

Method to Control the Spread of Mosquitos Carrying the Zika Virus by a Split Trans-Complementing Gene-Drive System for Suppressing Aedes aegypti Mosquitos

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BACKGROUND

The Aedes aegypti mosquito is known to transmit dengue fever, yellow fever, chikungunya virus, and Zika virus which have a worldwide impact on people’s health. Moreover, both Chikungunya and Zika virus were recently introduced into the western hemisphere and are poised to sweep throughout the areas in the range of mosquitos with the potential of infecting people who live in these broad areas. Attempts to eradicate these diseases by eliminating the Aedes aegypti mosquito by conventional use of spraying insecticides has met with limited success. So, in the absence of effective mosquito abatement, vaccines may provide the best strategy of preventing disease. Currently, there are vaccines for Yellow Fever and Dengue Fever (undergoing further testing); no vaccines exist for either Chikungunya or Zika virus at present. In the absence of such vaccines, UC San Diego researchers have developed a novel approach to control the spread of mosquitos.

TECHNOLOGY DESCRIPTION

Researchers from the laboratory of Ethan Bier at UC San Diego have developed an alternative technology for mosquito control by specifically targeting the mosquito Aedes aegypti. Genetically modified strains of Aedes aegypti will be introduced into the general mosquito population to suppress as well as eliminate the target populations. Specifically, Aedes aegypti will have a Cas9-mediated split gene-drive system for masculinizing the mosquito and ensuring that any female carries a sterile mutation. In addition, gRNAs direct Cas9 cleavage of insecticide-resistance loci, renders female mosquitos that escape the male converting gene drive, are sensitive to insecticides. This novel approach works by combining split gene drives and a female sterile fail-safe mechanism that acts as a secondary built-in population suppression strategy.

APPLICATIONS

The technology provides a mechanism for reducing or eliminating populations of Aedes aegypti mosquitos.

ADVANTAGES

Offers a lower cost than Sterile Insect Technology and may be more effective method for elimination of Aedes aegypti mosquitos

STATE OF DEVELOPMENT

Research stage

INTELLECTUAL PROPERTY INFO

A provisional patent application has been filed; and this technology is available for licensing

RELATED MATERIALS

CONTACT

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OTHER INFORMATION

KEYWORDS

Zika, Aedes aegypti mosquito,
mosquito abatement, insecticides,
genetically modified mosquito

CATEGORIZED AS

- **Agriculture & Animal Science**
 - Other
- **Biotechnology**
 - Health
- **Medical**
 - Disease: Infectious Diseases

RELATED CASES

2017-024-0

► [Gantz V., N. Jasinskiene, O. Tatarenkova, A. Fazekas, V.M. Macias, E. Bier*, and A.A. James*. \(2015\). Highly efficient Cas9-mediated gene drive for population modification of the malaria vector mosquito, Anopheles stephensi. Proc Natl Acad Sci U S A. 2015 Dec 8,112\(49\):E6736-43 - 12/08/2015](#)

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	2018035300	02/22/2018	2017-024

Additional Patent Pending

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