



Vector-borne Disease Consortium



Dr. Rebeca Carballar addresses the UCI MI Teams
UCI MI Meeting 01/24/2018

UC San Diego through the Tata Institute for Genetics and Society (TIGS) has joined with the University of California, Irvine Malaria Initiative (UCIMI) to create the Vector-borne Disease Consortium to promote discovery and development of novel science with the goal of eradicating mosquito-transmitted diseases in India and Africa. Consortium research is highly collaborative and allows for the sharing of materials, know-how, and brings together experts from molecular biology, entomology, public health, community engagement and regulatory control. Future field trials will adhere to guidelines developed by the World Health Organization, National Academies of Sciences and other regulatory agencies in which a phased approach is used to test both safety and efficacy of mosquito strains as the Consortium's work progresses.

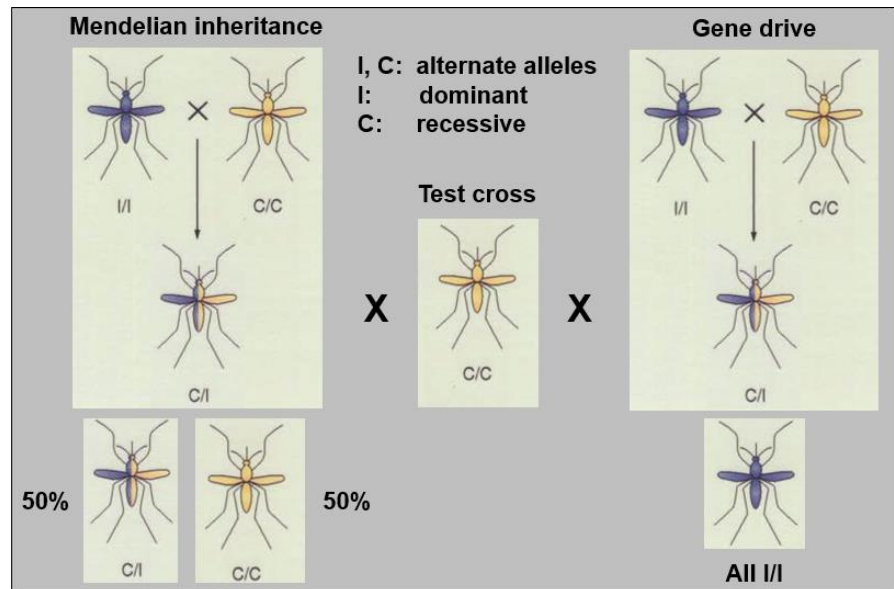
Combating Vector-borne Disease

Pioneering experiments conducted at UC Irvine and UC San Diego have demonstrated that the malaria vector mosquito *Anopheles stephensi* can be genetically engineered using Active Genetics to express genes targeted against the malarial parasite *Plasmodium falciparum*, and that this new trait is inherited by nearly all of the mosquitoes' progeny. UCIMI researchers and collaborators are expanding on this work with a goal of developing mosquito strains that may ultimately be used to substantially reduce malaria transmission, using a vector modification rather than a vector-elimination strategy. In addition to combating malaria, a disease that causes an estimated 450,000 worldwide deaths per year, this approach also may be leveraged against other mosquito-borne-disease agents, including Dengue, Chikungunya and Zika viruses.

Active Genetics

Active Genetics refers to the non-Mendelian transmission of heritable traits by means of self-propagating genetic elements. It was conceived and developed at UC San Diego in pioneering work on the fruit fly, *Drosophila melanogaster* (Gantz and Bier, 2015). Active Genetics is an exciting new technology that has immense potential in transforming health and agriculture. Its most powerful application to date

has been its adaptation in collaboration with the James laboratory (UC Irvine) as a gene drive system to create mosquitoes that can be used to control malaria transmission (Gantz et al., 2015). Active Genetics also can be used to bypass prohibitive constraints imposed by standard genetic methods to permit aggregation of multiple naturally occurring genetic variations in crop strains, allowing them to grow in new suboptimal environments. Active genetics can be used to combine multiple replacements of the mouse genome with human equivalents to create better models for studying and treating disease and may have important applications in cell-therapies targeting cancer and in combating antibiotic resistance in bacteria.



Tata Institute for Genetics and Society (TIGS)

TIGS is a partnership between the University of California San Diego, the India-based philanthropic Tata Trusts and the Institute for Stem Cell Biology and Regenerative Medicine (InStem) in Bangalore, Karnataka, India (<http://tigs.ucsd.edu/>). TIGS has both science-based and societal activities dedicated to the use of Active Genetics for beneficial purposes in a socially conscious, safe and ethical manner.