

## Effect of stress-related hormones on host *Drosophila* fitness depends on endosymbiont *Wolbachia* genotype

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**Motivation and Aim:** It is the first time the influence of gonadotropins, juvenile hormone (JH) and 20-hydroxyecdysone (20E) on the heat stress resistance of wild-type *D. melanogaster* females infected with different genotypes of  $\alpha$ -proteobacteria *Wolbachia pipientis* was investigated to verify the possibility that endosymbiont promotes adaptation to the host species, affecting the functioning of its protective systems.

**Methods and Algorithms:** To raise the JH level, we applied 0.1  $\mu$ g JHIII (Sigma-Aldrich), dissolved in 0.5  $\mu$ l acetone, to the abdomen of 4-day females, and 0.5  $\mu$ l pure acetone to control individuals. In order to investigate the effect of level 20E changes on the resistance to heat stress of *D. melanogaster* females infected with different strains of *Wolbachia*, on the 4th day after eclosion the flies were placed in vials, the bottom and 1 cm of the walls of which were covered with filter paper, soaked with 0.5 ml of culture medium containing 0.5 % sucrose, 0.2 % yeast and 60  $\mu$ g 20E (Sigma-Aldrich). In the control series in a solution of 20E was not added. On the 6th day after eclosion the JH or 20E-treated and control flies were subjected to thermal stress (38 °C, 2 hours 45 min) and 24 hours later the number of surviving flies were counted.

**Results:** It was found that the experimental increase in the level of the JH causes a decrease in resistance of 6-day females to heat stress, while the increase in the level of 20E – its increase, both in uninfected *Wolbachia* and infected with various strains of bacteria: *wMelCS*, *wMelPop* and *wMel*. However, the intensity of the response differs: in females infected with pathogenic strain *wMelPop*, the decline in survival at higher levels of the JH and its increase with increasing levels of 20E are more pronounced, while in females infected with genotype *wMelCS* is less pronounced than that in uninfected females and females infected with genotype *wMel*.

**Conclusion:** The obtained data indicate that the genotype of *wMelCS* causes a decrease, and *wMelPop* – an increase in the level of stress hormone, dopamine, in female *Drosophila*, since earlier we showed that an increase in the level of the JH in mature females increases the level of dopamine, while an increase in the level of 20E reduces it [1], and an increase/decrease in the level of dopamine, in turn, leads to a decrease/increase in the resistance of female *Drosophila* to heat stress [2].

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### References

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