The University of Hong Kong
School of Biological Sciences

Guest Seminar

Of fish and flies: studying the biological basis of sociality in two model organisms

Date: 5th February 2025

Time: 11am

Venue: KSBS 6N11

About the speaker:

Dr. Rui Oliveira is a Principal Investigator at the Gulbenkian Institute for Molecular Medicine working in behavioural neuroendocrinology and behavioural genomics. Main fields of interests are (1) the neuroendocrinology and genomics of social behaviour, (2) the evolution and mechanisms underlying behavioral plasticity, and (3) comparative social cognition.

Abstract:

Sociality has been considered a major driver in brain and cognitive evolution. In my lab we combine the study of proximate causes (genes, hormones, neural circuits, cognitive processes) and ultimate effects (evolutionary consequences) of social behavior. For this purpose, we have been using two model organisms - zebrafish and fruit flies - to study the neural circuits and the genetic architecture of social behavior. In this talk, I will show how oxytocin plays a critical role in the development of sociality in zebrafish and how it interacts with the social environment during development to shape the emergence of adult social behavior. I will then show how oxytocin is necessary for complex social behavior in adult zebrafish, including social contagion of fear and emotion recognition. Finally, I will address the evolvability of sociality in zebrafish illustrated by an artificial selection experiment (currently in the F7) that experimentally produced a high-sociality zebrafish line. In the second part of my talk, I will present results on a study that investigates the genetic architecture of social cognition in *Drosophila*. We specifically address the question of social learning being a domain-specific or a general-domain cognitive process. We phenotyped social and asocial learning in the core lines of the DGRP panel, and we show that there is no phenotypic correlation between the two learning types and that GWAS revealed different genetic variants located in different genes associated with social and asocial learning. Finally, we show that most social learning-associated genes are expressed in the *Drosophila* mushroom bodies and functionally confirmed their involvement in learning using RNAi lines. Together these results highlight the potential of each model organism to address question related to the evolution of neural and genetic mechanisms underlying sociality.