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# The role of E2F1-topoII $\beta$ signaling in regulation of cell cycle exit and neuronal differentiation of human SH-SY5Y cells

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## Abstract

This study aims to test the role of E2F1-topo II  $\beta$  signaling in neuronal differentiation of SH-SY5Y cells. With retinoic acid (RA) induction, a high percentage of cells were found to be arrested at the G<sub>0</sub>/G<sub>1</sub> phase, with decreased levels of cyclinD1, CDK4, phosphorylation status of pRb and E2F1, in addition to an elevated level of p27. The cells were shown to differentiate into neuronal phenotypes characterized by highly expressed neuronal markers, MAP2 and enriched topo II  $\beta$ , and remarkable neurite outgrowth. Exogenously forced E2F1 expression with a specific E2F1 plasmid led to suppression of topo II  $\beta$  expression and disruption of the neuronal differentiation of SH-SY5Y cells. On further examination using the ChIP assay, we found that E2F1 bound directly to the promoter region of topo II  $\beta$ , and its binding ability was inversely correlated with topo II  $\beta$  expression in response to RA induction. Thus, our findings suggest that E2F1-topo II  $\beta$  signaling may play a role in regulation of cell cycle exit and neuronal differentiation.

## Abbreviations

topo II  $\beta$ , topoisomerase II  $\beta$ ; E2F-1, Adenovirus E2 promoter-binding factor-1; RA, All-trans retinoic acid; CDKs, cyclin-dependent kinases; ChIP, chromatin immunoprecipitation;

## Key words

Topo II  $\beta$ ; E2F-1; Neuronal differentiation; RA; Cell cycle

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