

ROLE OF miRNAs IN PARKINSON'S DISEASE

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Parkinson's disease (PD) is an incapacitating neurodegenerative disorder that is prevalent in the aging population. Owing to many gaps in knowledge regarding this predominantly sporadic disease, current treatment methods only provide symptomatic relief and not neuroprotection. In recent years, an increasing number of researchers have shown miRNAs to be important biological molecules involved in the maintenance of normal cellular functions; and the dysregulation of miRNAs may contribute to the development of various diseases ranging from cancers to heart diseases. In our research, we hope to investigate the pathogenesis of PD from the miRNA perspective elucidate the underlying molecular mechanisms involved.

A characteristic of PD is the loss of dopaminergic (DA) neurons in the substantia nigra pars compacta (SNc) of the midbrain. By detecting the expression of dopaminergic and neuronal marker proteins such as Tyrosine Hydroxylase (TH), Dopamine Transporter (DAT) and Microtubule-associated Protein 2 (MAP2) in differentiated MN9D cells and undifferentiated SH-SY5Y cells, we have shown that these cell lines have DA neuronal characteristics and can be used to model DA neurons in the SNc. Our *in vitro* models of PD have been established by treating these neuronal cell lines with MPP iodide (1-Methyl-4-phenylpyridinium iodide) for 24 hours. Using qPCR, we identified 3 miRNAs of interest namely, miR-9, miR-219a and miR-328, which are dysregulated in our *in vitro* models of PD. By conducting in-depth investigations on these specific miRNAs and their downstream pathways, we aim to elucidate specific molecules or mechanisms that can be targeted to develop neuroprotective treatments for PD.