BASIC INFORMATION ON SUB-PROJECT

NAME OF PROGRAMME/FUND	Scholarship Fund - Sciex NMS^{ch}
RESEARCH FIELD AND OTHER RESEARCH FIELDS INVOLVED (if applicable)	Basic Biological Research, Basic Medical Sciences
TITLE OF THE SUB-PROJECT	Insect epithelial immunity in relation to midgut protozoan parasites
REGION OF THE CZECH REPUBLIC (according to the location of the home institution)	Prague
GRANT AMOUNT SPENT	92 224,25 CHF
INTERMEDIATE BODY	Swissuniversities
HOME INSTITUTION	Charles University in Prague, Faculty of Science
HOST INSTITUTION	EPFL, School of Life Sciences - Global Health Institute
NAME OF THE FELLOW	Anna Dostálová

Most of our knowledge on insect gut immunity stems from studies conducted with the model organism. Drosophila melanogaster. One of the main defence mechanism is production of antimicrobial peptide in the gut in response to infection. This response is controlled at the transcriptional level by the Imd pathway upon recognition of Gram-negative peptidoglycan by PGRP-LC (Peptidoglycan Recognition Protein-LC). On the other hand, tolerance to commensal microbiota is orchestrated in large part by a family of enzymatic PGRPs that are capable of degrading peptidoglycan, the elicitors of the Imd pathway. This balance between activation of the Imd pathway by PGRP-LC and inhibition of the pathway by enzymatic PGRPs allows the fine tuning activation if this pathway in the gut. The regulation of local immune response likely plays a crucial role in the ability of blood-feeding insects to serve as vectors of medically important pathogens. The aim of this proposal is to further study the contribution of enzymatic PGRPs to gut homeostasy and the immune response of Drosophila. In parrallel, I will analyze the gut response to oral infection with Crithidia spp. parasites with the goal of developing a powerful model to study host defense against protozoan parasites. My long-term goal is to use my expertise gained on the Drosophila gut response for deciphering the role of epithelial immune response in the phlebotomine sand flies, vectors of human a veterinary pathogens of the genus Leishmania.

MAIN RESULTS	A new model of trypanosomatid infection in *Drosophila—Jaenimonas drosophilae* – was established. Through experimental infections, we find that *Drosophila falleni*, the natural host, is highly susceptible to infection, leading to a substantial decrease in host fecundity. *J. drosophilae* has a broad host range, readily infecting a number of *Drosophila* species, including *D. melanogaster*, with oral infection of *D. melanogaster* larvae resulting in the induction of numerous immune genes. When injected into adult hemolymph, *J. drosophilae* kills *D. melanogaster*, although interestingly, neither the Imd nor the Toll pathway is induced and Imd mutants do not show increased susceptibility to infection. In contrast, mutants deficient in drosocrystallin, a major component of the peritrophic matrix, are more severely infected during oral infection, suggesting that the peritrophic matrix plays an important role in mediating trypanosomatid infection in *Drosophila*. This work demonstrates that the *J. drosophilae-Drosophila* system can be a powerful model to uncover the effects of trypanosomatids in their insect hosts. The main results of this project were published in mBio, a higly respected journal of the American Society for Microbiology. DOI: 10.1128/mBio.01356-15
DATE OF REALISATION OF THE FELLOWSHIP	1.8.2013 - 31.7.2014
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