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Short Communication

Biological Control of *Aedes Egypti* and Dengue Virus with Bacteria Wolbachia

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Dengue virus is a mosquito borne flavivirus and cusses 50 million infection each year. The spread of the virus through the female mosquito *Aedes egypti* or *Aedes albopictus* is very fast and containment strategies are constantly explored to stop the infection into human. Due to topographical dissemination of these mosquito vectors, over 2 billion individuals are at risk of contracting the infection and dengue hemorrhage fever (DHF). The disease in now epidemic to over 100 countries and 4 different serotypes have been reported from the insects and human. So far the containment and vaccine strategies are not effective to control the mosquito and spread of virus. Several countries have attempted to develop vaccines but are largely in clinical phases trials and result indict that such vaccines are not strong 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 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yellow fever attenuated 17D strain with that of the pre-membrane (PreM and Envelope (E) region of four dengue serotypes Unpublished reports indicate from phase 3 clinical trials with 31,000 children of 2 - 14 years, that efficacy with Dengvaxia was 50 to 60%. An inactivated tetravalent vaccine (TDEN 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 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 antivirals strategies to inhibit virus translation and replication.

Several strains of *Wolbachia* are implicated in the worldwide efforts for mosquito control. Evolutionary 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 in their advantage. Two strains wAllbB and wMelPop are capable of removing or eliminating the dengue transmission *Wolbachia* also inhibit replication of chikungunya virus in some studies. Using some elegant approaches, *Wolbachia pipientis* Wmel strain was shown to significantly diminish the infection and dissemination occurrence of Chikungunya virus and Yellow Fever Viruses. In *Anopheles stephensi*, the mosquito resistance to malaria is also initiated by wAlbB strain of Wolbachia. Furthermore, Zika virus was controlled utilizing the bio control mechanism of Wolbachia. In several countries, mosquitoes were purposefully breed 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 mosquitos' population and flavivirus transmission.