セミナーのご案内

Seminar

日時：平成 29 年 7 月 14 日（金）16:00~17:30
場所：理学部 A 館 2 階 A222
Date: July 14, 2017, 16:00-17:30
Room: A222, Build. A, Grad. Sch. Sci.

Translational control by non-AUG codons: The power of genetics

Translation initiation from non-AUG codons plays important roles in various gene regulation programs. In bacteria, GUG initiation is known to be an important part of RNA switch regulating replication protein of plasmids. GUG or UUG initiation is permitted in part by a simpler set of initiation factors than those found in eukaryotes. However, whether and how non-AUG initiation rate in eukaryotes is modulated remains a mystery. Here we show that the non-AUG initiation rate is nearly consistent under a fixed context in various human and insect cells. Yet, it ranges from <1% to nearly 100% compared to AUG translation, depending on Kozak and other new nucleotide contexts . Mechanistically, this range of non-AUG initiation is controlled in part, by the eIF5-mimic protein (5MP). 5MP represses non-AUG translation by competing with eIF5 for the Met-tRNAi-binding factor eIF2. Thus, eIF5 increases and 5MP decreases translation of *NAT1/EIF4G2/DAP5* whose sole start codon is GUG. Using eIF5 and 5MP1 as tools, ribosome profiling identifies a handful of new non-AUG initiation sites, some of which serve as sole start codons. If initiation rate for these codons is low, an AUG-initiated downstream ORF prevents generation of shorter AUG-initiated isoforms. We propose that the homeostasis of non-AUG translatome is maintained through balanced expression of eIF5 and 5MP.

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