



第 484 回つくば分子生命科学セミナー

TSUKUBA MOLECULAR LIFE SCIENCE SEMINAR

演題: Mechanistic insights into the function and regulation of insulin and IGF signaling

演者: Cunming Duan 先生 (Dept. Mol. Cell. Dev. Biol., Univ. Michigan / Professor)

日時: 2025 年 3 月 7 日 (金) 17:00-18:30

会場: 健康医科学イノベーション棟 8 階講堂

要旨:

Insulin and insulin-like growth factors (IGFs) are structurally related peptide hormones that control multiple aspects of human physiology. Aberrant activation of these hormonal pathways has been linked to major human diseases, including diabetes, growth disorders, and cancer. Despite enormous progress over the past century, significant gaps in our knowledge remain. For instance, their pleiotropic functions are mediated by two highly homologous receptor tyrosine kinases, insulin receptor and IGF1 receptor, which share downstream signaling pathways. However, how these homologous systems result in distinct biological functions and how insulin-IGF signaling translates into different, and sometimes opposing, cellular responses remain poorly understood. Recent studies have revealed novel, cell type-specific functions of insulin-IGF signaling, but the underlying mechanisms are still not well defined. In this talk, I will discuss recent structural and functional insights into the different modes of activation of insulin-IGF receptors. I will present our findings from zebrafish and mammalian models on the roles of microenvironments (hypoxia, nutrient availability etc.) and IGF-binding proteins in specifying insulin-IGF actions, as well as the newly discovered roles of insulin-IGF signaling in regulating cell plasticity via a novel mitochondrial ROS signaling loop.

参考文献

1. Choi, E.#, Duan, C.#, and Bai, X.# (2025) Regulation and function of insulin and insulin-like growth factor receptor signaling. Nat. Rev. Mol. Cell Biol. <https://doi.org/10.1038/s41580-025-00826-3>; # Co-corresponding author.
2. Li, Y., Liu, C., Rolling, L., Sikora, V., Chen, Z., Gurvin, J., Barabell, C., Lin, J., and Duan, C. (2023) ROS signaling-induced mitochondrial Sgk1 expression regulates epithelial cell renewal. PNAS, 120: e2216310120. DOI: [10.1073/pnas.2216310120](https://doi.org/10.1073/pnas.2216310120)

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