

KJELDGAARD Lecture - Professor Katja Petzold

Wednesday 28 February 2024 at 13:15—14:00

Followed by PhD-session at 14:30—15:00

(Coffee and cake will be served between lecture and PhD-session)

1871-120 (NUCLEUS)

Host: Xavier Bofill de Ros



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RNA structural switching and its impact on function revealed by NMR

Many functions of RNA depend on rearrangements in secondary structure that are triggered by external factors, such as protein or small molecule binding. These transitions can feature on one hand localized structural changes in base-pairs or can be presented by a change in chemical identity of e.g. a nucleobase tautomers. We use and develop $R_{1\rho}$ -relaxation-dispersion NMR methods for characterizing transient structures of RNA that exist in low abundance (populations <10%) and that are sampled on timescales spanning three orders of magnitude.

Different types of transient structures are going to be presented. 1) The HIV-1 dimerization initiation site (DIS) undergoes large secondary structure rearrangements that provide the basis for a molecular zipper, which can be crucial for genome packaging. 2) The GU wobble base-pair undergoes a change from standard wobble GU geometry to appear like a Watson-Crick base-pair stabilized by Keto-Enol tautomerization. 3) A microRNA – mRNA complex changes conformation to activate the RISC complex. 4) Flipping the 3D stabilizer A-minor motifs to regulate ribosome dynamics. We will furthermore give an outlook on recent efforts to measure in-cell NMR of nucleic acids in functional complexes.