



The 471th IMEG Seminar

【Date】 Oct. 17 (Tue), 2023 16:00~17:00

【Venue】 Conference room, 1st floor,
Institute of Molecular Embryology and Genetics (IMEG),
Kumamoto University

【 Title 】 Exploring human DNA replication with an improved auxin-inducible degron technology

【Speaker】 Masato Kanemaki, Ph.D.

Professor

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【Abstract】

Genetic perturbation is a powerful way to analyze the function of proteins in living cells.

Specifically, when investigating proteins important for cell viability, conditional perturbation offers a significant opportunity. For this purpose, we pioneered the auxin-inducible degron (AID) technology, enabling rapid degradation of a degron-fused protein upon the introduction of the plant hormone auxin. Through integration with CRISPR-based genome editing, it has become feasible to generate conditional mutants of human cells. Recently, we have refined this system, named AID2, by taking advantage of chemical biology.

We are employing AID2 to elucidate the mechanism governing genomic DNA replication and maintenance in human cells. Replication initiation in human cells occurs in a stochastic manner, but certain regions exhibit higher frequencies of initiation. These regions, known as initiation zones (IZs), are often found in proximity to open-chromatic active genes, showing a stark difference from yeast, which has sequence-defined replication origins. Importantly, the mechanism that defines IZs in human cells has been elusive. I will introduce a new technique for detecting IZs and discuss how IZs are defined and controlled in human cells.

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鐘巻先生は、令和5年度発生医学研究所共同研究拠点に採択されております。