Phosphorylated derivatives of phosphatidylinositol (phosphoinositides - PIs) are essential regulators of cytoskeletal dynamics, membrane trafficking, and are the basis of a ubiquitous membrane signalling system. In addition to their cytoplasmic roles, they are also involved in important nuclear processes as DNA transcription, pre-mRNA splicing, or mRNA export out of the nucleus. To widen our knowledge about phosphoinositides roles in the nucleus, we study the interacting partners of phosphoinositides in various nuclear processes.

We decided to study lysine-specific demethylase 7B (KDM7B; PHF8) and lysine-specific demethylase 2A (KDM2A; FBXL11) as possible PIs - interacting proteins. They contain PHD conserved domain and they were identified as components of nuclear PtdIns(4,5)P2 complexes by neomycine extraction. FBXL11 is a histone demethylase required to sustain centromeric integrity and genomic stability, particularly during mitosis. PHF8 acts as a coactivator of rDNA transcription, by activating polymerase I mediated transcription of rRNA genes.

Our experimental data confirm that PHF8 and FBXL11 are indeed in a complex with phosphatidylinositol 4,5-bisphosphate (PtdIns(4,5)P2). Using confocal fluorescence microscopy, we show that both FBXL11 and PHF8 partially colocalize with PtdIns(4,5)P2 in the nucleoplasm and in nuclear speckles, dynamic intranuclear compartmens, where many pre-mRNA splicing factors are stored. These data suggest that PtdIns(4,5)P2 may have a role in regulation of gene expression and maintenance of genomic stability through the interaction with PHF8 and FBXL11.

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