ACS Local Section
North Jersey

RNA binding of La-Related Proteins

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Date: **Tuesday March 24th, 2026**

Time: 12:00 pm ET via Microsoft Teams

Abstract:

La-related proteins (LARPs) are a superfamily of RNA-binding proteins characterized by the presence of a highly conserved domain known as the La domain (LA). In the vast majority of LARPs, this La domain forms the La module in tandem with a downstream ribonucleotide recognition motif (RRM). The archetypal La module found in LARP3 was the first to be discovered and demonstrates a specific recognition of nascent RNA polymerase III (RNAP III) transcripts at their 3' UUU-OH to impede digestion by exonucleases. Other LARPs demonstrate similar function, some evolving to contain other functional units to facilitate greater mRNA regulatory capacity.[1] Human LARP6 (HsLARP6) plays a role in the post-transcriptional regulation of type I and III collagen biosynthesis and therefore plays an integral part in onset and progression of fibrosis. Unlike most LARPs, LARP6 specifically binds to a highly conserved double-stranded RNA structure, the 5' stem loop (5'SL), present in the mRNAs encoding type I and III collagen. The 5'SL is 46-48 nucleotides in length and contains an internal loop with 9 highly conserved nucleotides, flanked by two stems with greater sequence variability. This 5'SL motif is conserved across all vertebrates and is crucial for regulating the translation of these collagen mRNAs. Recently, we have shown that 5'SL RNA binds via a unique, previously undescribed binding site, which we dubbed the noncanonical binding site.[2-4] While structurally similar to La domains of other LARPs, the La domain of LARP6 features a unique basic patch that coincides with the noncanonical binding site. Furthermore, the noncanonical interface enables the La domain to discriminate 5'SL RNA from homopolymeric or purely helical hairpin RNAs with low-nanomolar affinity, overturning earlier views that the adjacent RNA recognition motif is required for recognition.

References
1) Maraia et al. (2017) WIREs, 8:e1430
2) Gordon et al. (2025) Nucleic Acids Research, 53, gkaf682
3) Gordon et al. (2025) Biomol NMR Assign, 19, 165-17
4) Gordon et al. (2025) ACS Omega, 10, 12699-12709

Connection Information

This will be a virtual meeting hosted via Microsoft Teams. A Link will be posted closer to the date. Further information can be found on the NMR Topical Group website.

Please reach out to QingZhe Ni (qingzhe.ni@merck.com) or Tao Xie (tao.xie@bms.com) with any questions.

Presented by the NMR Topical Group – North Jersey ACS