2024 年度開催　生物科学セミナー

第 532 回	2024 年 9 月 2 日（月）	Christian Wegener 先生	詳細ページへ
第 531 回	2024 年 4 月 3 日（水）	Cristina Bertocchi 先生	詳細ページへ

第 532 回生物科学セミナー

日時：2024 年 9 月 2 日（月）13:30～

場所：D303

演者：Dr. Christian Wegener (Professor)

所属：Julius-Maximilians-Universität Würzburg, Biocenter, Neurobiology and Genetics, Germany

言語：英語

演題：Circadian timing of eclosion behaviour in Drosophila

概要：

In most insects, adult emergence (aka as eclosion in holometabolic insects) is timed to a specific time of the day, likely to optimise survival and finding of mating partners. In Drosophila, eclosion behaviour occurs in the early morning and requires time information from the central clock in the brain, and a peripheral clock in the prothoracic gland (PG) that produce the steroid hormone ecdysone.

During the last years, our group has systematically analysed the neuronal and neuroendocrine networks underlying the coupling between the clocks, neuroendocrine and peripheral sensory neurons and has characterised their importance for circadian timing of eclosion. Our results showed that even in quasi-natural environments, a functional clockwork is required for proper timing of eclosion under temperate conditions. Under constant conditions, this functional clock requires the peptidergic PTTH neurons that couple the central and the peripheral PG clock. Using different genetic approaches, we found that these neurons become active during the later half of pupal development, and that this activity is required for rhythmic eclosion behaviour on the population level. PTTH neurons are inhibited by the small ventral lateral clock neurons (sLNvs) which seem to represent the key input from the central clock. In addition, we found evidence that clock neurons

provide synaptic- and non-synaptic inputs to the eclosion hormone (EH) neurons, a set of descending peptidergic neurons that is central to the neuroendocrine feedback loop that initiates eclosion. The EH neurons receive further input from peripheral sensory neurons. Yet, our evidence so far suggests that these clock- and sensory inputs to the EH neurons are not required for eclosion rhythmicity, but rather may modulate the decision to initiate eclosion behaviour.

世話人：浜中　良隆 先生

第 531 回生物科学セミナー

日時：2024 年 4 月 3 日(水) 16:00～

場所：理学研究科 A427 セミナー室

演者: Cristina Bertocchi 博士

所属・身分: Pontifical Catholic University of Chile・Assistant Professor

発表言語：英語

演題: Molecular mechanics modulating cell-cell adhesion nanomachineries

概要:

Cells sense their physical surroundings through molecular nanomachines regulating force transduction and mechanosensing. One of such complexes is the Adherens Junction (AJ), an adhesion complex mediating cell-cell interaction. Within AJ, proteins such as α- and β-catenin, and vinculin have been shown to form the backbone of the force transduction module as they sense and bear mechanical forces transmitted between the actin cytoskeleton and intercellular contacts. While recent milestones defined the nanoscale architecture and molecular mechanics of this module, the proposed model seems to well explain the minimal complex for physiological conditions, but it fails to explain force transduction in transformed cells where, for instance, parts of the module are mutated or missing. Here we provide experimental and computational evidence that mechanical modulation is achieved by multistep molecular switching between vinculin in its closed and open conformations and its interaction with α- and β-catenin. This generates the graded response needed in development, tissue homeostasis and, it could also explain the

different phenotypes observed in various cancer cell types that lack essential proteins of AJ but still can adopt collective mode of invasion.

世話人：梅津　大輝 先生