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The hormonal mechanism of heat stress effect on the carbohydrate metabolism in *Drosophila melanogaster* females

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The *Drosophila* studies have revealed a strong evolutionary conservatism of the insulin/insulin-like growth factor-like signaling (IIS) and its involvement in the regulation of metabolic homeostasis and resistance to various types of stressors. The two main forms of circulating carbohydrates in *Drosophila* are glucose and trehalose (glucose disaccharide). The use of the evolutionary conservatism of I/IGF makes it possible to analyze the mechanisms underlying the development of diabetes mellitus and allows the experimental study of the influence of factors that can have a provoking effect on it, in cases where human research is impossible. One of these factors is stress – the universal response of living organisms to any adverse influences. Various hormones have been implicated in the stress response of the *Drosophila* adult, in particular biogenic amines – dopamine (DA) and octopamine (OA), which perform neurotransmitter, neuromodulatory and neurohormonal functions, juvenile hormone (JH) and 20-hydroxyecdysone (20E), playing a fundamental role in the control of reproductive function in adult insects. The purpose of this work is to study the effect of heat stress on the carbohydrate metabolism of *D. melanogaster* females of the wild type Canton S (CS) strain combinated with changes in the level of stress-related hormones (DA, OA, JH, 20E). We show that:
1) DA and JH have an inhibitory effect on carbohydrate metabolism under normal conditions;
2) OA and 20E exert a stimulating effect on the level of the main carbohydrate of insects, trehalose, but an inhibitory effect on the level of glucose under normal conditions;
3) DA, JH, 20E have an inhibitory effect on the level of both carbohydrates, OA has an inhibitory effect on the level of glucose and a stimulating effect on the level of trehalose in case of heat stress.
Our data suggest that the hormones involved in the neuroendocrine stress response of *D. melanogaster* are involved in the regulation of carbohydrate metabolism. Further work will focus on correcting carbohydrate metabolism in *D. melanogaster* with strains disrupted IIS disorders.