

Researchers find essential proteins for critical stage of malaria

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Researchers at the Johns Hopkins Malaria Research Institute (JHMRI) have identified the molecular components that enable the malaria-causing parasite *Plasmodium* to infect the salivary glands of the *Anopheles* mosquito—a critical stage for spreading malaria to humans. According to the researchers, saglin, a mosquito salivary protein, is a receptor for the *Plasmodium* protein Thrombospondin-Related Anonymous Protein (TRAP). The two proteins bind together to allow invasion of the salivary gland by *Plasmodium* sporozoites, which can be transmitted to a human when bitten by an infected mosquito. The findings are published January 16 in the open-access journal *PLoS Pathogens*.

Malaria is estimated to infect 300 to 500 million people worldwide resulting in over 1 million deaths each year. JHMRI was established in 2001 at the Bloomberg School of Public Health to mount a broad program of basic-science research to treat and control the deadly disease.

Through a series of experiments, Marcelo Jacobs-Lorena, PhD, and his colleagues found that saglin bound with the artificial peptide SM1. The team then developed an antibody to find a protein similar to SM1 that existed naturally in the parasite, which they identified as TRAP. To further prove the interaction between saglin and TRAP, the team conducted experiments to down-regulate, or switch off, saglin expression, which greatly diminished salivary gland invasion in the mosquito.

"This work is the culmination of a decade-long research project in which peptide libraries were used to understand the mechanisms that the parasite uses to develop in its obligatory mosquito host," explained Jacobs-Lorena. "We are learning more and more about how the malaria parasite develops inside the mosquito, which could lead to novel approaches for disrupting its lifecycle and preventing the spread of malaria."

Citation: Ghosh AK, Devenport M, Jethwaney D, Kalume DE, Pandey A, et al. (2009) Malaria Parasite Invasion of the Mosquito Salivary Gland Requires Interaction between the Plasmodium TRAP and the Anopheles Saglin Proteins. PLoS Pathog 5(1): e1000265.
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