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Juvenile hormone related pathways in silkworm: New insights from genome-wide approaches

Daojun Cheng

State Key Laboratory of Silkworm Genome Biology, Southwest University, China

chengdj@swu.edu.cn

Abstract

The silkworm (*Bombyx mori*) is one of the economically important insects and has been also becoming one of the best-characterized models for the studies of the order Lepidoptera. From 2003 to 2013, our lab has successively completed draft sequence map, fine sequence map and genetic variation map for silkworm genome. SilkDB, a database of all public silkworm genome resource, has been broadly serving for insect studies around the world. A genome-wide microarray covering the known and predicted genes in the silkworm genome provided a platform for profiling gene expressions during silkworm growth and development.

Juvenile hormone (JH) is a sesquiterpenoid hormone and has been confirmed to be involved in the regulation on insect growth and development. We identified 49 genes related to JH biosynthesis, metabolism and signaling in the silkworm genome. Comparative analysis showed that the early steps of MVA pathway and neuropeptide regulation of JH biosynthesis as well as JH signaling are highly conserved during the evolution of silkworm and other surveyed insects. But, genes involving in the isoprenoid branch of JH biosynthesis and JH metabolism, together with *FPPS* genes for catalyzing the final step of MVA pathway, exhibited varied copies, indicating that these genes may experience duplication during insect evolution and is likely associated with the fact that JH types are diverse in silkworm and other insects. Based on the microarray analysis of gene expression, we found that in silkworm JH related pathways could be activated after pathogen infection, and JH also play roles in modulating the metabolic process and insulin signaling.

Biography

Daojun Cheng has got his Ph.D. degree from Southwest University. His focus is on silkworm genome research and hormone regulation on silkworm development. He also worked on the field of *Drosophila* genetics at Harvard Medical School for one year as a visiting scholar. He has published more than 15 papers in several reputed journals.