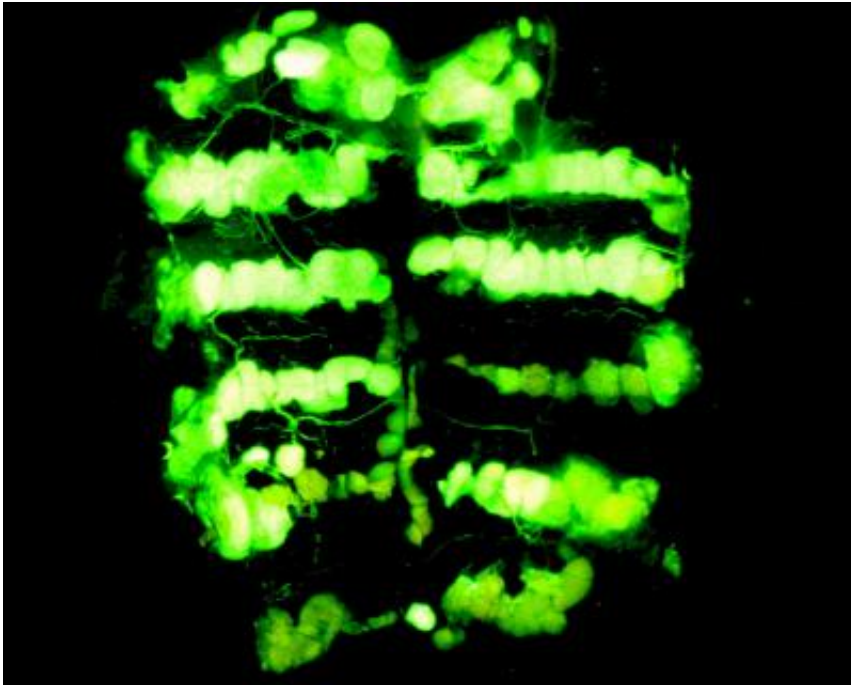


Genetic roots of insect's waterproof coating could lead to innovative pest control

July 15 2016



Wax-producing cells found on the fly abdomen are labelled with green fluorescent protein. Spidey is essential for maintaining the health of these cells. Credit: Chiang, et al. (2016)

An international team of scientists led by University of Hawai'i at Mānoa researcher Joanne Yew may have discovered a new and effective way to control insect pests that are a threat to agriculture and humans. Yew and her team identified a gene in vinegar flies responsible for the insect's waterproof coating, which provides them protection from microbes and

environmental stress. They nicknamed the gene spidey and announced the findings in a recently published study in *PLOS Genetics*.

