ScienceDaily®
Your source for the latest research news

Science News

from research organizations

Evolution of a species also involves the bacteria it carries

Date: September 29, 2016

Source: Instituto Gulbenkian de Ciência (IGC)

Summary: Animals live in close association with microorganisms, carrying beneficial bacteria while coping with pathogenic infections. Now, a study shows that symbiotic bacteria play a direct role in the evolution of their host, shaping the way it adapts to pathogens.

Share:

FULL STORY

Lab work with fruit flies.

Credit: Sandra Ribeiro, IGC

Animals live in close association with microorganisms, carrying beneficial bacteria while coping with pathogenic infections. Now, in a study published this week in *Plos Genetics*, researchers from Instituto Gulbenkian de Ciencia (IGC, Portugal) discovered that symbiotic

bacteria play a direct role in the evolution of their host, shaping the way it adapts to pathogens.

More and more it becomes clear that bacteria living inside animals play important roles in the host's life. Symbiotic bacteria can influence host development, physiology, behaviour, and can also increase host resistance to pathogens. But how much the evolution of the symbiotic bacteria influence the adaptation of animals to pathogens had not been addressed yet. Elio Sucena and Luis Teixeira, group leaders at the IGC, joined their expertise to solve this problem.

The experimental set up involved fruit flies (*Drosophila melanogaster*) and its symbiotic bacterium, *Wolbachia*, exposed to viral infection. "Our previous work had shown that *Wolbachia* can protect fruit flies against viruses, and that different strains of these bacteria confer different levels of protection. Therefore, by studying flies that carried different strains of *Wolbachia* we could investigate how evolution occurred both at the level of the bacteria and of the host," explain Vitor Faria and Nelson Martins, first co-authors of this work.

By comparing populations of flies that evolved in the presence of the virus with others that evolved in its absence, the researchers observed significant changes in their bacterial composition. Throughout evolution the *Wolbachia* strains that provided higher protection to viral infection were selected and remained in the population of flies exposed to virus, whereas the other strains disappeared. These results indicated that selection of *Wolbachia* strains was associated with the advantage they provided to the host: after infection, flies with these strains were able to survive better and reproduce more than the flies that carried less protective strains.

"Host and its symbiotic bacteria are acting as an unit in response to pathogen infection, with the evolution of both genomes contributing to host adaptation. We believe similar results will be observed with other bacteria and animals," says Elio Sucena.

"The role played by symbiotic bacteria in host evolution may have to be taken into consideration when addressing different host-pathogens interactions," adds Luis Teixeira.

In this study, the IGC team collaborated with Sara Magalhães from Centre for Ecology, Evolution and Environmental Changes (Ce3C) at the Faculty of Sciences of the University of Lisbon (Portugal), and with Christian Schlötterer from Institut für Populationsgenetik at Vetmeduni Vienna (Austria). This work was funded by the Fundação para a Ciencia e a Tecnologia (FCT; Portugal) and by the Austrian Science Funds.

Story Source:

Materials provided by **Instituto Gulbenkian de Ciência (IGC)**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Vitor G. Faria, Nelson E. Martins, Sara Magalhães, Tânia F. Paulo, Viola Nolte, Christian Schlötterer, Élio Sucena, Luis Teixeira. **Drosophila Adaptation to Viral Infection through Defensive Symbiont Evolution**. *PLOS Genetics*, 2016; 12 (9): e1006297 DOI: 10.1371/journal.pgen.1006297

Cite This Page:

MLA APA Chicago

Instituto Gulbenkian de Ciência (IGC). "Evolution of a species also involves the bacteria it carries." ScienceDaily. ScienceDaily, 29 September 2016. <www.sciencedaily.com/releases/2016/09/160929142322.htm>.

RELATED STORIES