"*The Role of miRNA-331-5p in Apoptosis via MAPK signaling pathway in 6-OHDA-induced Parkinson's disease cell model*"

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Parkinson's Diseases (PD) is a debilitating neurodegenerative disorder causing movement and neurological disabilities. Apoptotic death of the dopaminergic neurons in the substantia nigra pars compacta region of midbrain of PD patients are known to be the devastating events following the buildup of oxidative stress. MicroRNA (miRNA) is a class of small, non-coding RNA which plays important roles in regulating gene expression post-transcriptionally. Increasing evidence suggested that miRNA profile might be altered in PD. A recent investigation reported that miR-331-5p was significantly elevated (~ 22 folds of that in controls) in the blood plasma of PD patients. However, no study has been conducted to understand the pathological involvement of this miRNA in PD. Thus, this study aims to investigate whether levels of miR-331-5p in neuronal cells are affected under high oxidative stress. In this study, neurotoxin, 6-hydroxydopamine (6-OHDA) was added to SH-SY5Y cells for 6, 12, and 24 hours to induce oxidative stress. Cell viability was assessed with MTT assay whereas levels of reactive oxygen species (ROS) was quantified with DCFH-DA fluorescent probe staining. Expression of MiR-331-5p in the cells was quantified using quantitative Real-time PCR. Result shows that 6-OHDA treatment caused a time-dependent increased in ROS generation most pronounced in 100 and 200 μM treatment group. 6-OHDA treatment also resulted in a time-dependent decreased of cell viability to 10% across all concentration tested. Subsequently, miRNA expression level showed significant up-regulation with 12 and 24 hours treatment group. This increase in miR-331-5p level is correlated to the increase in ROS level and neuronal cell death. In conclusion, these findings suggest that miR-331-5p might be involved in the pathogenesis of PD as its expression is altered under elevated oxidative stress.

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