UMR 7216 Epigénétique & Destin Cellulaire

Masters (M2) Internship in epigenetics

Hijacking the Host : genomic and epigenomic aspects of host-parasite interactions

We study how intracellular parasites change the phenotypes of their host cells. We use cellular and genomic approaches to investigate how pathogens hijack the signaling pathways of host cells to manipulate their genomes and epigenomes.

We have been studying how *Theileria* parasites hijack host signaling pathways to induce host cell transformation. We identified epigenetic events in the host cell nucleus that are induced by the intracellular parasite. One example is the regulation of a positive feedback loop involving microRNAs (Marsolier *et al.*, 2013); the parasite induces oncogene addiction which maintains host cell phenotypes. We also found examples of host methylation events induced by the parasite which lead to stable changes in host nuclear chromatin and gene expression (Cock-Rada *et al*. 2012). In addition to investigating changes in the host genome and cellular states, we explore unique features of the parasite genome. We mined the *Theileria* genome in search of parasite-encoded onco-proteins. We identified a parasite-encoded Pin1 protein that is secreted into the host cell and rewires host cell metabolism and oncogenic signaling (Marsolier *et al.*, 2015). **We study *Theileria*-infected leukocytes as a model to explore the plasticity of cellular phenotypes, the determinants of cell identities and the evolutionary strategies of interacting cellular systems.**

The M2 project will take an integrated genomic and proteomic approach to investigate parasite-induced transformation. The project is supported by funding from the ANR and the Labex WHO AM I? The Unité Epigénétique et Destin Cellulaire is equipped with all the technologies and expertise necessary for successful completion of this project. **The successful candidate should be curious about phenotypic plasticity and interdisciplinary approaches to epigenetic regulation. We are looking for a team player with creativity, passion and determination.**

send CV and motivation letter to
Professor Jonathan Weitzman
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Reference: PCP2018

http://parisepigenetics.com/

Recent papers

Marsolier *et al*. *Theileria* parasites secrete a prolyl isomerase to maintain host leukocyte transformation. (2015) ***Nature*** 520:378

Weitzman & Weitzman. What's the damage? The impact of pathogens on pathways that maintain host genome integrity. (2014) ***Cell Host & Microbe*** 15:283

Marsolier *et al*. OncomiR addiction is generated by a feedback loop in *Theileria*-transformed leukocytes. (2013) ***PLoS Pathogens*** 9(4):e1003222

Cock-Rada *et al*. SMYD3 promotes cancer invasion by epigenetic upregulation of the metalloproteinase MMP-9. (2012) ***Cancer Research*** 72:810