



University of Zabol

Graduate school

Faculty of science

Department of biology

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

**Title:**

**Evaluation of Changes in Expression Level of  
Cathepsin D in Transgenic Drosophila model  
of Tau and A $\beta$**

**Supervisors:**

Dr. M. Haddadi

**Advisors:**

Dr. S. Raeiszadeh Jahromi

**By:**

Ehsan Dahmardeh

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## ABSTRACT

Alzheimer's disease(AD) is the most common type of dementia and is known as a progressive neurodegenerative disorder associated with the extracellular accumulation of beta-amyloid peptide in senile plaques and the intracellular accumulation of hyperphosphorylated tau. Also APP, PS1 / 2 is also involved in the pathogenesis of Alzheimer's disease.

Cathepsin D is a soluble lysosomal aspartic endopeptidase that is most active in lysosomes and is involved in the pathogenesis of Alzheimer's disease due to its involvement in APP and Tau processing via the autophagy-lysosomal pathway.

Drosophila melanogaster is an insect whose many developmental and behavioral aspects are seen in parallel in humans. Drosophila is one of the best model organisms that can be used to obtain information about the pathogenic processes in the brains of Alzheimer's underlies, using its various transgenic strains expressing human A $\beta$  and Tau.

**Methods:** In this study, the expression level of cathepsin D gene involved in autophagy-lysosomal pathway was measured using quantitative PCR in transgenic strains of Drosophila melanogaster expressing human A $\beta$  and Tau.

**Results:** According to this study, the expression level of cathepsin D in Tau-expressing strains is 3 times higher than control strains, while the expression level of the same gene in A $\beta$  transgenic lines does not increase significantly compared to control strains.

**Suggestions:** Due to the observed change in the expression levels of cathepsin D gene in transgenic models strains of Drosophila for AD. it is recommended that the expression of the desired gene be studied in more detaile experiments and at age intervals higher than 10-12 days.

**Keywords:** Drosophila melanogaster, Alzheimer's disease, Cathepsin D, Autophagy, Tau, A $\beta$