University of Zabol
Graduate School
Faculty of Science
Department of Biology

The Thesis Submitted for the Degree of M. Sc in Genetics

Title:

Evaluation of atg٦ gene expression changes in the CNS of transgenic Drosophila models of tauopathy and amyloidopathy

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Abstract

Alzheimer's disease is the most common and well-known cause of a progressive and irreversible neurological disorder that, in addition to causing forgetfulness, causes serious impairment of the cognitive function of personality, thought, perception, and behavior in the elderly. Numerous genetic factors are involved in the development of Alzheimer's disease. These include beta-amyloid protein plaques and Tau tangles. Despite various studies, the exact mechanism of pathogenesis of these factors is still not fully understood. Accordingly, the association between amyloid-beta and Tau proteins with autophagy is the main focus of the present study. For this purpose, the transgenic model of Drosophila was used in which wild and mutated copies of human Tau gene and amyloid-beta ٤٢ is expressed in the CNS of the flies using GAL٤ / UAS system and changes in expression level of *atg* ٦, one of the main genes in autophagy process, was examined. For better understanding, these transgenes were expressed in neurons in a group of genotypes and glial cells were targeted in another genotype group. Head samples were used to assess gene expression employing real-time qPCR and eEF-١α gene was used as a reference to normalize the data. Results indicate decreased expression of *atg* ٦ in flies expressing Aß٤٢ and Tau ^{R٤٠٦W} in neurons. Likewise, mutated tau expression in glial cells leads to *atg* ٦ expression decline. Altogether, the findings support a connection between autophagy, amyliodopathy and tauopathy and provide new therapeutic scopes for researchers who are active in this field.

Keywords: Autophagy, atg٦ gene, transgenic Drosophila models, Tauopathy,Amyloidopathy