Regulation of Sox6 by cyclin dependent kinase 5 in brain

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Cyclin dependent kinase 5 (Cdk5) is a proline-directed Ser/Thr kinase involved in various biological functions during normal brain development and neurodegeneration. In brain, Cdk5 activity is specific to post-mitotic neurons, due to neuronal specific expression of its activator p35. The biological functions of Cdk5 have been ascribed to its cytoplasmic substrates, however not much is known in nucleus. Here, we show that nuclear transcription factor Sox6 is a direct nuclear target of Cdk5. Sox6 is expressed in Tuj1 positive neurons, suggesting that Sox6 is expressed in differentiating neurons. The expression of Sox6 is high in mitotic nuclei during embryonic day 12 (E12) and gradually decreases during development into adult. On the other hand, Cdk5 expression gradually increases during its development. We show that Sox6 is expressed in mitotic nuclei in embryonic day 12 (E12) and in migrating neurons of E16. Sox6 is phosphorylated in vivo. Sox6 was detected by phospho-Ser/Thr and phosp