



第 498 回つくば分子生命科学セミナー

TSUKUBA MOLECULAR LIFE SCIENCE SEMINAR

演題 : Dissecting a Role for Protein Arginine Methylation in Metabolic Reprogramming

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日時 : 2026 年 1 月 8 日 (木) 17:00-18:00

会場 : 医学学系棟 483 室 (Medical Science Building 4F Rm 483)

要旨 : Arginine methylation is a key post-translational modification catalyzed by protein arginine methyltransferases (PRMTs) and is especially common among RNA-binding proteins. Despite its prevalence, how this modification is regulated and how it modulates the function of RNA-binding proteins remain open questions. Understanding these mechanisms is essential for linking arginine methylation to cellular adaptation and organismal phenotypes.

We identified a novel role for arginine methylation in the metabolic reprogramming of budding yeast. Methylation of the SR/hnRNP-like protein Npl3 by Hmt1 (the yeast homolog of mammalian PRMT1) is dynamically regulated during the transition from fermentative to respiratory growth. Both an Npl3 methyl-arginine-deficient mutant and an Hmt1-null mutant exhibit enhanced growth under respiratory—but not fermentative—conditions. During respiratory growth, ribosomal protein gene (RPG) expression, normally downregulated, is instead upregulated in the Npl3 methyl-arginine mutant. Genome-wide binding analyses reveal that Npl3 occupancy at RPGs is markedly reduced in the methyl-deficient mutant. Using a methyl-Npl3-specific antibody, we show that methyl-Npl3 occupies RPGs under fermentative conditions and increases its occupancy during respiratory growth, suggesting a repressive role in RPG expression. Npl3 binds motifs recognized by RPG-regulating transcription factors during respiratory growth, and this association is altered in the methylation-deficient mutant. We further show that methylation targets Npl3 for selective autophagic degradation and suppresses its liquid-liquid phase separation *in vitro*. Together, our findings support a model in which precise control of methylated Npl3 levels is essential for proper RPG expression during yeast metabolic reprogramming.

本セミナーは、TARAセンター共同セミナーとして開催します。医学学位プログラム（博士）「医学セミナー」（担当：専攻各教員）、及び、フロンティア医科学学位プログラム（修士）「医科学セミナーII」（担当：入江賢児）の関連セミナーに相当します。連絡先：筑波大学医学医療系 Kiong Ho（内線5612、kiongho@md.tsukuba.ac.jp）

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