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Imaging the influence of mosquito biting on *Plasmodium berghei* gametocytes

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Uptake of *Plasmodium* gametocytes by mosquitoes from infected humans is essential for sexual reproduction of the parasite and onward transmission of malaria. However, very little is known about where gametocytes reside in the skin of infected humans, and what effect mosquito biting has on them.

It has been shown that mosquitoes fed on the skin of infected individuals become more readily, and more highly infected than those fed with venous blood from a membrane feeder. In addition, individuals with submicroscopic infections can also infect mosquitoes at a rate higher than would be expected. Infection of mosquitoes is well-described to follow a negative binomial distribution, however, the explanation for why this occurs still eludes us. Through histological assays, we previously discovered that gametocytes do not accumulate in the skin compared to peripheral circulation as a default destination. Based on these observations and further histological analysis we hypothesise that gametocytes respond in real-time to mosquito biting.

To further explore gametocyte behaviour in the vasculature of the skin, we have developed an intravital platform to visualise fluorescent *Plasmodium berghei* parasites in a skin flap of an infected mouse. Using an inverted microscope, we can place a mosquito on top of the skin flap and observe parasite and vascular changes in real-time as mosquitoes probe and feed. This setup allows us to determine the interactions between the host, parasite and mosquito over large areas, including areas proximal and distal to the bite site. By understanding the basic biology at this key bottleneck of the *Plasmodium* lifecycle, we hope to better inform modelling approaches and move closer towards malaria elimination.