

Biological Control of *Aedes Egypti* and Dengue Virus with Bacteria *Wolbachia*Khalid Al-ghamdy<sup>1</sup> and Ishtiaq Qadri<sup>2\*</sup><sup>1</sup>Department of Biological Sciences, Faculty of Science, King Abdul-Aziz University, Jeddah, KSA<sup>2</sup>Head Virology, Department of Biological Sciences, Faculty of Medicine, King Abdul Aziz University, Jeddah, Saudi Arabia**\*Corresponding Author:** Ishtiaq Qadri, Head Virology, Department of Biological Sciences, Faculty of Medicine, King Abdul Aziz University, Jeddah, Saudi Arabia.**DOI:** 10.31080/ASMI.2020.03.0480**Received:** December 12, 2019**Published:** January 06, 2020© All rights are reserved by **Khalid Al-ghamdy and Ishtiaq Qadri.**

Dengue virus is a mosquito borne flavivirus and causes 50 million infections each year. The spread of the virus through the female mosquito *Aedes aegypti* or *Aedes albopictus* is very fast and containment strategies are constantly explored to stop the infection into humans. Due to topographical dissemination of these mosquito vectors, over 2 billion individuals are at risk of contracting the infection and dengue hemorrhagic fever (DHF). The disease is now epidemic in over 100 countries and 4 different serotypes have been reported from insects and humans. So far, the containment and vaccine strategies are not effective to control the mosquito and spread of the virus. Several countries have attempted to develop vaccines but are largely in clinical trial phases and results indicate that such vaccines are not strongly immunogenic against all Dengue serotypes. A live attenuated tetravalent chimeric vaccine, Dengvaxia, is commercially available in limited high-risk areas of Thailand and Brazil. The plasmid for the vaccine was constructed by replacing the yellow fever attenuated 17D strain with that of the pre-membrane (PreM and Envelope (E) region of four dengue serotypes. Unpublished reports indicate that from phase 3 clinical trials with 31,000 children of 2 - 14 years, the efficacy with Dengvaxia was 50 to 60%. An inactivated tetravalent vaccine (TDENV PIV) is jointly developed by GSK and the Walter Reed Army Institute, which is based on a synergistic (boost) concept. In this scheme, the immunogenicity of the primary vaccine is enhanced with another serotype. Pharmaceutical giant Merck is in the process of developing a subunit vaccine based on fruit fly *D. melanogaster* Schneider cells. All these efforts are in the initial stages of development. Therefore, multiple approaches are obligatory for mosquito eradication, such as biological control, insecticide, and new antiviral strategies to inhibit virus translation and replication.

Several strains of *Wolbachia* are implicated in worldwide efforts for mosquito control. Evolutionarily speaking, *Wolbachia* is

a promoter of genetic selection to give infected females an incidence-reliant propagative gain and may also protect them from any harmful effect of viruses. Some mites/filarial nematodes also harbor *Wolbachia* and use the bacterium to their advantage. Two strains, wAllB and wMelPop, are capable of removing or eliminating the dengue transmission. *Wolbachia* also inhibits replication of Chikungunya virus in some studies. Using some elegant approaches, *Wolbachia pipiensis* wMel strain was shown to significantly diminish the infection and dissemination occurrence of Chikungunya virus and Yellow Fever Virus. In *Anopheles stephensi*, the mosquito resistance to malaria is also initiated by wAllB strain of *Wolbachia*. Furthermore, Zika virus was controlled utilizing the bio-control mechanism of *Wolbachia*. In several countries, mosquitoes were purposefully bred with *Wolbachia* bacterium inside the body and then released in a small-scale field study. After the successful outcome, the Government of Brazil has approved the use of *Wolbachia*-infected mosquitoes to combat Zika and dengue viruses. Such studies are pivotal for the ultimate assault for control of mosquitoes' population and flavivirus transmission.

**Assets from publication with us**

- Prompt Acknowledgement after receiving the article
- Thorough Double-blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- High visibility of your Published work

**Website:** <https://www.actascientific.com/>**Submit Article:** <https://www.actascientific.com/submit.php>**Email us:** [editor@actascientific.com](mailto:editor@actascientific.com)**Contact us:** +91 9182824667