発生ダイナミクス分野主催セミナー
Developmental Dynamics Seminar

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## 2024.9.2 (Mon) 15:00~16:30

片平・生命科学プロジェクト研究棟講義室AB(ハイブリッド開催)
Life Sciences Project Research Laboratory, Lecture hall. (Hybrid )

## Nutri-developmental biology: impacts of nutrition histories in juvenile stages on growth, organogenesis, and lifespan

## 栄養発生生物学：成長期の栄養履歴が個体成長、器官形成、寿命に与える影響

Postembryonic development is characterized by massive and rapid growth of juveniles. This developmental stage, in early life, is heavily influenced by the quality and quantity of nutrients consumed by the juveniles. To study how juveniles adapt to various nutritional environments, we have been characterizing growth and organogenesis in *Drosophila melanogaster* larvae under various diets, and in addition have been performing comparative analyses of Drosophila species with distinct feeding habits in nature. On the other hand, the impact of the nutritional environment in the early life —referred to nutrition history— is not restricted to that stage, but that it also exerts long-term health effects later in life, even to adult stages. Such far-reaching effects of the nutrition histories support the “developmental origin of health and disease (DOHaD)” hypothesis. However, unveiling its underlying mechanisms has been hampered by a lack of appropriate experimental models to identify effective nutrition histories and determine causative juvenile responses. To address these challenges, we have developed a novel interspecies assay using Drosophila melanogaster larvae fed with various mutants of budding yeast (*Saccharomyces cerevisiae*), which is one of the major ingredients of laboratory media for *D. melanogaster*. In our screening of a yeast single-gene knockout (KO) collection, we revealed that a diet of nat3 KO yeast exerted far-reaching effects beyond the larval development and shortened lifespan of adults that were aged on the standard food. Remarkably, transcriptomic and epigenetic analyses showed that the nat3 KO yeast diet diminished the function of the histone acetyltransferase Gcn5 in larvae. We are addressing whether the diminished Gcn5 function in larval stages is a cause of the shorter lifespan in adults, investigating the larval tissue or cell type that contributes to the early death of adults, and identifying key nutrients in the nat3 KO yeast that reduce Gcn5 function in larvae and shorten the adult lifespan.

References: Watanabe et al. *Cell Rep.* 28:2594-2607 (2019); Kanaoka et al. *eLife* 12:e79461 (2023); Tsuyama et al. *Development* 150:dev200815 (2023).

**Language: English**

This is credit-granted seminar (2 points).
本セミナーは生命科学研究科単位認定セミナー（2ポイント）です。

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