DBEM Lab Talk

Monday 6th March 2017
11:00 - 12:00
PRC second floor - Room 6203

Speaker

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Title

Reduction of mosquito populations by gene drive systems

Abstract

Invasion of alien species is posing a serious threat to human health and to ecosystems in several parts of the World. This adds to the burden of arthropods transmitted diseases, which cause more than 1 million deaths every year. According to the World Health Organization, more than 2.5 billion people in over 100 countries are at risk of contracting dengue alone and those figures are expected to rise as a consequence of climate change and globalization. Malaria is the most deadly vector-borne disease, killing more than 430.000 people a year (WHO, 2015).

The most successful control strategy of a vector-borne disease is the control of the vector that transmits it. Conventional methods include use of insecticides, bed nets, removal of breeding sites and sterile insect techniques, but in several cases those are not sufficient to eradicate a disease on a large scale. Therefore novel controls strategies are needed.

We are developing gene drive systems based on super-Mendelian inheritance of a transgene with the aim to reduce the size of insect populations of medical or agricultural importance in a meaningful timeframe. Such genetic modifications can for instance compromise the reproductive capacity of a vector population in order to reduce the population size to levels that do not support transmission of disease, and potentially to eradication. A gene drive may be able to spread despite negative fitness effects, and can therefore introduce pathogen resistance or a population suppressor, which would otherwise be rapidly removed. We are developing the technology in the malaria mosquito *Anopheles gambiae*, but the genetic principles and components are highly transferable to several insect pest (at least to those with a genome sequence available). Gene drive-based vector control can provide an effective, long-term, sustainable solution to the invasion and control of pest species and disease vectors.

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