



**Fellow:** Mgr. Martina Gáliková, PhD.

**Title:** Hormonal regulation of *Drosophila* metabolism via gonad-derived steroids and interacting peptides

**Host organisation:** Institute of Zoology SAS

**Duration of the project:** 1. 1. 2021 – 31. 12. 2024

### Bio:

Martina Gáliková did her bachelor and master studies at Comenius University in Bratislava (Slovakia, 2004-2009). She continued in the Genetics studies at the University of Veterinary Medicine in Vienna (Austria, 2009-2013), where she received her PhD in 2014. Subsequently, she worked as a postdoctoral fellow at the Max Planck Institute for Biophysical Chemistry in Göttingen (Germany, 2013-2017) and afterwards at the Stockholm University (Sweden, 2017-2019). Currently, she works at the Institute of Zoology at the Slovak Academy of Sciences (Slovakia).

### Abstract:

Regulated investment of energy resources into reproduction versus fat storage is crucial for survival in environment with fluctuating nutrient availability. In mammals, this regulation is achieved by endocrine system. Reproductive glands (gonads) of mammals produce sex steroid hormones that control energy metabolism; however, the precise mechanism behind this regulation is not completely clear yet. My pilot data show that the metabolic functions of the gonad-derived hormones are conserved also in the fruit fly *Drosophila melanogaster*, a popular invertebrate human disease model. *Drosophila* may therefore serve as a useful model to reveal metabolic functions of these hormones. My initial experiments indicate that ecdysteroids (the gonad-derived hormones of flies) govern fat storage by a direct action on the adipose tissue and further via inter-organ communication between this organ and feeding centers in the brain. The proposed project aims to reveal the detailed mechanism behind this inter-organ communication, including identification of the involved secretory proteins. Ecdysteroids may also interact with the fly peptides that act similarly as insulin and glucagon hormones in humans. These interactions will be investigated in greater detail, as they might be responsible for the metabolic actions of ecdysteroids. Altogether, the project aims to reveal novel metabolic functions of the gonad-derived hormones. Given the high evolutionary conservation



of the endocrine pathways involved in metabolism, this research might have important implications for the field of biomedicine. In particular, the data might contribute to our understanding of the metabolic disorders caused by aberrant levels of the gonad-derived hormones in humans.