Genetic modification

Bioengineering 100

Fall 2016

GM mosquitos should be released to reduce the population of wild mosquitos that may carry Zika

http://wlrn.org/post/south-florida-likely-see-small-scale-zika-outbreaks; Jentavery/flickr

GM mosquitos for Dengue, Zika

http://www.pbs.org/video/2365491027/

SELF-LIMITING GENE
HOW IT WORKS

OXITEC

Introduction

The self-limiting gene is an environmentally friendly way to control insect pests like dengue mosquitoes. It works by preventing them from developing without using toxins or pesticides. It is species-specific so the genes do not spread, and the released insects and their genes do not stay in the environment.

Mosquito

Mosquito cell nucleus

Chromosome in cell nucleus

DNA in chromosome

Normal gene expression (transcription)

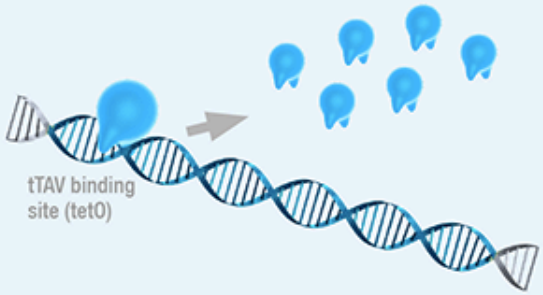
Components

http://www.oxitec.com/our-solution/technology/the-science/

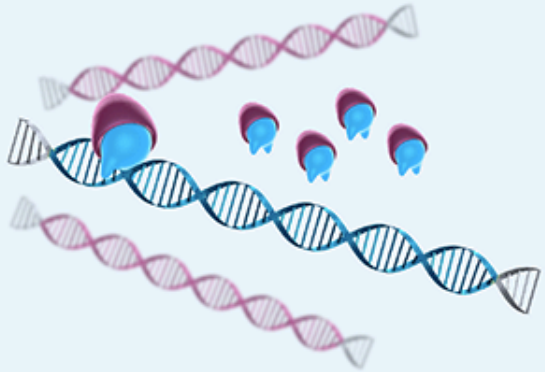
Mosquito Releases

Self-limiting gene at work controlling dengue mosquitoes

tTAV binds to special site (tetO operator) so more and more tTAV is produced



tTAV ties up transcriptional machinery so essential genes are not expressed



Without essential gene expression mosquitoes cannot develop

Mosquito Production

Self-limiting gene inactivated by antidote to produce Oxitec mosquitoes

During the Oxitec mosquito production process, the antidote 'switches off' the self-limiting gene by preventing tTAV from binding to the tetO operator

With the self-limiting gene inactivated, normal gene expression takes place

Transcriptional machinery works to express essential genes for essential

FDA Releases Final Environmental Assessment for Genetically Engineered Mosquito

Update

August 5, 2016

The FDA has completed the environmental review for a proposed field trial to determine whether the release of Oxitec Ltd.'s genetically engineered (GE) mosquitoes (OX513A) will suppress the local *Aedes aegypti* mosquito population in the release area at Key Haven, Florida. After considering thousands of public comments, the FDA has published a final environmental assessment (EA) and finding of no significant impact (FONSI) that agrees with the EA's conclusion that the proposed field trial will not have significant impacts on the environment.

FDA's finalization of the EA and FONSI does not mean that Oxitec's GE mosquitos are approved for commercial use. Oxitec is responsible for ensuring all other local, state, and federal requirements are met before conducting the proposed field trial, and, together with its local partner, the Florida Keys Mosquito Control District, to determine whether and when to begin the proposed field trial in Key Haven, Florida.

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https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwjNyon-0_bPAhXlqVQKHbCUCS0QjRwIBw&url=http%3A%2F%2Fwlrn.org%2Fpost%2Fsouth-florida-likely-see-small-scale-zika-outbreaks&psig=AFQjCNF4XI4vWXMkOe0xsquf3iSObvelVg&ust=1477508904611966