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Chemical Strategy

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Finding Better Chemical Controls Against Insects

Insects transmit a variety of disease-causing pathogens. Grand Challenges projects are seeking safer, more effective, and more affordable chemical methods to reduce or incapacitate populations of insects that transmit disease.

Grand Challenge #8:

[Develop a Chemical Strategy to Control Insects](#)

Disruption of Malaria Transmission by Chemical Manipulation of Anopheline Olfactory Responses

Lead investigator: Laurence J. Zwiebel, Vanderbilt University, U.S.

Grant amount: \$8.5 million

Molecular Approaches to Alter Olfactory-Driven Behaviors of Insect Disease Vectors

Lead investigator: Richard Axel, Howard Hughes Medical Center at Columbia University, U.S.

Grant amount: \$5 million

The mosquitoes that transmit the malaria parasites to humans use their sense of smell to guide them to their human targets. These two projects will complement each other to build on state-of-the-art knowledge of insects' sense of smell in order to develop safe, effective, and low-cost mosquito repellants that will reduce malaria transmission in endemic areas. Molecular technology will be used to identify compounds that interfere with the host-seeking behavior of malaria-transmitting mosquitoes by stimulating or blocking the responses of specific odor receptors.

Molecular Design of Selective Anticholinesterases for Mosquito Control

Lead investigator: Jeffrey R. Bloomquist, Virginia Polytechnic Institute and State University, U.S.

Grant amount: \$2.7 million

Insecticide-treated bed nets have been proven to have a community-wide effect on malaria control by reducing the number of infected mosquitoes. However, nets must be periodically re-treated to maintain their effect, and most insecticides are too toxic for untrained people to use safely. This project will use a novel chemical synthesis method called "click chemistry" to produce an insecticide that is inactive and nontoxic until its components reach the mosquito central nervous system. This approach could develop a safe, lasting, and highly potent insecticide that is targeted specifically to the mosquito species that transmits malaria, and is nontoxic to humans and other animals.

The Grand Challenges in Global Health initiative has offered grants to 43 innovative research projects involving scientists in 33 countries.

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