

TDR Molecular Entomology research: objectives and achievements

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TDR Molecular Entomology Committee (BCV) was created in 1994 following the Tucson, Arizona, (USA), 1991 meeting about "Prospect for malaria control by genetic manipulation of vector populations". Its main objective is to support disease vectors research aiming at interrupting malaria, dengue and Human African Trypanosomiasis (HAT) pathogens transmission through the exploitation of advances in molecular biology and genomics. At present, the Committee will support relevant proposals with the specific objectives to:

- Understand the molecular basis of vectorial capacity. This will involve genetic and molecular biology studies of vector-parasite/virus interactions, and of midgut, haemolymph and salivary gland targets for disruption of pathogen transmission. Special attention should be given to the search for antiparasitic/antiviral molecules and processes
- Further develop genetic and molecular tools for engineering insect vectors resistant to pathogen transmission
- Understand vector population biology, genetics and dynamics in order to be able to apply these new methods effectively in the field (gene flow, mating barriers between wild populations, and adaptive mechanisms to environmental conditions)
- Evaluate (in the field and laboratory, and by computer modeling) factors affecting the competitive fitness and vectorial capacity of *Anopheles*, *Aedes* and *Glossina* (mating, host-seeking behavior, oviposition, gene driver systems, and genomic stability)
- Facilitate insect vector genome sequencing, mapping, and post genomic analysis
- Identify novel insecticide resistance mechanisms and develop tools for monitoring them in field populations.
- Assess the requirements to be considered before deploying transgenic vectors. This will include biosafety studies; risk/benefit evaluation; development of guidelines and principles; site preparation; baseline data collection on vector biology, ecology and genetics; and issues about ethical, legal and social implications (ELSI), so as to develop an evidence base for policy and minimize the risk to humans and the environment from use of biotechnologies for disease vector control
- Build capacity in disease endemic countries (DECs) through training and participation in molecular biology, genomics, and post genomics (e.g. bioinformatics, gene discovery, functional analysis) activities on disease vectors as well as biosafety assessment. Provide support to disease endemic country investigators for the use of insect vector genome data.

The activities of this committee contributed to the development of refractory transgenic *Anopheles* mosquitoes unable to sustain *Plasmodium* development. They facilitated the sequencing of the *Anopheles gambiae* genome through efforts in the coordination of the Consortium and funding of catalytic preparatory activities (EST and BAC libraries, database...). The Committee is also funding two training centres in functional genomics for disease vectors in Asia and Africa. It facilitated recently the creation of the International *Glossina* Genomics Initiative (IGGI), which is preparing the ground for the sequencing of the HAT vectors.

For more information, about how to apply for research grants to the BCV Committee, please visit TDR web site at: <http://www.who.int/tdr/grants/forms.htm> or contact tourey@who.int. Proposals for 2006 should be submitted before 17 February 2006.