O-GlcNAc Modification Is Involved in Neurite Outgrowth of Dopaminergic Neuronal Cells.

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β-*O*-linked N-acetylglucosamine (*O*-GlcNAc) is a nucleocytosolic post-translational modification on serine and threonine residues that is dynamically regulated by *O*-GlcNAc transferase and *O*-GlcNAcase. Many proteins are *O*-GlcNAcylated in response to various cellular process, include transcription, proliferation, apoptosis and signal transduction. In the case of neuronal cells, there are many *O*-GlcNAcylated proteins that are related to neurodegenerative diseases. Neuronal differentiation process is largely studied, but it is rarely known the relationship between *O*-GlcNAcylation and neuronal differentiation. To examine whether *O*-GlcNAc modification is involved in neuronal differentiation process, we utilized neurite outgrowth model system inducedby all trans retinoic acid(tRA) in dopaminergic neuronal cell line. *O*-GlcNAcase inhibitors are co-treated with tRA to prevent the decrement of intracellular *O*-GlcNAcylation level, and the extent of neurite outgrowth was decrease 17% compared to tRA-treated neurons. The total extent of neurites, the primary neurite length and the number of neurites per cell were suppressed slightly. The activation of c-Jun N-terminal kinase(JNK) in tRA-induced neurite outgrowth process is previously reported, and in this study JNK seems to be less activated when *O*-GlcNAcase inhibitor is co-treated with tRA. Thus, our data indicate that *O*-GlcNAc modification seems to be involved in neurite outgrowth in cultured dopaminergic neuronal cells.