

Bachelor and Master Thesis Topic:

“Cold tolerance and seasonal adaptation in *D. melanogaster*”

Background

In order to stay synchronized with the external world most organisms have evolved endogenous clocks, which are necessary not only to track but also to anticipate periodical changes in environmental conditions. These endogenous oscillators rely on molecular clocks, of which the core components are transcriptional regulators. Fluctuation in the environmental conditions can influence the oscillation of core clock proteins and, therefore, the expression of clock regulated genes. We already know that the molecular clock in the brain of flies exposed to short winter-like days is different from that of flies exposed to long summer-like days, and that this correlates with the animal's ability to cope with seasonal changes in the environment. Indeed, flies with a winter-like clock are more cold resistant. **How is the molecular clock modulating the fly physiology in such a way that makes “winter flies” more cold “resistant than “summer flies”?**

Aim of the work

We aim to understand the link between the molecular clock and those physiological processes that it modulates in response to day length. We will **use behavioral, molecular, and histological approaches** to understand whether 1) the master clock in the brain of the fly is necessary for proper responses to cold exposure, 2) what is the effect of changing day length on the clock neurons and a cellular level, and 3) how clock mutants are impaired in their ability to interpret day length information.

The specifics of the projects might vary depending on the progress of the project and your interest!

Contact us for any information:

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