Journal of Parasitology and Vector Biology Vol. 2(2) pp. 014-021, March 2010
Available online at http://www.academicjournals.org/JPVB
Academic Journals

Full Length Research Paper

Lactobacillus infection related to midgut protein synthesis in the dengue vector *Aedes albopictus*: Platform of non-symbiont bacteria for the control of *Aedes* vectors

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Accepted 01 February, 2010

There have been a number of recent studies regarding the use of engineered insect symbiont bacteria for control of insect-borne diseases. However, searches for cultivable bacteria residing in the mosquito midgut have met with little success. The present study was conducted to evaluate the effects of the human non-pathogenic *lactobacilli* on midgut protein synthesis in the dengue vector *Aedes albopictus*, taking into account the ease of infection and its persistence. It was showed that antibiotic treatment of mosquitoes did not prevent experimental infection, and readily reduced undesired infection, but did not prevent re-infection by *Lactobacillus* spp. It suggests a high potential of colonization of a target vector population under field conditions. Ingested lactobacilli remained in the female midgut for five days. *Lactobacillus reuteri* (Lactobacillales: Lactobacillaceae) showed more specific proteins than *Lactobacillus brevis* (Lactobacillales: Lactobacillaceae). Some proteins identified in *L. brevis* were present at much higher levels in *L. reuteri*, while other proteins found in the latter were found at higher levels in the former. Infection by *L. brevis* resulted in the absence of many proteins. In contrast, *L. reuteri* infection resulted in increased levels of synthesis of a set of proteins present in the healthy midguts. Both bacteria triggered changes in midgut protein synthesis, but activation was seen to a greater extent with *L. reuteri*. These results are discussed in the context of paratransgenesis.

Key words: Bacteria, *Lactobacillus reuteri*, *Lactobacillus brevis*, *Aedes albopictus*, midgut, ease of infection, persistence, protein synthesis.

INTRODUCTION

Vaccine development and insecticides used to be the main strategies for controlling mosquito-borne diseases, but the genetic variability of the pathogens and insecticide resistance have increasingly limited the success of such measures (Caetano and Yoneyama, 2001; Dieng et al., 2007). Another promising method, which consists of replacing wild populations with vector-incompetent transgenic mosquitoes, has been suggested. While the ability to generate refractory vectors is available (Jasinskiene et al., 1998; Catteruccia et al., 2000), a mechanism for replacing a wild vector population with a vector-incompetent refractory population remains elusive (Riehle and Jacobs-Lorena 2005). In addition, there are still no suitable gene carriers available for the transformation of some important vectors.

These include *Aedes albopictus*, a species originating in Southeast Asia, found on all continents and reported in

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