimA*, *nimB1-5* and *nimC1-4* genes contain a signal peptide, characteristic NIM domains and a short conserved CCxGY motif, immediately preceding the first NIM domain. In order to study the bacterium binding properties of Nimrod proteins we have developed an immunofluorescence and flow cytometry based analysis and found that native NimC1 expressed by *Drosophila* phagocytic cells binds *Escherichia coli*, but does not bind *Staphylococcus epidermidis*. We produced several FLAG-tagged recombinant Nimrod proteins and analyzed them using this assay. We found, that NimA, NimB1, NimB2 and NimC1 bind *E. coli* bacteria, but only NimB1 binds *S. epidermidis*. We also observed that neither lipopolysaccharide, nor peptidoglycan, but a protein molecule serves as ligand for the NimC1 receptor.

We further analyzed the Nimrod gene cluster by studying the *vajk* genes and noticed that they encode proteins having similar sequence properties; they contain N-terminal signal peptide, low complexity regions and at least 20% valine amino acids. To analyze the expression of the *vajk1-4* genes in different developmental stages of the fruit fly we used RT-PCR. We found that all *vajk* transcripts are present in the embryo, only *vajk-2* and *vajk-3* are expressed during larval stages, and none of the *vajk* genes were transcribed in adults, therefore we also examined the *vajk-1* and *vajk-4* gene expression upon immune induction provoked by parasitoid wasp infection, wounding and/or bacterial infection. To look into the expression of

the Vajk proteins in the body, we developed antibodies against recombinant Vajk proteins.  
We test the function of *vajk* genes after silencing them with RNA interference constructs.