

Genetically engineered bacteria prevent mosquitoes from transmitting malaria

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Researchers at the Johns Hopkins Malaria Research Institute have genetically modified a bacterium commonly found in the mosquito's midgut and found that the parasite that causes malaria in people does not survive in mosquitoes carrying the modified bacterium. The bacterium, *Pantoea agglomerans*, was modified to secrete proteins toxic to the malaria parasite, but the toxins do not harm the mosquito or humans. According to a study published by PNAS, the modified bacteria were 98 percent effective in reducing the malaria parasite burden in mosquitoes.

"In the past, we worked to genetically modify the mosquito to resist malaria, but [genetic modification](#) of bacteria is a simpler approach," said Marcelo Jacobs-Lorena, PhD, senior author of the study and a professor with Johns Hopkins Bloomberg School of Public Health. "The ultimate goal is to completely prevent the mosquito from spreading the malaria parasite to people."

With the study, Jacobs-Lorena and his colleagues found that the engineered *P. agglomerans* strains inhibited development of the deadliest human malaria parasite *Plasmodium falciparum* and rodent malaria parasite *Plasmodium berghei* by up to 98 percent within the mosquito. The proportion of [mosquitoes](#) carrying [parasites](#) (prevalence) decreased by up to 84 percent.

"We demonstrate the use of an engineered symbiotic bacterium to interfere with the development of *P. falciparum* in the mosquito. These findings provide the foundation for the use of genetically modified

[symbiotic bacteria](#) as a powerful tool to combat malaria," said Jacobs-Lorena.

Malaria kills more than 800,000 people worldwide each year. Many are children.

More information: "Fighting malaria with engineered symbiotic bacteria from vector mosquitoes" *PNAS*, 2012.

Provided by Johns Hopkins University Bloomberg School of Public Health

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