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new hot papers - 2010

March 2010

PDF

Karyn Johnson talks with *ScienceWatch.com* and answers a few questions about this month's New Hot Paper in the field of Microbiology. The author has also sent along an image of her work.

Article Title: Wolbachia and Virus Protection in Insects
Authors: Hedges, LM;Brownlie, JC;O'Neill, SL;**Johnson, KN**
Journal: SCIENCE
Volume: 322
Issue: 5902
Page: 702-702
Year: OCT 31 2008
* Univ Queensland, Sch Integrat Biol, Brisbane, Qld 4072, Australia.
* Univ Queensland, Sch Integrat Biol, Brisbane, Qld 4072, Australia.

SW: Why do you think your paper is highly cited?

We found that insects infected with a very common bacterial endosymbiont (*Wolbachia*) are protected from pathogenic viruses. This finding is both unexpected and has the potential to influence the outcome of host-pathogen interactions in a number of ways.

I think our paper is highly cited because it has led to several new directions for research in understanding the mechanism of this symbiont-mediated protection, the impact on *Wolbachia* and virus ecology, and the importance of this protection on the transmission of pathogens by insect vectors.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

This paper describes a new discovery. Interestingly, in independent research, Luis Teixeira of the Department of Genetics, University of Cambridge found similar results to ours, which were also published in 2008.

[+] enlarge

A fly (Drosophila

SW: Would you summarize the significance of your paper in layman's terms?

Many human, animal, and plant viruses are transmitted between hosts by insects.

Understanding the processes that control virus infection in insects may facilitate strategies that aim to control the spread of important viral pathogens.

melanogaster) on the end of an injection needle.

There are also insects that are beneficial both to our environment and agriculture, for example, honeybees are important pollinators of plants. Controlling the pathogenic viruses that infect them could protect these beneficial insects.

Our paper identified a naturally occurring novel way to interfere with the virus infection cycle in insects.

SW: How did you become involved in this research, and were there any problems along the way?

We set out to understand the biological mechanisms used in insects to reduce susceptibility to virus infection. To examine this question a student in my lab, Lauren M. Hegdes, looked at virus infection in the model organism, *Drosophila melanogaster*.

The finding that *Wolbachia* is a major contributing factor to antiviral defense in flies was unexpected. It took us some time to realize that the antiviral affect we were seeing was not controlled by the host as we had expected, but was dependent on the *Wolbachia* infection status of the host.

SW: Where do you see your research leading in the future?

We are currently investigating the mechanisms that lead to symbiont-mediated antiviral protection and are collaborating with theoretical ecologists to look at the impact this protection would have on the ecology of microbes in natural insect populations.

SW: Do you foresee any social or political implications for your research?

If symbiont-mediated protection can be harnessed to decrease insect-vectored pathogen transmission this could indeed have important social outcomes.

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KEYWORDS: DROSOPHILA-MELANOGASTER; WOLBACHIA; SYMBIONT-MEDIATED PROTECTION; VIRAL PATHOGENS.

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