

## Dominican Research Advances Anti-Malarial Drugs



The researchers have generated drug-resistant mutations that visibly change the digestive organelle of *Plasmodium falciparum*, the blood parasite that causes malaria. The mutation causes grossly enlarged food vacuoles in the malaria parasite. These changes were found to alter susceptibility to specific anti-malarial drugs, said Roland Cooper, associate professor of [biology at Dominican](#).

The ability to actually see the impact of drug resistance to the parasite will help scientists understand how micro-organisms can evolve to become drug resistant. Findings provide tools for understanding mechanisms of action of different classes of anti-malarial drugs, as well the cell biology of the parasite.

“We are able to see visible changes in the parasite’s digestive organelle and can actually see the effects of the drug resistance mutations,” Cooper said. “Because these changes correlate with drug resistance, we can understand how the parasite deals with the physiology of becoming drug resistant.”

[CLICK HERE TO READ THE MARIN INDEPENDENT JOURNAL FRONT PAGE STORY ON DR. COOPER](#)

Malaria remains one of the world’s deadliest diseases. Each year, malaria causes up to 660 million clinical cases and claims around one million lives, mostly children under the age of five and pregnant women of sub-Saharan Africa. The situation is largely attributed to the spread of multi-drug resistant *Plasmodium falciparum*. With no vaccine available, there is a dire need for low cost, effective, safe, and sustainable malaria treatments.

Scientists involved with the multi-institution collaboration are focused on understanding how *P. falciparum* responds to a diverse range of anti-malarial drugs by examining the molecular mechanism of drug action and resistance in the parasite. Specifically, the researchers are investigating the structure/function relationship of a drug-resistant protein, known as PfCRT (*P. falciparum* chloroquine resistance transporter). This protein occurs on the malaria parasite food vacuole membrane, so mutations in the protein sometimes lead to directly observable effects on parasite physiology.

Cooper and the research collaborators recently presented the findings at the Annual Molecular Parasitology Meeting in Woods Hole, MA.

Meanwhile, Cooper and two of his Dominican students will present their malaria research in November at the American Society of Tropical Medicine and Hygiene meeting in Washington, DC.

Cooper and graduate student Stephanie Huezo and senior biology major Melissa Forbush will present two posters focused on Cooper's ongoing research examining the effectiveness of two experimental malaria drugs in preclinical investigation. These studies are part of a long-standing collaboration with researchers at Portland State University and DesignMedix Inc., of Portland OR.

Huezo is the lead author on the poster titled "Selection of *Plasmodium falciparum* Resistance to Antimalarial Acridones." Forbush is lead author on the poster titled "Selection of Cytotoxic Resistance to a Reversed-Chloroquine Compound in *Plasmodium falciparum*."

Cooper and Huezo have spent the [summers working on a clinical trial in Uganda](#) focused on studying the effectiveness of the two drugs against parasites by examining blood extracted from patients at Tororo District Hospital in eastern Uganda. Findings show that the experimental anti-malarial drugs, which due to the proprietary nature of the clinical trial cannot be named at this point, to be highly effective.

Cooper joined Dominican's faculty in 2011. His NIH-funded research is focused on the molecular mechanism of drug action and resistance in the human malaria parasite, *Plasmodium falciparum*. His projects are based both in the laboratory and Uganda. Dr. Cooper teaches Advanced Genetics, Medical Parasitology and Research Methodology.

To read more about Roland Cooper's work at Dominican, please visit <http://www.dominican.edu>

<http://www.dominican.edu/dominicannews/dominican-biologist-receives-grant-to-help-fight-malaria>

<http://www.dominican.edu/dominicannews/dominican-biologist-receives-grant-to-fight-malaria>

Media contact: Sarah Gardner, [sarah.gardner@dominican.edu](mailto:sarah.gardner@dominican.edu), 415-485-3239.

*October 17, 2014*