

Effects of Puerarin on Tau Hyperphosphorylation in Neuronal Cell SH-SY5Y

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Abstract: Abnormal hyperphosphorylation of tau protein in a brain plays a vital role in the molecular pathogenesis of Alzheimer's disease (AD). Promising new preventive and therapeutic agents acting inhibit and/or reverse tau hyperphosphorylation have been searched. Puerarin (PU) is a major isoflavonoid substances isolated from the root of *Puerariamirifica*. Previous reports indicated that PU could prevent amyloid beta (A β)-induced neurodegeneration *in vitro* and *in vivo* studies, but no report on tau hyperphosphorylation. Therefore, this study aimed to investigate the effects of PU on A β -induced tau hyperphosphorylation in neuronal cell SH-SY5Y. For this purpose, cells were treated with various concentration of PU (0.1, 10, 1000 μ M) with or without 20 μ M A β . Cell viability was determined by MTT assay. In addition, the protein levels of hyperphosphorylated-tau and tau kinase were measured by western blot. The results revealed that all doses of PU had no effect on cell viability. And PU did not affect hyperphosphorylated-tau level induced by A β and tau kinase level. However, previous study had shown that PU can suppress *Tau4* expression, the gene encoding tau protein, and attenuate cognitive impairment in cognitive impaired rats. Thus, the experiment was extended to investigate effects of PU on cell differentiation induced by retinoic acid (RA). The cells were treated with RA at concentration of 10 μ M for 6 days to induce cell differentiation. After that, the cells were treated with PU at the same concentrations with previous experiment. The result from bare eyes observation has shown that PU seems to increase the amount of differentiated cells. However, statistical analysis is required to support this result.

Keywords: Alzheimer's disease, tau kinase, isoflavonoid, *Puerariamirifica*

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