

## Promising Study Identifies First-Ever *Anopheles* Pheromone with Potential for Mosquito Population Control

Clock genes together with environmental cues like light and temperature coordinate *Anopheles* pheromone synthesis, mosquito swarming, and mating behavior, according to a new study published January 22 in *Science*.

Tens to thousands of male *Anopheles* mosquitoes swarm and mate at dusk when females fly into the swarm. Experiments in the laboratory and near-field conditions were conducted to identify components of the circadian clock apparatus that regulate *Anopheles* male swarming and mating behavior. This was done by comparing genes expressed in the heads of swarming male mosquitoes with genes in resting male mosquitoes.

“We found that circadian genes and a gene responsible for the synthesis of cuticular pheromones were uniquely activated in swarming mosquitoes. Clock genes are significantly upregulated in swarming male mosquitoes and when we knocked down their expression, it affected male swarming and mating success in the laboratory and in semi-field conditions,” says study senior author Professor Marcelo Jacobs-Lorena, PhD, a professor in the Department of Molecular Microbiology and Immunology at the Bloomberg School of Public Health.

“What surprised us,” says Professor Jacobs-Lorena is that “we found that clock genes regulate the activity of an enzyme—Desaturase. This enzyme Desaturase produces a pheromone that attracts females. This is the first mosquito pheromone ever identified.”

Infecting more than 200 million people and causing nearly half a million deaths annually, the malaria parasite, transmitted by *Anopheles* mosquitoes, poses a massive health risk in the absence of a highly effective vaccine. Insecticide-treated nets and indoor residual spraying for mosquito control remain some of the most effective methods to combat the disease. Yet the findings could lead to developing other methods to control mosquito populations, such as mosquito lures or traps, adding to the arsenal of tools leading toward malaria elimination.

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Media Contact: Ana Coyne

410-614-3336

[acoyne4@jh.edu](mailto:acoyne4@jh.edu)

[LINK to Science: “Clock genes and environmental cues coordinate \*Anopheles\* pheromone synthesis, swarming and mating”](#)