

DISSERTATION SUMMARY

The origin of lamellocytes in *Drosophila melanogaster*

Róbert Márkus

Institute of Genetics, Biological Research Center, Hungarian Academy of Sciences, Szeged, Hungary

Drosophila larvae defend themselves with a sophisticated cellular and humoral immune system, which shares similarities with the innate immune system of vertebrates. Therefore *Drosophila* became an excellent tool to study the innate immune reactions and host-parasite relationship (Hultmark 2003) in general. The cellular components of the *Drosophila* immune system are the hemocytes, they are present in three hemocyte compartments: in the circulation, in the lymph glands and attached to the cuticle, the latter are being the so called sessile hemocytes. In the larval circulation there are three differentiated cell types: plasmatocytes, lamellocytes and crystal cells. The majority (99%) of the hemocytes are plasmatocytes; they are responsible for phagocytosis of bacteria and apoptotic cells. The lamellocytes are large flattened cells, seldom seen prior to pupariation in wild type larvae. Upon parasitic wasp infestation the number of lamellocytes is dramatically increased in the circulation; their role is to eliminate foreign bodies and abnormally developing tissues by encapsulation (Rizki 1984). It is believed that following wasp infestation the lamellocytes originate from the lymph glands (Lanot et al. 2001; Sorrentino et al. 2002). Our preliminary data however suggested that this can not be the case.

We have searched for the origin of lamellocytes in different hemocyte compartments in the larva by infesting the larvae of the *Hemese*-Gal4 and *Hdc* transgenic flies. The hemocyte compartments of these larvae can be characterized by the expression pattern of the *Hemese*-Gal4 driver (Zettervall et al. 2004) and the *headcase* gene (Weaver and White

1995). The presence of the *Hemese*-Gal4 and the absence of the *headcase* is specific to hemocytes from circulation and sessile tissue, while the absence of *Hemese*-Gal4 and expression of *headcase* is characteristic to the lymph gland hemocytes. We have correlated these compartment specific and the lamellocyte specific markers to define the origin of lamellocytes.

Following wasp infestation the differentiating lamellocytes in the circulation had the same phenotype as the lamellocytes found in the sessile tissue, thus we conclude that lamellocytes originate from the sessile tissue.

References

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