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PARENT-OF-ORIGIN EFFECT IN GENETIC INSTABILITY OF SOMATIC BRAIN'S CELLS OF DROSOPHILA AND MEMORY FORMATION UNDER NORMAL AND STRESS CONDITIONS

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It is impossible to imagine the functioning of the nervous system without the controlled genomic instability, leading to the "somatic mosaicism of the brain". The source of variability is the presence of "hot spots" in the genome –

repetitive sequences provoking non-allelic recombination, as well as double-stranded DNA breaks (DSBs) that occur during matrix processes and physiological activity of neurons involved in memory formation and learning. The implementation of the "norm" – "pathology" scenario is under epigenetic control, in particular, depends on the parental effect of genome origin and stress. On the model of Drosophila's Williams syndrome containing the agn^{ts3} mutation of the gene for LIMK1 (a key actin remodeling enzyme) was studied parent-of-origin effect in learning and memory, as well as the formation of chromosome rearrangements caused by DSR and impaired cell division apparatus in normal and stressor exposure to a weak static magnetic field. For these purposes, reciprocal hybrids between agn^{ts3} and wild-type strain *Canton-S (CS)* were used. The prevailing role of the paternal genome in the formation of a memorial trail, paternal inheritance of the frequency of rearrangements and DSBs, as well as bridges under stress in the case of the paternal agn^{ts3} lineage, are shown. In the offspring of maternal-type agn^{ts3} females, disturbance of the cell division apparatus is inherited. Based on previous studies, miRNAs have been identified possible candidates for the role of mediator of paternal effects.

Keywords: chromosomal rearrangements, LIMK1, microRNA, weak static magnetic field, learning and memory