Invited Lecture

Where to start: the dynamic adventure of identifying start codons in mRNAs

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During the process of translation, ribosomes produce proteins decoding the information stored in messenger RNAs (mRNAs). The linear nature of the message to decode requires the correct identification of the reading frame on the mRNAs. The identification of the first triplet (the mRNA start codon) and the delivery of the first aminoacyl-tRNA to this codon is an essential milestone to achieve for the successful production of functional proteins. The overall endeavor, termed translation initiation, is sophisticated, involving the small ribosomal subunit as well as dozens of protein factors and a dedicated aminoacyl-tRNA (Met-tRNAiMet). Single-particle CryoEM methods have revealed mechanistic insights on both, the overall architecture as well as the dynamics of the initiation process, allowing the formulation of a comprehensive model for how ribosomes search and find initiation codons. In this context, we will describe our studies focusing on the differences and similarities between canonical initiation and viral initiation with the aim to underline common basic principles within a mechanistic outlook.