TRANSANO- ANR-07-MIME-025-01

BIOLOGIE & SANTÉ 2011

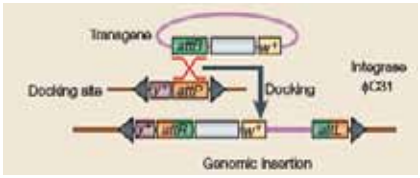
Development of site-specific Phi-C31 transgenesis in *Anopheles gambiae* for functional analysis of *Plasmodium falciparum - Anopheles* interactions

Emilie Pondeville[1], **Nicolas Puchot**[2], **Angélique Bisson**[2], **Jean-Claude Jacques**[2], **Catherine Bourgouin**[1, 2]GGIV[1], CEPIA[2], Institut Pasteur, 28, rue du Docteur Roux, 75015 Paris

General objectives

Human malaria is exclusively transmitted by *Anopheles* mosquitoes. This disease is still an important health problem in tropical countries. In recent years, mosquito molecular biology has been a scene of astounding achievements, more particularly with the acquirement of genome sequence of *Anopheles gambiae,* the main african vector of malaria. However, the lack of an efficient transformation system in this mosquito species remains a serious obstacle in our ability to study essential mosquito-specific mechanisms. Our goal is to develop an efficient transformation system and genetic tools in the malaria mosquito based on the Phi-C31 bacteriophage integrase and to apply this system for functional analysis of sets of genes that are involved in the receptivity of *An.gambiae* to the human malaria parasite *P. falciparum*

ΦC31 mediated transgenesis



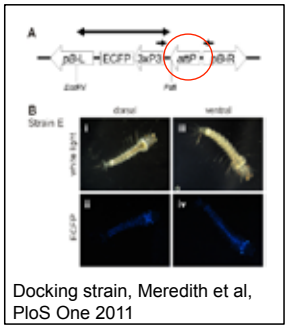
From Venken and Bellen (2005) *Nat Rev*

Specific objectives

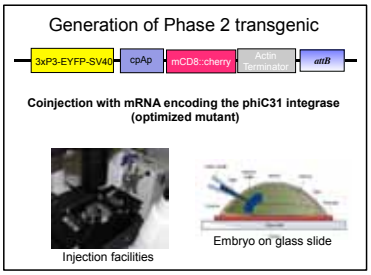
The project is aimed at constructing both a universal recipient “docking” line for ΦC31 integrase-mediated transgenesis and an optimal set of lines based on the UAS-Gal 4 system that upon specific crosses will permit to produce the desire transgenic lines to investigate the effect of tissue- or temporal- expression of genes/ constructs of interest. We will apply this system for functional analysis of genes involved in the receptivity of *A. gambiae* to the human malaria parasite *P.falciparum*, and more particularly *Anopheles* midgut carboxypeptidases and the genes present in the *Plasmodium* Resistant Island.

Results and perspectives

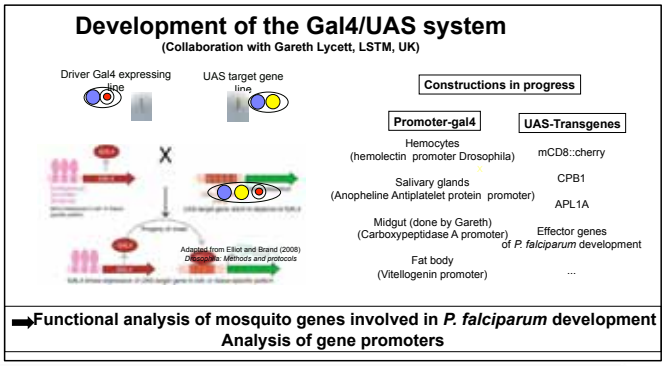
Using a AttP docking strain created by our collaborators, we established the overall procedures for creating Phase 2 transgenic lines. The first set of lines will express a fluororescent protein in the membrane of mosquito midgut cells for further *in vivo* imaging of *Plasmodium*-midgut cell interactions



Docking strain, Meredith et al, PloS One 2011



=> Two potential transgenic lines under analysis



CONTACT :

C. Bourgouin- Génétique et Génomique des Insectes Vecteurs- Institut Pasteur- cabourg@pasteur.fr