
МАТЕРИАЛЫ КОНФЕРЕНЦИИ
И ШКОЛЫ

IMBALANCE OF KYNURENINES AND STRUCTURAL-FUNCTIONAL
ORGANIZATION OF DROSOPHILA BRAIN

© 2020 г. E. A. Nikitina^{1,2,*}, P. N. Ivanova^{1,2}, and E. V. Savvateeva-Popova¹

¹ Pavlov Institute of Physiology RAS, Saint Petersburg, Russia

² Herzen State Pedagogical University of Russia, Saint Petersburg, Russia

*e-mail: 21074@mail.ru

DOI: 10.31857/S0044452920072140

The implementation of different forms of behavior in *Drosophila* depends on the work of the central structures of the brain, including mushroom bodies (GT) and the central complex (CC). CC is necessary for: targeted locomotion; visual and motor training; maintaining motivation; switching between behavioural programmes according to changing conditions; memory formation in the conditioned courtship suppression paradigm. The latter is of particular interest, since memory disturbance is one of the main diagnostic features of neurodegenerative diseases, in the development of which kynurenines also control aging processes play an important role. The neuroactivity of kynurenines is also shown for invertebrates, including *Drosophila*. In this regard, it is important to trace the change in CC volume during aging in *Drosophila* mutants characterized by an imbalance of kynurenines: *cinnabar* (*cn*) (accumulation of kynurenic acid) and *cardinal* (*cd*) (accumulation of 3-hydroxykynurenine). Measurement of CC volume was made on the frontal brain sections of the wild type stock *CS* and mutants *cd* and *cn* at the ages of 5, 9, 12, 21 and 29 days

using a specially developed computer program courtesy of R. Wolf (Würzburg, Germany). CC volume in mutants is reduced compared to the wild type, and in *cd* this is more pronounced. The age dynamics of the change in CC volume is similar in these stocks at the age of 5–12 d. However, during aging, mutants are characterized by a different picture than for the wild type. In *CS*, CC volume remains unchanged for the interval of 12–21 d, insignificantly decreasing by 29 d. In *cd* and *cn* at the interval of 12–21 d, CC volume increases, by 29 d the changes are multidirectional – the maintenance in *cd* and a significant decrease in *cn*. These differences are obviously due to the imbalance of kynurenines, which affects the organization of *Drosophila* brain, an excellent model object for studying basic cognitive processes, normally and in different types of pathology.

Supported by RFBR 20-015-00300 A, Program of Fundamental Scientific Research of State Academies for 2013–2020 (GP-14, section 63).