

Insect gene expression responds to diet

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Cabbage looper caterpillars (*Trichoplusia ni*) are able to alter the expression of genes associated with metabolism, homeostasis and immunity in response to feeding on plants carrying bacteria. Research published in BioMed Central's open access journal *Frontiers in Zoology* has shown that, as well as tailoring gene expression within their own digestive systems, the insects are able to pass this information along to their offspring.

Dalial Freitak worked with a team of researchers at the Max Planck Institute for Chemical Ecology to study the effects of dietary bacteria on general [gene expression](#) in the plant pest. She said, "Larval feeding on a bacteria-rich diet leads to substantial gene expression changes, potentially resulting in a reorganization of the insects' metabolism to maintain organismal [homeostasis](#), not only in the larval but also in the adult stage."

The authors believe that having a suite of genes capable of responding to dietary composition allows the cabbage looper to fine-tune its natural defenses. Freitak said, "Mounting an [immune response](#) is costly and dangerous. The fact the insects can up regulate immunity related genes like Gloverin, HDD1 and hemolin in response to the presence of bacteria, but leave them switched off in the absence of pathogens, minimizes the release of multiple potentially cytotoxic molecules, which could in turn activate other stress related defenses".

The researchers also found that the eggs of parents fed on a bacterial diet showed different gene expression patterns to eggs from parents who had

sterile food. They conclude, "If expression differences in eggs carry over into the larvae that develop from them, this would support the idea that parents are able to prime their offspring against possible environmental stressors, like increased microbial exposure".

More information: Bacterial feeding induces changes in immune-related gene expression and has trans-generational impacts in the cabbage looper (*Trichoplusia ni*), Dalial Freitak, David G Heckel and Heiko Vogel *Frontiers in Zoology* (in press), www.frontiersinzoology.com/

Source: BioMed Central ([news](#) : [web](#))

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