

Memory formation in *Drosophila* with neurospecific suppression *limk1* gene expression in nervous system

Zalomaeva E.S.^{1,2*}, Egozova E.S.^{1,3}, Medvedeva A.V.², Zhuravlev A.V.², Nikitina E.A.^{1,2}

¹ Herzen State Pedagogical University of Russia, St. Petersburg, Russia

² Pavlov Institute of Physiology, RAS, St. Petersburg, Russia

³ Saint-Petersburg Institute of Bioregulation and Gerontology, St. Petersburg, Russia

* Zalomaeva.E@yandex.ru

Key words: *limk1*, learning, memory, forgetting

Nowadays one of the significant problem of neurobiology is the investigation of the etiology and progression of different neurodegenerative diseases. One of the causes of neurodegenerative diseases is disturbance of actin remodeling cascade whose key enzyme is LIMK1. *Drosophila* constitutes a convenient model for studying the link between genome organization and chromosome architecture observed in cognitive disorders. The revealed association between *limk1* gene's mutational damage, changes in its expression and activity as well as cognitive impairment allows to use current model for the study of neurodegenerative and genomic diseases. We analyzed the formation and dynamics of short-term and medium-term memory in *Drosophila* stocks with neurospecific suppression *limk1* gene expression in nervous system, without such suppression and wild type *CS* stock. Conditioned courtship suppression paradigm was used to assess learning ability and memory formation. A 5-day-old virgin male was put in a special box with a fertilized female *CS* and was left for 30 min. Courtship behavior was analyzed in naive males and in males in 0, 15, 30, 60 min and 24 h after training to assess the formation and dynamics of memory. The behavior of the male was recorded in a special program for 300 sec. We calculated the learning index (LI) to assess the effectiveness of learning. Randomization test was used to statistical analysis. Research demonstrated that LI of all stocks on all points after training significantly different from zero, but not different from each other within the same stock. LI *CS* stock and stock with suppression *limk1* gene after 24 h was significantly less than LI after 0 min ($p \leq 0,05$). LI stock without suppression *limk1* gene was not decline on all the points. Thus, forgetting *Drosophila* with no suppression *limk1* gene is less pronounced.

Acknowledgements: The study was funded by RFBR (No. 20-015-00300 A).