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## Repeat infection with malaria parasites

Saturday, 11 July 2015, 12:53 pm

Press Release: [PLOS Pathogens](#)

### Repeat infection with malaria parasites might make mosquitoes more dangerous

In malaria-endemic regions, humans are often infected repeatedly with the *Plasmodium* parasite, and the consequences of such multiple infections are under intense study. In contrast, little is known about possible co-infection and its consequences in the *Anopheles* mosquitoes that transmit the disease. A study published on July 16th in *PLOS Pathogens* reports that not only can individual mosquitoes accumulate infections from multiple blood feeds, but also that an existing malaria infection makes mosquitoes more susceptible to a second infection, and that infections reach higher densities when another strain is already present.

Interested in interactions between malaria parasites and their insect hosts, Laura Pollitt, from the University of Edinburgh, UK, and colleagues in the US, asked whether and how mosquitoes can be infected with different *Plasmodium* strains, how such heterogeneous parasites interact in the insects, and whether such interactions affect transmission of malaria to vertebrate hosts.

The researchers set up cages of female *Anopheles* mosquitoes and allowed them at defined times to feed on mice infected with two different *Plasmodium* strains. This study design allowed them to examine how the presence of a co-infecting strain affects parasites that enter the vector first and second, and to test whether co-infection impacts mosquito survival.

They found that mosquitoes can accumulate mixed strain malaria infections after feeding on multiple hosts, and found that parasites have a greater chance

of establishing a secondary infection if another *Plasmodium* strain is already present in a mosquito. Moreover, the presence of the primary infection facilitated replication of the secondary infection while the first infection developed as normal. This resulted in doubly infected mosquitoes having substantially higher parasite loads.

The large parasite numbers do not appear to kill the insects, and as it is expected that mosquitoes carrying more parasites are more likely to transmit malaria to vertebrates, mosquitoes taking multiple infective bites might disproportionately contribute to malaria transmission. This in turn would increase rates of mixed infections in vertebrate (including human) hosts, with implications for the evolution of parasite virulence and the spread of drug-resistant strains.

“If the facilitation we have demonstrated here”, the authors say, “occurs in natural transmission settings to humans, there could be significant epidemiological consequences. Control measures reducing prevalence in the vertebrate host, and therefore reducing the likelihood of mosquitoes taking multiple infective feeds, could disproportionately reduce transmission of individual strains. By increasing the proportion of infectious mosquitoes with mixed strain infections, it is also likely that the facilitation reported here will increase the rates of mixed infections in vertebrate hosts which could have implications for infection virulence and the spread of drug resistant strains.”

ENDS

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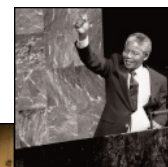
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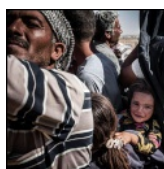


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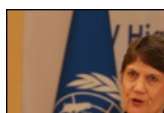
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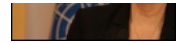


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