Drosophila CG10527 mutants are resistant to juvenile hormone and its analog methoprene

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Abstract

Juvenile hormone (JH) is critical for development, metamorphosis, and reproduction in insects. While the physiological importance of JH has been appreciated for decades, its biosynthesis pathway and molecular action remain poorly understood. *Drosophila CG10527* encodes a protein with high homology to crustacean farnesoic acid methyltransferase (FAMeT) that converts farnesoic acid to methyl farnesoate (MF), a precursor of JH, but its *in vivo* functions remain unclear. Here we report that *CG10527* is expressed widely in secondary cells in the male accessory glands, in ovarian follicle cells, and in glial cells in the nervous system. Furthermore, *CG10527* is expressed abundantly in the corpora allata where JH is synthesized. To understand the physiological functions of *CG10527*, we generated specific *CG10527* deletions. Phenotypic analysis showed that *CG10527* null mutants are fully viable and fertile in both sexes, indicating that *CG10527* is not essential for survival and fertility. Surprisingly, *CG10527* mutants showed no defects in the biosynthesis of MF and JH. However, *CG10527* mutants were 3–5 times more resistant than wild-type flies to topically applied MF and JH as well as the JH analog methoprene at both sub-lethal and lethal doses. Taken together, our data indicate that *Drosophila CG10527* plays little, if any, role in JH biosynthesis but may participate in the JH signaling pathway.