

## Role of Nuclear Lipid Islets in RNA Pol II transcription

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The nuclear fraction comprises polar and neutral lipids which are involved in many genomic and metabolic processes such as transcription, chromatin remodeling and signaling. Among the polar lipids, PI(4,5)P<sub>2</sub> was identified by our laboratory to form a novel structure in nucleus, which was defined as Nuclear Lipid Islets (NLI) (Sobol et al., 2018). This recent finding suggests that these structures are in fact involved in RNA polymerase II transcription by gathering RNAs and transcription factors to their vicinity. Particularly, PI(4,5)P<sub>2</sub>-Nuclear Myosin I (NMI) interaction plays a significant role in the regulation of the Pol II transcription that is dependent on the NLI integrity. Quantitative Mass Spec analyses of the NMI nuclear interactome revealed the Myosin Phosphatase Rho-Interacting Protein (MPRIP), which is involved in formation of stress fibers in cytoplasm, carrying two highly conserved PH domains -at N-term- as putative binding sites for Phosphoinositols. The C-term of the protein is a long intrinsically disordered region which are known to constitute the nuclear bodies by phase separation. In the case of MPRIP, this region comprises a binding site for PPP1R12A (Protein phosphatase 1 regulatory subunit 12A). As a key regulator of protein phosphatase 1C (PPP1C), PPP1R12A is a potential mediator for dephosphorylation of NMI and its association to Pol II transcription machinery. In addition, the nuclear F-actin might be an integral factor of this pathway through the F-actin binding domain of MPRIP (Mulder et al., 2003). Herein, it is important to mention that the function of MPRIP in nucleus is not yet studied and there are strong indications of its nuclear localization that are supported by our preliminary results. Altogether, these facts emphasize that MPRIP might be an important regulator of Pol II transcription in proximity of NLIs while the exact pathway remains to be enlightened.

### References:

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