

University of Zabol
Graduate School
Faculty of Sciences
Department of Biology

The Thesis Submitted for the Degree of M.Sc
(in the field of Genetic)

Title

evaluation of Atg8 gene expression changes in transgenic A β and
TAU models of Drosophila

Supervisores

Dr.L.Vafadar ghasemi
Dr.M.Hadadi

By

Sudabe Sobhani moghadam

June 2021

Abstract: Autophagy, meaning self-eating, is a cellular process in which the cytoplasmic content (old proteins and damaged organs) are enclosed within bilayer vesicles and, after joining the lysosome, break down to produce energy. Autophagy is often used as a mechanism to maintain cell survival, but excessive progression of autophagy can lead to cell death. One of the genes involved in autophagy is Atg8. The Atg8 gene is very important in macrophagy. Macroautophagy is one of the three distinct types of autophagy, characterized by the formation of vesicles enclosed in a double membrane and separating parts of the cytosol called autophagosomes. In Alzheimer's disease, tau protein tangles, along with amyloid beta extracellular plaques, are the second most damaging factor to nerve cells. One of the pathways in which tau and amyloid beta can be pathogenic can be disrupted by inhibiting the autophagy pathway. *Drosophila melanogaster* as a suitable laboratory model due to having a wide range of advanced genetic techniques for genetic instructions as an efficient and cost-effective system can help researchers to understand this issue. In the present study, we determined the changes in Atg8 gene expression by real-time PCR technique in the transgenic amyloid beta and tau models of vinegar fly. In this study, UAS / TAU, UAS / AB42 elav / Gal4 and Repo / Gal4 Gmr / Gal4 lines were used. Thus, virgin Gal4 lines were taken and then mated with UAS male flies and first generation offspring were examined. The accuracy of the model was confirmed, after which RNA extraction and cDNA synthesis were performed and Atg8 gene expression was evaluated by Real time

PCR. The results showed that the expression of wild and mutant version of human TAU in the central nervous system of Drosophila increased the expression of Atg8 gene. Also, the expression of AB42 in the central nervous system of Drosophila increased the expression of Atg8 gene.