KOLLOQUIUM
Institut für Molekulare Biowissenschaften
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GOETHE UNIVERSITÄT FRANKFURT AM MAIN

Science in progress

Tuesday, May 28th, 2024, 12:00, Biocentre, lecture hall B3

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Jan-Niklas Tants

Molecular mechanisms of Roquin-RNA complex formation

mRNA *cis*-regulatory RNA elements recruit *trans*-acting factors to control transcript half-lives. The immune-regulatory protein Roquin binds and remodels constitutive and alternative decay element (CDE and ADE, respectively) stem-loops (SLs) and initiates mRNA decay. Binding to SLs is mediated through the core ROQ domain, which is flanked by two HEPN-domains that create a second RNA-binding site (extended ROQ). The interaction of core ROQ with SL elements has been long studied, but how both RNA binding sites recognize and remodel target RNA structures in a concerted manner remains elusive. We here use optical tweezer experiments and NMR spectroscopy to analyze folding pathways of the ADE of the crucial T cell co-receptor Ox40. We reveal stabilization of the apical RNA SL through Roquin binding. Further, we give evidence for additional interaction of extended ROQ with single-stranded RNA which requires partial unwinding of RNA duplexes in lower stem regions. We propose the expanded region to steer regulation by context-encoded specificity and suggest plasticity of stem structures as a determinant for full-length Roquin RNP formation. Our work reveals a previously unknown mechanism of a dual-function RNA binding surface and revises our previous model of Roquin RNA targets and their recognition. This study illustrates a powerful methodological toolbox to capture RNA folding intermediates and their role in RNP formation.

Science in progress represents talks of institute members. Either post docs or advanced PhD students present and discuss their recent data.

More Information: https://tinygu.de/kolloqmbw