

Discovery of new ways to kill malaria mosquitoes a race against resistance

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Malaria kills nearly 1 million people a year, most in sub-Saharan Africa. Five years ago it was five times as many, but the widespread use of insecticide-treated bed nets and other strategies has dramatically reduced the annual number of deaths. However, mosquitoes evolve resistance to insecticides -- which is why the Foundation for the National Institutes of Health (FNIH) has awarded almost \$6 million to four teams to find new solutions to limit transmission of malaria.

Virginia Tech is represented among the four teams funded by the "[New Insecticides](#) for [Malaria](#) Control" program. Paul Carlier, professor of chemistry in the College of Science and a member of the Vector-Borne Disease Research Group at Virginia Tech, will receive \$450,655 to work with Jeffrey Bloomquist, who will lead the effort to develop an entirely new strategy to kill the mosquito that transmits the malaria parasite.

Bloomquist, a member of the Emerging Pathogens Institute and the entomology and nematology departments at the University of Florida, has also enlisted Max Totrov, a protein modeler at Molsoft Corp. LLC, to assist in molecular design of the new insecticides. The total award, which is managed by the FNIH to the University of Florida, is \$1.4 million over three years.

"Our team seeks to develop a new class of insecticide that will work by blocking potassium ion channels – specifically those involved in nerve signal transmission," said Carlier. "If we can paralyze mosquitos, they will not be able to fly. If they cannot fly, they can't bite. If they can't

bite, the [malaria parasite](#) cannot be passed to humans."

No such insecticides exist. If the scientists succeed, the new compound would be safe and effective for use on [bed nets](#). "Nets work for malaria control because malaria [mosquitoes](#) only bite at night," said Carlier.

Bloomquist specializes in neuroscience and toxicology in animals and insects. Carlier specializes in organic and medicinal chemistry. This grant marks the fourth award for malaria research they have shared since 2005, including a National Institutes of Health-funded program that Carlier leads.

Since 2003, FNIH has worked with the Bill & Melinda Gates Foundation and other partners on the Grand Challenges in Global Health Initiative. In 2009, foundation received a five-year, \$24 million grant to extend certain aspects of research initiated under the original initiative. The "Vector-based Control of Transmission: Discovery Research" program will continue to support the development of novel strategies to deplete or incapacitate disease-transmitting mosquito populations. The [original announcement](#) about the four new grant awards is posted on the FNIH website.

Provided by Virginia Polytechnic Institute and State University

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