POSTER ABSTRACT PRESENTATIONS

SESSION TITLE: STRUCTURE AND FUNCTIONS OF THE TRANSCRIPTION AND TRANSLATION APPARATUS OF THE CELL

Abstract P-22: Enhanced Crosslinking and Immunoprecipitation (Eclip) Data Reveal Interactions of RNA Binding Proteins with the Human Ribosome

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Background: The ribosome is a protein-synthesizing molecular machine composed of four ribosomal RNAs (rRNAs) and dozens of ribosomal proteins. In mammals, the ribosome has a complicated structure with an additional outer layer of rRNA, including large tentacle-like extensions. A number of RNA binding proteins (RBPs) interact with this layer to assist ribosome biogenesis, nuclear export and decay, or to modulate translation. Plenty of methods have been developed in the last decade in order to study such protein-RNA interactions, including RNA pulldown and crosslinking-immunoprecipitation (CLIP) assays.

Methods: In the current study, using publicly available data of the enhanced CLIP (eCLIP) experiments for 223 proteins studied in the ENCODE project, we found a number of RBPs that bind rRNAs in human cells. To locate their binding sites in rRNAs, we used a newly developed computational protocol for mapping and evaluation of the eCLIP data with the respect to the repetitive sequences.

Results: For two proteins with known ribosomal localization, uS3/RPS3 and uS17/RPS11, the identified sites were in good agreement with structural data, thus validating our approach. Then, we identified rRNA contacts of overall 22

RBPs involved in rRNA processing and ribosome maturation (DDX21, DDX51, DDX52, NIP7, SBDS, UTP18, UTP3, WDR3, and WDR43), translational control during stress (SERBP1, G3BP1, SND1), IRES activity (PCBP1/hnRNPE1), and other translation-related functions. In many cases, the identified proteins interact with the rRNA expansion segments (ES) of the human ribosome pointing to their important role in protein synthesis.

Conclusion: Our study identifies a number of RBPs as interacting partners of the human ribosome and sheds light on the role of rRNA expansion segments in translation.

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