Abstract

Alzheimer's disease is a degenerative neurodegenerative disease in which different mechanisms and molecular pathways are involved in its pathogenesis and prevalence. Since there is no definitive cure for it, it is important to study these mechanisms. In this study, the mechanism of action of cyclosporine, an immunosuppressive drug on human tao mutant (TauR406W), on the expression of *CANA1* and *crebB* genes was investigated. *CANA1* or calcinurin A1 activity is Ca^{2+} -dependent and involved in cell signaling, dephosphorylation, and NFAT activation. Elevated NFAT is associated with increased neuroinflammation and acute brain damage in diseases such as Alzheimer's. The *crebB* gene is involved in creating long-term memory through calcium signaling. In this study, UAS-TauWt, UAS-TauR406W, GMR-Gal4, Elav-Gal4, w1118 lines were used. Virgin Gal4 lines were taken and mated with UAS male flies and first generation offspring were examined for morphology, behavioral testing and gene expression. The accuracy of the model was confirmed by the expression of TauR406W in the eyes of vinegar flies and the observation of structural confusion. Dosage was determined orally and a dose of 2 µl was used for treatment. Alcohol sensitivity between the control model and the treated model proved the effective dose and model confirmation. The effect of cyclosporine on *CANA1* increased the expression and increased toxicity of tau compared to the control model and on *crebB* gene increased gene expression and increased long-term memory and decreased associated toxicity of tau. The results showed that the neuroprotective effect of cyclosporine was not the same on all genes. It is suggested that the effect of cyclosporine on other mechanisms of Alzheimer's and other taupathic diseases be investigated.

Keywords: Cyclosporine, *CANA1*, *crebB*, Neurodegenerative diseases, Tau Pathies

University of zabol
Graduate school
Faculty of science
Department of Biology

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Supervisore:

Dr. N.Sanadgol

Dr.M.Hadadi

Advisors:

Dr.M.Baeri

By:

Mahla Ghazanfarpour

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