

Neurodegeneration: the Processes

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While neuronal apoptosis has long been considered to be the major mode of neurodegeneration in chronic neurological disorders in Parkinson's disease, increasing lines of findings have demonstrated that neurodegeneration are mingle of autophagy, synaptic retraction, and axonal transport. Different survival and pro-apoptotic signalling pathways become biological targets for intervention. Apart from investigating the degenerative signalling in neurons, the responses of glial cells are important to determine the fate of dopaminergic neurons. Therefore, pharmacological interventions of neurodegenerative processes in Parkinson's disease can be on both glial cells and neurons. I will at first briefly introduce different modes of neurodegenerative processes.

As dopaminergic neurons are vulnerable to oxidative stress, prevention of neuronal loss in Parkinson's disease is mainly relied on anti-oxidant. However, any potential drug candidate which has simply anti-oxidative effect only may not be sufficient to be neuroprotective agent for Parkinson's disease. We have investigated and examined different small molecules from dietary supplement and food extracts. One of the targets we have initiated is the derivative of stilbene, oxyresveratrol. Parkinsonism mimetic is often the starting point of finding the neuroprotective agent against neurodegeneration in Parkinson's disease. We have investigated protective effects of oxyresveratrol against 6-hydroxydopamine (6-OHDA) neurotoxicity. Our results demonstrate that oxyresveratrol can penetrate into the dopaminergic neurons to antagonise free-radical production. It can also increase SIRT1 and survival signalling pathway, suggesting that neuroprotective effects of stilbene is not just anti-oxidation. The results lead us from the starting point to further investigate whether this kind of stilbene derivative can be developed into therapeutic agents against neurodegeneration of Parkinson's disease. As dietary supplement is generally accepted by the public, this may be a potential approach to prevent Parkinson's disease in the community.

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