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## Silencing of hormonal biosynthesis genes by double stranded RNA (dsRNA) impairs larval growth and development of cotton bollworm (*Helicoverpa armigera*)

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*Helicoverpa armigera* is a polyphagous insect pest responsible for major losses in cotton and other agronomically important crops. RNA interference (RNAi) has emerged as a potential alternative to raise insect-resistant plants by in planta expression of dsRNA specific to a vital insect gene. In the present study, the hormonal biosynthesis genes in *H. armigera* were targeted by feeding dsRNAs corresponding to each target gene viz. Juvenile Hormone Acid Methyl Transferase (HaJHMT), Pro-Thoracicotropic Hormone (HaPTTH), Pheromone Biosynthesis-Activating Peptide (HaPBAP), Molt Regulating Transcription Factor (HaHR3), Activated Protein 4 (HaAP-4) and Eclosion Hormone Precursor (HaEHP) which play key roles in regulation of physiological, developmental and behavioural events in the target insect pest. Ingestion of target gene dsRNAs via artificial diet resulted in variable mortality ranging from 60-92% in all the six targeted genes. Silencing of the target genes showed retarded larval growth, delayed in molting, metamorphosis and pupal formation. A comparison of the silencing potency of un-diced long HaPTTH dsRNA with RNase III-diced-siRNAs revealed that long dsRNAs were more effective in target gene silencing as compared to siRNAs. The HaPTTH-dsRNA coated onto the detached leaf was found to be more effective in silencing target gene when compared to dsRNA feeding via artificial diet. The qRT-PCR analyses showed that mRNA level of six target genes was drastically reduced compared to control or unrelated GFP-dsRNA control correlated with the developmental defects. These results indicate that hormonal biosynthesis genes can be used as vital targets for improving pest resistance in cotton and other crop plants which are infested with *H. armigera*.

### Biography

Anjali Jaiwal is pursuing PhD under the supervision of Professor M V Rajam, Head of Department of Genetics, University of Delhi South Campus, New Delhi, India. She did her Post-Graduation in Biotechnology from M D University, Rohtak, Haryana and received Gold Medal for standing first in the university. She received different scholarships during Graduation and Post-graduation. She cloned and submitted three gene sequences to GenBank of NCBI. She published one review article 'Coenzyme Q10 production in plants: current status and future prospects' in 'Critical Reviews in Biotechnology' as second author. She attended six national and three international conferences. She was awarded CSIR-UGC JRF and prestigious DST-INSPIRE Fellowship by the DST (Department of Science and Technology). Her research work includes the screening of few vital genes of *Helicoverpa armigera* by feeding target gene dsRNAs to the insect pest via semi-synthetic artificial diet and the development of insect resistant transgenic tobacco and cotton plants via plant-mediated RNAi silencing of vital genes of *H. armigera*.

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