

若手イニシアティブセミナー

Wakate-Initiative Seminar

How do cell-surface molecules specify synaptic-layer targeting in the *Drosophila* visual system?

ショウジョウバエの視神経が特異的なシナプス層をどのように認識するのか？

Dr. Takashi Suzuki (鈴木 崇之 博士)

Max Planck Institute of Neurobiology, Germany

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会場： 総合研究棟 A 棟 107 室

Refined spatial organization is a fundamental attribute of the nervous system allowing the faithful perception of the complex outside world with a high information content. The *Drosophila* visual system possesses highly refined organization both in the alignment of the cell body (planar cell polarity (PCP)) and in the synaptic-layer targeting of photoreceptor axons. The protocadherin Flamingo (Fmi/Celsr) is known to regulate both PCP and axon pathfinding in the *Drosophila* visual system. So far, Flamingo's molecular machinery is well studied in PCP formation, but little is known in axon guidance. Here we show that the transmembrane receptor Golden goal (Gogo) physically interacts with Fmi in cis, and this complex functions specifically in axon pathfinding. The Gogo-Fmi complex ensures the targeting specificity of R8 photoreceptor axons to the correct synaptic layer M3, whereas Gogo alone seems to promote adhesion to the temporary target layer M1. The function of the Gogo-Fmi complex in target selection is mediated by intracellular signaling through Gogo cytoplasmic domain, and that the Gogo signaling is regulated by the phosphorylation of a conserved tyrosine in the cytoplasmic domain. We also show the requirement of Fmi in a subset of brain cells for photoreceptor axon targeting suggesting that Fmi homophilically interact between R axons and target cells. Altogether we suggest that the synaptic-layer targeting specificity can be achieved by physical interaction of cell-surface molecules controlling Cadherin-based axon pathfinding. Finally, we propose that Fmi uses different sets of interacting proteins in a temporally and spatially separated manner to achieve distinct tasks in PCP and in axon pathfinding to shape refined sensory circuits.

連絡先： 生命環境科学研究科・構造生物学専攻・古久保 - 徳永 克男

内線 6644 ; furukubo-tokunaga.gm@u.tsukuba.ac.jp

生命環境科学研究科・若手イニシアティブ・丹羽 隆介

内線 6652 or 4907; rniwa@biol.tsukuba.ac.jp