Gut microbiota and some physiological aspects of *Aedes aegypti* digestion.

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Associations between insects and microorganisms are ubiquitous. Gut symbionts are microorganisms which persist for extended periods of time in the intestinal tract and are often reliably transmitted to successive host generations. Insects that have limited diets throughout their entire developmental cycle rely on microbial symbionts that supply additional nutrients not found in their diet. Female mosquitoes, well known for their blood feeding habit, actually feed on sugar more often than on blood. Both male and female mosquitoes feed on natural sugar sources from plants. Actually, blood or sugar feeding are nutritionally deficient diets when taken alone. In this work we identified different species of bacteria from *Aedes aegypti* midguts (blood reservoir) and ventral diverticulum (sugar reservoir) of wild and laboratory-reared mosquitoes using culture-dependent and culture-independent approaches. The main bacteria found were *Serratia marcescens*, *Serratia* sp, *Bacillus sp* and *Asaia.* The number of resident bacteria in mosquito midguts and ventral diverticulum grew strongly after blood feeding. The pH of the diverticulum content decreased 24h after ingestion of sucrose solution due to bacterial fermentation. It was possible to observe, through transmission microscopy, that bacteria interacted with the peritrophic matrix in the peripheral region of the food bolus. The midgut lumen was entirely taken by bacteria 48h after blood meal ingestion and all erythrocytes had already been lysed at this stage. Our data indicate that the gut resident bacteria are important for *Ae. aegypti* digestion. Our results bring new insights that will help to elucidate the role of the gut bacteria in mosquito development and also elucidate their impact on the fitness (growth, survival and fecundity) of the mosquito.

Key words: gut microbiota, *Aedes aegypti*, blood and sugar digestion.
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