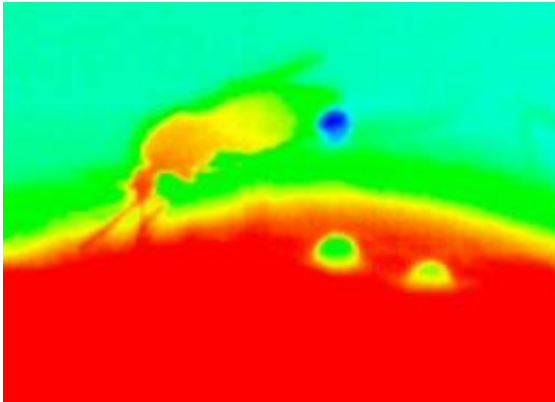


Blood-sucking mosquitoes keep their cool

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The mosquito performs evaporative cooling. The retention of the fluid drop attached to the abdomen end leads to a fall of the abdomen temperature causing a clear temperature gradient along the mosquito body. N.B., the color of the droplet does not reflect the real temperature, because of the difference in the emissivity between the cuticle of the mosquito and the drop surface. Credit: Lahondčre et al. *Current Biology*

No one likes being bitten by whining mosquitoes, but have you ever considered what the experience is like for them as their cold-blooded bodies fill with our warm blood? Now researchers reporting online on December 15 in *Current Biology* have uncovered the mosquitoes' secret to avoiding heat stress: they give up cooling droplets of their hard-won meals.

The study shows for the first time that blood-feeding insects are capable of controlling their body temperature, the researchers say.

"During feeding on a warm-blooded host, such as a human being, mosquitoes ingest quite a large amount of hot blood in a short period of time," said Claudio Lazzari of Université François Rabelais. "We aimed to determine to what extent these insects are exposed to the risk of overheating during the blood intake."

Mosquitoes have to be quick, lest their host turns into a potential predator, Lazzari points out. But that influx of heat could send their internal body temperature soaring past physiological limits.

Insects' [body temperatures](#) generally do depend on the environment around them. However, earlier studies have shown that insects, including bees and aphids, can control their temperature with beads of nectar or sap. Mosquitoes, too, will give up drops of fluid during feeding.

"What intrigued us was why they eliminate fresh blood, which is a precious and risky-to-obtain nutritive element," Lazzari said.

To find out, he and Chloé Lahondère used a camera that depends on heat to form images, much as a regular camera depends on light. Those images highlighted differences in temperature between the body parts of mosquitoes as they fed. Their heads reached temperatures close to that of the ingested blood, while the rest of their bodies remained closer to ambient temperature. That temperature variation wasn't observed when mosquitoes dined on sugar water instead.

The researchers showed that the cooling depended on those drops of fluid the insects excrete from their backsides as they feed. Lazzari and Lahondère say that the mosquitoes' strategy no doubt protects them and any malaria-causing (*Plasmodium*) parasites they might be carrying. The new understanding of mosquito physiology is more than a curiosity; it could lead to strategies aimed to control mosquitoes and the diseases they spread.

"Blocking or delaying the production of the excreted fluid would have a double impact on the physiology of [mosquitoes](#): on water and thermal balance," Lazzari said. "Indirectly, this would affect microorganisms transmitted by [insects](#) by modifying the thermal environment to which they are exposed."

More information: [DOI:10.1016/j.cub.2011.11.029](https://doi.org/10.1016/j.cub.2011.11.029)

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