

## Abstract

Alzheimer's disease (AD) is described by structural and functional disturbances of the human brain. In AD, the amyloid fibril proteins are located and deposited inside neurons as neurofibrillary tangles. These are also deposited in the extracellular compartment as amyloid plaques. These changes are accompanied by the progressive disorder and loss of nerve cells that are accountable for the loading and managing of information. Finally, AD patients are suffering from loss of cognitive abilities with intense behavior changes. The aim of this study was to investigate the relationship between expression of ATF6 factor and age in the AD mode of fruit fly (*Drosophila melanogaster*) induced by A $\beta$ . After mating the virgin female flies GMR-Gal4 and elav-Gal4 with male flies of Human UAS-A $\beta$ 42, the first generation was examined. The confirmation of induction of A $\beta$  mutation in first-generation fruit flies was proved by morphological (GMR-Gal4-UAS-A $\beta$ 42), behavioral and molecular (elav-Gal4-UAS-A $\beta$ 42) analysis. The first-generation flies were located at 18 °C for the first 10 days in order to downregulate the expression of A $\beta$  expression, and then they were located in the normal temperature (24 °C) for the next 20 and 30 days in order to evaluate the aging process. Then, the analysis of gene expression was performed using Real-time PCR with three replications for all ages at target time points. It was found that the temperature 18 °C reduced the expression of human A $\beta$  in flies, and the highest toxicity was observed after a decade by placing flies at normal temperature. On the other hand, the amount of ATF6 expression was reduced by lowering the temperature and its expression increased in the 20th and 30th days compared to the cold period. In the end, it is suggested that the ATF6 gene will be targeted to develop new therapeutic strategies for AD associated with age. For more information about age, we need to study in 40, 50 days *Drosophila*. Also, extension of experiment and analysis of various expressions of the elav-Gal4 gene with the aging process in the fruit flies as well as other important genes involved in the end-stage of UPR<sup>1</sup>, such as CHOP<sup>2</sup>, could be also helpful.<sup>26</sup>

**Keyword:** Alzheimer's disease, ATF6 factor, Amyloid beta, Aging, *D. melanogaster*

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<sup>1</sup>Unfolded protein response (UPR)

<sup>2</sup>CCAAT-enhancer-binding protein homologous protein (CHOP)



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**Graduate School**

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

Title:

**Evaluation of relationship between age and ATF6 expression in *Drosophila melanogaster* Alzheimer model**

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Summer 2018