OFFICIAL ABSTRACT and CERTIFICATION

Investigating the Role of Neuronal Pentraxin 2 (NPTX2) in Parkinson's Disease

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The main obstacle for developing effective therapies for Parkinson's Disease (PD) is a limited understanding of the mechanisms that provoke dopaminergic neurodegeneration. To address this issue, I investigated the role of Neuronal Pentraxin 2 (NPTX2) in post-mortem brain tissue of healthy and PD patients. NPTX2 has been shown to play a vital role in excitatory synapse formation and in the clustering of AMPA receptors, resulting in cell death of dopaminergic nerve cells, suggesting its role in PD pathology. Additionally, a robust correlation between reduced NPTX2 in Alzheimer's Disease and diminished cognitive performance has been established. NPTX2 regulation was analyzed with Western Blot, with β-actin and Tubulin used as loading controls. Results were widely varied but, in the population with an average age of 66, NPTX2 was found to be upregulated (p=0.06), unlike the older population (average age 86.7), which had a greater variance between samples (p=0.85). Taken as a whole, these results are inconclusive, but a possible explanation for the large variance between samples of diverse ages is that the upregulation in NPTX2 in younger patients may be because NPTX2 is a component of Lewy bodies, as suggested by Moran et al in 2008. The downregulation in some older patients may be due to the patient's development of dementia, which approximately 40% of PD patients develop. Further research will be conducted exploring this relationship. Thus, these findings can be used as a premise for future research connecting the mechanisms of cognitive decline in the two most prevalent neurodegenerative diseases.

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