

- 7 2. Sinapic acid protects SH-SY5Y human neuroblastoma cells against 6-8 hydroxydopamine-induced neurotoxicity
- 9 3. Administration of quercetin improves mitochondria quality control and protects the neurons in 6-OHDA-lesioned Parkinson's disease models
- 11 4. Conclusion

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12 Abstract

Parkinson's disease (PD) is a common neurodegenerative disorder with severe motor impairments. Phenolic compounds have various beneficial effects, including anti-inflammatory, antioxidant, and neuroprotective properties. Hence, this study aimed to investigate the neuroprotective effects of different phenolic compounds in PD and their mechanisms. Sinapic acid (SA) can protect SH-SY5Y cells against 6hydroxydopamine (6-OHDA)-induced neurotoxicity and its mechanisms. The results demonstrate that the SA significantly increased cell viability and markedly reduced apoptosis and the related proteins expression. In addition, SA can reduce mitochondrial dysfunction and endoplasmic reticulum stress by decreasing 40-80% reactive oxygen species production, enhancing the antioxidant proteins expression, and increasing mitochondrial membrane potential by 0.2-0.6 times, which may be induced the mitogen-activated protein kinase signaling pathway inactivation. Furthermore, in the neuroprotective effects and mechanisms of quercetin in 6-OHDA-induced damage in both PD rats and PC12 cells. In vitro show that quercetin (20 µM) improved mitochondrial quality control, reduced oxidative stress, increased the levels of PTENinduced putative kinase 1 and Parkin and decreased α-synuclein protein expression. *In* vivo, demonstrated that quercetin relieved 6-OHDA-induced progressive PD-like motor behaviors, mitigated neuronal death, and reduced mitochondrial damage and αsynuclein accumulation, which associate with the Pink1-Parkin mitophagy pathway. Above all, both phenolic compounds show different pathways to protect nerve cells, indicating their potential development as new preventive health foods for PD.

Reference

- **Tungalag, T., & Yang, D. K.** (2021). Sinapic acid protects SH-SY5Y Human Neuroblastoma Cells against 6-Hydroxydopamine-Induced Neurotoxicity. *Biomedicine*, 9(3), 295
- Wang, W. W., Han, R., He, H. J., Li, J., Chen, S. Y., Gu, Y., & Xie, C. (2021). Administration of quercetin improves mitochondria quality control and protects the neurons in 6-OHDA-lesioned Parkinson's disease models. *Aging (Albany NY)*. 2021, 13(8), 11738-11751.