Insights on the homeostasis regulation in the midgut of *A. aegypti* in response to diet and stress

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**INTRODUCTION:** *Aedes aegypti* females are anautogenous, as they require blood for the completion of their reproductive cycles, and are responsible for the transmission of arboviruses such as Dengue (Flavivirus) and Chikungunya (Alphavirus). As such, they have adapted to deal with two very different diets along their life cycle and the midgut homeostasis has a fine regulation according these. The objective of this work is to better understand how *A. aegypti* regulates cell division and differentiation in the midgut, depending on the diet and in response to stress. **METHODS:** Midguts from adult females (28°C, 70% humidity) fed on sugar or rabbit blood, were dissected at different time points to determine the regeneration rates and evaluate the expression of genes from the Notch and Hippo pathways. Artificial feeding with pro- and anti-oxidants and with *P. entomophila* or *S. marcesens* was made to perform the biotic and abiotic challenges. **RESULTS AND DISCUSSION:** After eclosion of the adult females, the regeneration reach a higher rate between days 4 to 7, when they become fit to feed on blood. Upon the blood fed, the midgut maintains a stable mitotic rate, even with the high increase of microbiota and potentially stressing molecules product of the blood digestion. Different pro-oxidant conditions and high concentrations of regular or pathogenic bacteria both induce an increase of mitosis as response to cell damage. **CONCLUSION:** *A. aegypti* females regulate tissue homeostasis in the midgut epithelium to achieve, tolerate and endure the digestion of blood necessary for their reproductive cycle. Challenges with strong pro-oxidants and infection with high concentrations of bacteria induce cell damage and increased regeneration of midgut epithelia.

Key words: Homeostasis, regulation, *A. aegypti*

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