

**Part 1: Article Description**

Scientists have discovered that dengue-suppressing *Wolbachia* strains experimentally introduced into *Aedes aegypti* mosquito populations in Cairnes, Australia have the potential to self-spread. The scientists transferred the *Wolbachia* strain, wMel, from *Drosophila melanogaster* to laboratory raised *Ae. aegypti* mosquitos. The *Wolbachia* infected mosquitos were then released to mate with wild, uninfected mosquitos at three, non-isolated locations within the city of Cairnes in early 2013. The *Wolbachia* infected mosquitos were released over two large areas covering 0.97 km<sup>2</sup> and 0.52 km<sup>2</sup>, and one smaller area covering 0.11 km<sup>2</sup>. The frequency of wMel infections were tracked through *Ae. aegypti* and the geographical spread of infection was also documented. The scientists discovered that wMel can be stably established in an urban population if the introduction location is sufficiently large. The frequency of wMel infection in the two large areas where infected mosquitos were initially released had doubled in two years, while the smallest area did not have a stable establishment of wMel due to the small area of the release zone. The successful infection of dengue-suppressing *Wolbachia* in mosquitos could eliminate dengue fever from the world, and the technology could be used to eradicate other mosquito-borne diseases like Zika.

**Part 2: Connect to class**

*Wolbachia spp.* were introduced during lecture as a type of non-pathogenic bacterial group that live inside invertebrates. The *Wolbachia* species can make sex pheromones and increase resistance of invertebrates to insecticides or viruses. Infections of the bacteria can change males into females, induce male killing, cause parthenogenesis, and cause cytoplasm incompatibility. The phenomenon of cytoplasm incompatibility was used during this experiment

to cause embryos of infected male mosquitos and uninfected female mosquitos failure to hatch. The infection of *Wolbachia* into *A. aegypti* mosquitos is also an example of vector control to eliminate or reduce dengue. The scientists used *Wolbachia* infected mosquitos as a method to control spread of disease. The infected male mosquitos that mate with uninfected female mosquitos produce inviable embyros and the infected female mosquitos that mate with uninfected male mosquitos produce progeny with wMel infections.

good

### Part 3: Evaluation

The article was published in a peer-reviewed journal. Each author was credited with the specific work they did on the experiment and the university affiliation for each author was disclosed. One author, Michael Turelli, provided an email address as contact information. All the authors of this article have declared no competing interests exist, however some of the authors probably have a vested interest in the experiment. The staff of the Eliminate Dengue Program did field and laboratory work for the experiment. The Eliminate Dengue Program is a not-for-profit initiative led by one of the experimenters, Scott O'Neill. Therefore, there may not be competing interest but the experiment might be pushing Scott O'Neill's own agenda. The funding information for the experiment was also disclosed. However, the funders of the experiment had no role in the design of the study, the data collected, analysis of data, decision to publish, or preparation of the manuscript. This indicates the experimenters were able to conduct their own study without bias from the funders.

### Citation

Schmidt TL, Barton NH, Rašić G, Turley AP, Montgomery BL, et al. (2017) Local introduction and heterogeneous spatial spread of dengue-suppressing *Wolbachia* through an urban population of *Aedes aegypti*. PLOS Biology 15(5): e2001894. <https://doi.org/10.1371/journal.pbio.2001894>

Excellent work-

Can I keep this as an example?

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6  
6  
5  
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+25/25