Newsroom

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Georgia Southern University

Georgia Southern University Professor Dr. Tom Kollars Invents Device to Reduce Deaths from Mosquito-Borne Illnesses

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More than 500 million people worldwide are infected with malaria each year, killing one to three million people, many of them children. Georgia Southern University professor Tom Kollars hopes his invention, the ProVector Bt, will drastically reduce those numbers.

'If we can make a dent in that, I can go out of this world knowing I made it a better place," said Kollars, the director of the Biodefense and Infectious Disease Laboratory in Georgia Southern's Jiann-Ping Hsu College of Public Health.

The ProVector targets mosquitoes that carry deadly diseases such as malaria, dengue fever and West Nile virus. In blind trials conducted by a Walter Reed Army Institute of Research overseas laboratory, the ProVector killed 50 to 100 percent of mosquitoes within days.

The small device is essentially an artificial flower, made out of the same type of plastic used for football helmets. Mosquitoes are drawn to the ProVector by a four-color decal (different mosquito species are attracted to different colors).

The insect feeds on an artificial nectar through a metal screen with openings big enough for only a mosquito's mouth parts to fit through. Kollars' work in developing the ProVector Bt formula is unique in that it is the first time anyone has been able to get mature mosquitoes to ingest and die from Bacillus thurengiensis (Bt), a safe biopesticide.

The ProVector comes in two models: the ProVector Bt, which kills the mosquito within a few days of eating the bait, and the ProVector M, which kills the malaria parasite inside the mosquito, leaving the mosquito to survive and serve its role in the environment without infecting humans.

'We trick the mosquitoes into coming right to it and eating it," Kollars said. 'This is a very environmentally-friendly apparatus that uses a safe biopesticide, so it can be safely used in the home. No pesticides are sprayed into the environment."

The homes where Kollars envisions ProVectors are in tropical and subtropical regions. People in those areas live in forests and fields, in huts without basic things that many of us in the United

States take for granted, like air conditioning and windows with screens. Bed nets have been a tremendous tool in reducing mosquito-borne illnesses, but have proven to be only seven percent effective in children under six months old. The bed nets also develop holes over time and mosquitoes have become resistant to the pesticides used on the nets, Kollars said.

'Hundreds to thousands of mosquitoes can go into a home in one night," he said. 'Think of living in the Everglades with nothing covering your windows."

Kollars says he spent about 10 years perfecting the ProVector working out of his garage and spending 'over a hundred-thousand dollars" of his own money to develop it and now that is all paying off. Kollars patented the idea and then licensed the patent to Medical Infusion Technologies, Inc., which plans to begin manufacturing and marketing the ProVector this year.

What makes the ProVector such a viable tool, Kollars says, is its cost-effectiveness. The devices will sell for about $10 apiece. About every three months, it will need a $1 bait refill.

'The average Kenyan, for example, spends about $110 a year out of their $360 a year salary to treat their family for malaria alone. That's one disease," Kollars said. 'A health department could buy this device for the family, and then the family could protect itself for $4 a year instead of $110 a year."

Kollars recently returned from Puerto Rico, where he tested the ProVector in a real jungle environment. He and Dr. Steven Hatfill, an infectious disease physician, set up a simulated village of 14 tents, each with a ProVector inside. They spent three weeks in the jungle, and will return in seven months to see how well the devices fare in extreme tropical conditions to reduce the mosquito population.

ProVector Bt is currently being used to reduce mosquito populations around homes in Afghanistan. Next month, Kollars will visit and provide the ProVector Bt to a school in Thailand to help reduce the number of children contracting dengue, which kills up to 40 percent of children contracting the disease. In May, Kollars will travel to Kenya to conduct field research with the U.S. Army, and he will also travel to Uganda to begin epidemiology research with the Ministry of Health with the goal of reducing the number of malaria cases.

Kollars and two assistants continue to conduct ProVector laboratory and field experiments at Georgia Southern University. They recently presented their research in Vienna, Austria, and Heidi Hulsey, Kollars' doctoral student in the Jiann-Ping Hsu College of Public Health, will present at the American Mosquito Control Association in New Orleans.

'We're potentially going to save hundreds of thousands of lives," Kollars said. 'What more could a person want in the public health profession, than to make such an impact?"

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