PR: Competition and the Evolution of Reproductive Restraint in Malaria Parasites

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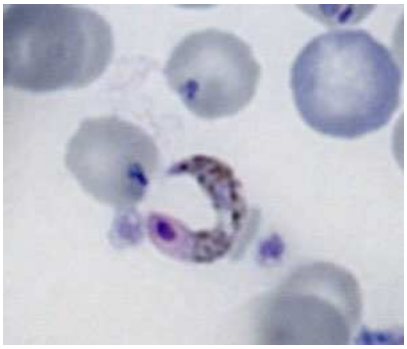
Defending the fortress: malaria parasites fight for blood in mixed infections



Malaria and related parasites cause some of the most serious infectious diseases of humans, wildlife, livestock, and companion animals. New research from the University of Edinburgh has shown that these parasites gather information on their environment (e.g., the presence of competitors and the amount of resources) and use this to adjust their transmission strategies.

Malaria is caused by single-celled parasites that replicate in the red blood cells of their host, causing the symptoms of the disease. Throughout infections, some parasites don't replicate, and instead develop into specialized transmission forms which are taken up by mosquitoes that spread the disease to new hosts. Malaria parasites must balance the investment of their limited resources between production of these transmission forms and the replicating forms that allow the current infection to be maintained.

When malaria parasites share their host with competitors, they have to vie for limited red blood cells, and their survival can be threatened. New research led by Laura Pollitt shows that parasites switch to producing fewer transmission forms under competition. This enables the parasites to invest more in replicating forms, increasing their ability to compete for the red blood cells they need to survive. Furthermore, the parasites adjust their strategy depending on how many resources are available (e.g., the fewer resources available, the harder the parasites fight for them).

Natural infections commonly consist of multiple competing malaria parasite strains, and understanding how these interact will have important implications for the severity and transmission of disease. This study also suggests a possible answer to the long-standing question of why malaria parasites produce so few transmission stages–when they are fighting to survive, parasites simply can't afford them.

Image: Malaria parasite transmission form in the blood (photograph by Sarah Reece ©).

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