

IDENTIFICATION AND CHARACTERIZATION OF NOVEL HEMOCYTE-SPECIFIC MOLECULES IN *DROSOPHILA MELANOGASTER*

Beáta Kari

Gábor Csordás, Viktor Honti, Katalin Medzihradzky Fölkl, Zsuzsanna Darula, István Andó, Éva Kurucz

Biological Research Centre of the Hungarian Academy of Sciences, Institute of Genetics, Laboratory of Immunology, Szeged, Hungary

Insects are armed with an evolutionarily conserved cell mediated immune-defense mechanism, which may serve as a prototype of innate immunity in all phyla of the animal kingdom. The fruit fly, *Drosophila melanogaster*, with its unique genetic system, is one of the most significant model organisms to study regulation of cell mediated immune defense. The effector cells of the cellular immune response in the fruit fly are the hemocytes (Honti et al., *Dev. Comp. Immunol.* 2013). The subsets of hemocytes exert a concerted action in the cell mediated immune response. The plasmatocytes engulf microorganisms, the crystal cells are involved in melanization and the lamellocytes participate in the encapsulation of large foreign particles. Lamellocytes, the encapsulating cells, may develop from phagocytic plasmatocytes upon immune induction. In the course of plasmatocyte-lamellocyte transition the morphological and functional changes can be monitored by the expression pattern of hemocyte-specific marker molecules (Kurucz et al., *Acta Biol. Hung.* 2007); the plasmatocyte-specific markers become silenced and markers, defining subsets of lamellocytes, are expressed sequentially (Honti et al. *Mol. Immunol.* 2010).

In addition to the already identified hemocyte-specific markers we defined two novel markers on subpopulations of plasmatocytes and lamellocytes, H18 and 3A5. The H18 molecule is restricted to a subpopulation of plasmatocytes in naïve animals, however, after immune induction the proportion of the H18 positive plasmatocytes is increased and the molecule is also expressed on differentiated lamellocytes. The expression of H18 is related to blood cell differentiation after immune induction. The 3A5 molecule is expressed in the cytoplasm of a subset of plasmatocytes and it is present in the hemolymph too. Mass spectrometric analysis of immunoprecipitates identified specific sequence derived from specific *Drosophila* ORFs. The H18 molecule is encoded by the *Drosophila* homolog of the human *Tetraspanin* genes, which are involved in human in signal transduction, immune cell proliferation and activation. The 3A5 molecule is encoded by the *CG2233* gene, which has no human homolog, however, it is well conserved among *Drosophilidae* and is most likely a novel clotting factor.

Further analysis of the functions of these molecules will provide additional information on the molecular events of blood cell differentiation and the cell mediated immune response.

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