

The human parasite *Leishmania* is a probiotic for the fly that carries it

22 July 2014



A sandfly, the vector that passes on the *Leishmania* parasite. Credit: Rod Dillon

The *Leishmania* parasite, which causes the human disease leishmaniasis, acts as a probiotic in the insect that transmits it to humans, protecting them from bacterial disease. Findings published in the open access journal *Parasites and Vectors* suggest that using bacterial controls to stop the spread of leishmaniasis could sometimes have the opposite effect to that intended, by benefiting flies carrying the parasite.

Around 12 million people are currently infected with leishmaniasis worldwide, mostly in South America, Africa and Asia. It is estimated to kill 20-50,000 people per year. Sandflies transmit the parasite by feeding on an infected mammal and, if they survive long enough, feeding on another mammal, and passing the parasite on to them.

A team from Lancaster University were studying sandflies' interactions with bacteria, to find a new way to control the sandfly populations, and curb the spread of leishmaniasis. They set out to study the effects on the sandfly of carrying both the *Leishmania* parasite and the bacterial pathogen

Serratia marcescens, a naturally occurring disease in sandfly populations.

The team took a population of *Lutzomyia longipalpis* sandflies and fed them blood meal containing the *Leishmania* parasite, and a second group with uninfected blood meal. They then fed both groups with the *Serratia* pathogen. The group that were carrying the *Leishmania* parasite had a survival rate of 56% after six days, in contrast to the control group, which had a survival rate of just 11%. This showed that carrying both the *Leishmania* parasite and the bacterial pathogen protected the flies and increased their lifespan.

The authors say that this finding is important for efforts to develop biological controls against vectors of disease using bacterial pathogens, as these may have unexpected effects in the wild.

Dr Rod Dillon said: "We're looking at using bacteria to stop the spread of [leishmaniasis](#), but it turns out that the *Leishmania* parasite works as a kind of probiotic and reduces the mortality of the fly."

More information: Colonisation resistance in the sand fly gut: *Leishmania* protects *Lutzomyia longipalpis* from bacterial infection Mauricio RV Sant'Anna, Hector Diaz-Albiter, Kelsilândia Aguiar-Martins, Waleed S Al Salem, Reginaldo R Cavalcante, Viv M Dillon, Paul A Bates, Fernando A Genta and Rod J Dillon *Parasites & Vectors* 2014 7: 39.

Provided by BioMed Central

APA citation: The human parasite Leishmania is a probiotic for the fly that carries it (2014, July 22) retrieved 15 November 2019 from <https://medicalxpress.com/news/2014-07-human-parasite-leishmania-probiotic.html>

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