Phosphorylation of PBAF subunit PHF10 is upregulated in the cell cycle

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Remodeling complexes play an important role in the regulation of gene expression during development and in the adult organism. The PBAF remodeling complex is the subfamily of SWI/SNF complexes in mammals that change the structure of chromatin, providing access for transcription factors to regulatory sequences of genes.

One of the functions of the ATP-dependent chromatin-remodeling complexes is the regulation of the expression of genes involved in the cell cycle. Several studies have shown that phosphorylation can regulate the function of ATP-dependent remodeling complexes during the cell cycle. PHF10 is the part of the signature module of PBAF, which determines the interaction of the PBAF complex with chromatin.

In mammalian cells, PHF10 is represented by four isoforms, that are alternatively incorporated in the PBAF complex and have different effects on the genes remodeled by the complex. We have shown that two isoforms of PHF10 contain N-terminal domain that interacts and can be phosphorylated by Akt kinase. Phosphorylation of the N-terminal domain of PHF10 is triggered by two key serines, that are the part of the motif recognized by the Akt kinase.

The phosphorylation status of PHF10 is upregulated in G1/S transition during the cell cycle and correlates with the activation of Akt kinase, which is known to regulate the function of various proteins at the G1/S and G2/M transitions. Moreover, PBAF complexes that incorporate PHF10 isoforms with the Akt kinase recognition site and those that can’t be phosphorylated are differently distributed on the promoters of the genes related to the cell cycle. Thus, we can conclude that phosphorylation of PHF10 can modulate the functions of the PBAF complex, mediating chromatin remodeling and gene activation in the cell cycle.

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