FACULTE DES SCIENCES DE LA VIE
GLOBAL HEALTH INSTITUTE

EPFL-SV-GHI-UPLEM
Station nº19
CH-1015 Lausanne

Téléphone : +4121 693 18 18
Fax : +4121 693 17 90
E-mail : bruno.lemaitre@epfl.ch
Site web : http://ghi.epfl.ch

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

SEMINAR

GHI Floor Seminar

Monday, September 5th, 2016
@ 15.00 p.m.

Conference Room AI 1153

Badrul AREFIN

University of Stockholm, Sweden

Hosted by Prof. Bruno Lemaitre

The *Drosophila* defense towards nematodes and the contribution of danger signals

Insects have an evolutionary conserved innate immune system to fight different pathogens and to control damage via danger signals (without infection). During the last two decades, significant progress has been made in insect immunity, including for example, discoveries of two major immune pathways namely Toll and Imd. Despite the advancement of our knowledge on insect defenses against bacteria and fungi, little is known about the defense against entomopathogenic nematodes (EPN). Moreover, nematodes have devastating consequences in human health and in agriculture. The aim of this study was to get a better understanding of the *Drosophila* defense towards nematodes and about the contribution of danger signals, and translate this knowledge to vertebrate system due to the similarities of many genes.

Heterorhabditis bacteriophora are entomopathogenic parasitic worms that contain the obligate endosymbionts *Photorhabdus luminescens*. We provide for the first time a genome-wide transcriptional analysis of *Drosophila* larvae infected with EPN to elucidate their interactions with the aim to get a better picture of the *Drosophila* defense to nematodes, By comparison of infected and non-infected larvae, we found a total of 642 transcripts that are differentially regulated upon nematode infection. Gene ontology (GO) analysis showed one-quarter immune-related genes out of the top 100-upregulated genes. Further functional analysis identified a thioester containing complement-like protein (TEP3), a basement membrane component (Glutactin), a recognition protein (GNBP-like-3) and several small peptides, which upon loss showed increased susceptibility after nematode infection. This study unravels a novel function in immunity for some of the genes.

We then investigate the role of cellular immunity of *Drosophila* to nematodes and the innate immune response in a danger situation. For that, *Drosophila* blood cells (hemocytes) were genetically depleted. We find that this induces massive lamellocytes differentiation when apoptosis is induced in naïve larval plasmatocytes and crystal cells, emergence of melanotic masses, up- and down-regulation of Toll and Imd pathway respectively, and a strong defect in adult legs. Further investigations showed that these phenotypes are mediated by nitric oxide and taken together these findings suggest a pro-inflammatory response of *Drosophila.*