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Drosophila mutational models for Huntington's disease, Parkinson's disease with dementia and levy bodies and genomic disorder Williams-Beuren syndrome

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Pavlov Institute Multi-access Center "Biocollections" exploits the concepts of N. Vavilov's (1920) Law of Homologous Rows of Hereditary Variability and T. Dobzhansky assuming that the evolutionary conservation both of gene function and of elemental behavioral mechanisms guarantees that much of what we learn in one organism will inform our understanding of behavior in all animals, including humans. This insight permits behavior-geneticists to choose organisms based on experimental tractability for a given scientific question and to develop experimental model systems to probe the causes, consequences and mechanisms of pathology leading to human disease. Traditionally, we are doing this together with Novosibirsk Institute of Cytology and Genetics, the first example is neurochemical study of the kynurenine pathway in Drosophila and the honey bee [1]. This has resulted in developing models both for Huntigton's Disease [2], aging [3] and in silico bioinformatics analysis of antioxidant properties of kynurenines, as a cause, having neurodegeneration and cataract as consequence [4]. The second example is molecular biologic study which has allowed to develop Drosophila model for genesis of LIM-kinase 1-dependent cognitive phenotypes both in Parkinson's Dementia with Levy Bodies (DLB) and genomic disorder Williams-Beuren Syndrome (WBS) [5, 6]. At the same time, structural variants in genes associated with human WBS appear to underlie hypersociability in domestic dogs [7] explaining both the Pavlovian selection on different types of higher nervous activity and D. Belyaev's domestication [8].

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