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

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INTRODUCTION

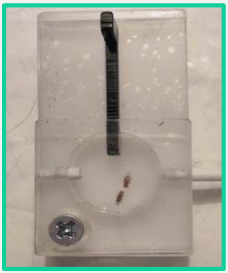
Nowadays one of the topical problem of neurobiology is the research of the etiology and progression of different neurodegenerative diseases. One of the causes of neurodegenerative diseases is disturbance of actin remodeling cascade whose key enzyme is LIMK1. *Drosophila* constitutes a convenient model for studying the link between genome organization and chromosome architecture observed in cognitive disorders. The revealed association between gene *limk1* 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.

AIM

To analyzed the formation and dynamics of short-term and medium-term memory in *Drosophila* stocks with neurospecific suppression *limk1* gene expression in nervous system, with no suppression and wild *Canton-S* stock

MATERIALS AND METHODS

- *Canton-S wild* type stock
- *Drosophila* stocks with neurospecific suppression *limk1* gene expression in nervous system
- *Drosophila* stocks with no suppression *limk1* gene expression



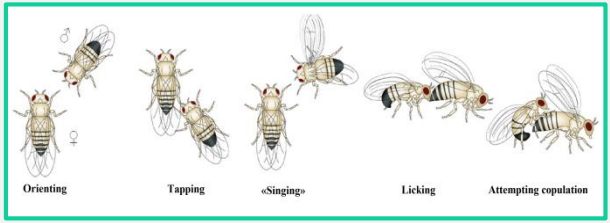
Conditioned courtship suppression paradigm was used to asses learning ability and short-term memory formation.

1. A 5-day-old virgin male was put in a special box with a fertilized female *Canton-S* and was left for 30 minutes.

2. Courtship behavior was analyzed in naive males and in males in 0, 15, 30, 60 minutes and 24 hours after training to assess the formation and dynamics of short-term memory.

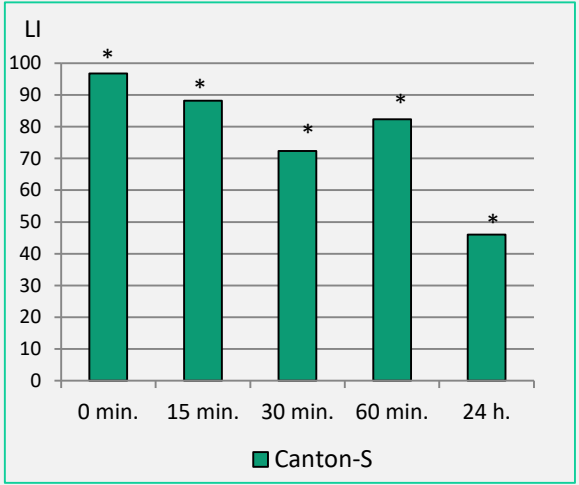
The behavior of the male was recorded in a special program for 300 seconds. We recorded the start time of individual courtship elements and the execution time of non-courtship elements (activity, prinning, rest).

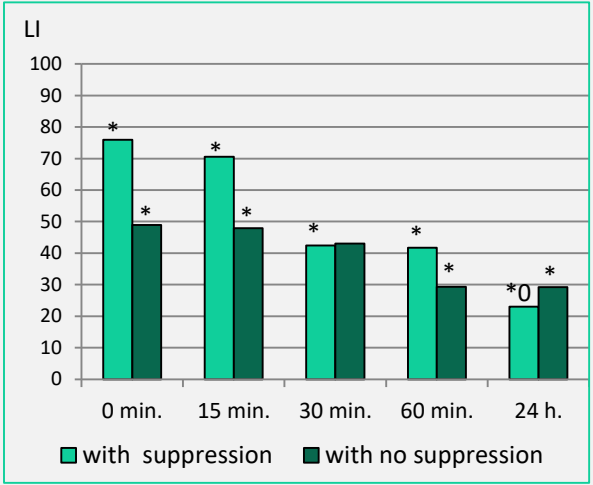
3. We calculated the learning index (LI) to assess the effectiveness of training. Randomization test was used to statistical analysis.



Learning index (LI) in *Drosophila* stocks with neurospecific suppression *limk1* gene expression in nervous system,with no suppression and wild stock *Canton-S*

RESULTS





0 - LI significantly differents from 0 min, p<0,05

* - LI significantly differents from zero, p<0,05

CONCLUSION

Thus, all stocks demonstrated the ability to learn and memory formation. However, the forgetting processes were more pronounced in stocks with neurospecific *limk1* suppression in the nervous system. The data obtained indicate the unconditional involvement of the *limk1* gene in the processes of active innate forgetting. This fact opens up broad prospects for further study of the role of active innate forgetting in the formation and preservation of memory with changes in the *limk1* gene.

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