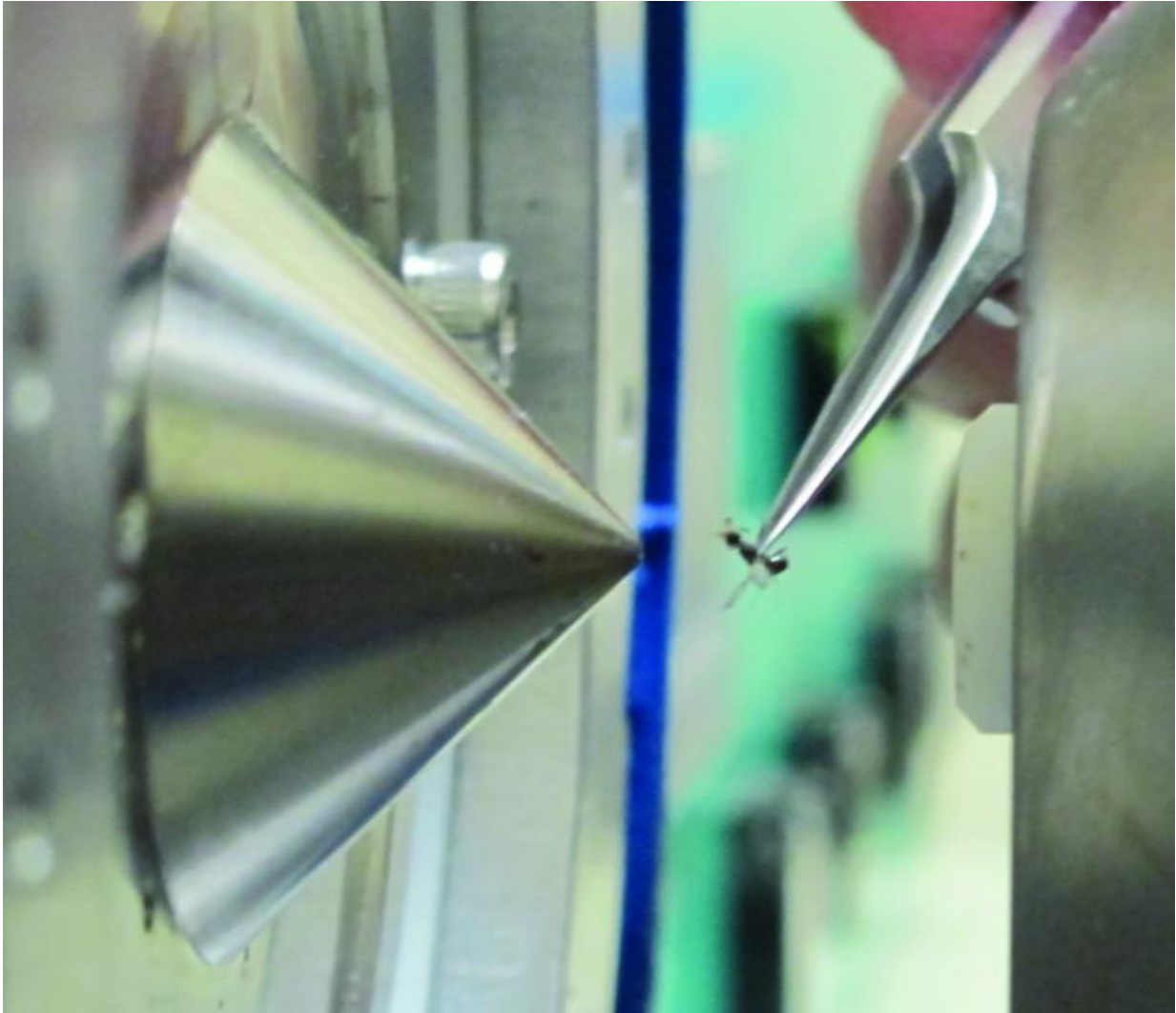
"When we knocked out spidey in adult flies, the flies exhibited several striking features: their lifespan was shortened by about 50 percent, they lost almost all of their waxy coating and flies frequently got stuck to the sides of the plastic vials and were unable to free themselves," said Yew, an assistant researcher based in the Pacific Biosciences Research Center of UH Mānoa's School of Ocean and Earth Science and Technology.

"This last feature was reminiscent of the comic book character Spider-Man, which is why we named the gene spidey."

Spidey is important for regulating levels of a steroid hormone, which maintains wax-producing cells. This hormone was already known to play a crucial role in the development and metamorphosis of fly larvae. The researchers did not expect that [steroid hormones](#) would play such a central role in maintaining adult tissues, such as the wax-producing cells.

"We did this work in vinegar flies, which is a major model organism," said Yew. "From here, perhaps we can bridge to pest species."

Yew and her colleagues now plan to knock out spidey in [pest species](#) like Oriental, Mediterranean and melon fruit flies, which are a major threat to agriculture, and possibly mosquitoes, which can carry human diseases, to see if they lose their waterproofing ability like the [vinegar flies](#). She says it would be at least four more years of more research, testing and government approvals before the discovery could be used as a pest control.



Analysis of a single fly using mass spectrometry. The fly is held by forceps in the mass spectrometer inlet. This form of analysis revealed that knockdown of *spidey* resulted in a near-complete loss of hydrophobic waxes on the insect surface. Credit: Chiang, et al. (2016)

More information: Yin Ning Chiang et al, Steroid Hormone Signaling Is Essential for Pheromone Production and Oenocyte Survival, *PLOS Genetics* (2016). [DOI: 10.1371/journal.pgen.1006126](https://doi.org/10.1371/journal.pgen.1006126)

Provided by University of Hawaii at Manoa

Citation: Genetic roots of insect's waterproof coating could lead to innovative pest control (2016, July 15) retrieved 10 April 2024 from <https://phys.org/news/2016-07-genetic-roots-insect-waterproof-coating.html>

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