



MASTER THESIS

SEX and the HOUSEFLY

Musca domestica

The housefly is a member of the order Diptera and the most common fly in habitations around the world. It is a known vector of more than 100 different pathogens causing i.a. typhoid, cholera, tuberculosis salmonellosis, etc.... and considered to be the most dangerous transmitter of diseases in the world.



Literature

Bopp et al, *Sex Dev* **8** 2014

Sharma, Heinze et al. *Science* 356, 2017



Contact information

If you are interested to participate in our research, please contact:

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Almost all species throughout the animal kingdom produce two sexually distinct phenotypes, females and males.

Nonetheless, many different mechanisms exist which select and fix the sexual fate of a developing individual. In insects, for instance, dominant male or female determiners, parental genotypes, haplo-diploidy, or even environmental cues are employed as primary signals to instruct male or female development.

What is the molecular basis underlying diversification of sex determining signals?

In *Musca domestica* different mechanisms exist in natural populations (dominant male or female determiner or maternal determiner) reflecting the diversity in insect sex determination. The housefly thus provides an excellent model to study how these differences emerge. We identified several key genes of which function and regulation are being investigated using state-of-the-art methodologies (CRISPR/CAS9, RNAi, -omics, transgenesis).

What are the evolutionary forces driving turnovers in sex determination pathways?

Geographical distributions of male and female housefly determiners seem to follow latitudinal clines - from north to south. This observation suggests that environmental factors such as temperature can drive transitions in *Musca* sex determination. To address this we will investigate how temperature affects the activity of key signaling genes.