

Transcriptional analysis of the Malpighian tubules of *Zophobas morio* larvae (Coleoptera: Tenebrionidae)

Silva, J. R.¹; Amaral, D. T.²; Prado, R. A.²; Viviani, V. R.^{1,2}

¹Graduate Program of Evolutive Genetics and Molecular Biology, Dep. of Biology, São Carlos, Federal University of São Carlos, Brazil; ²Graduate Program of Biotechnology and Environmental Monitoring, Dep. of Physics, Chemistry and Mathematics, Brazil Federal University of São Carlos, campus of Sorocaba, Brazil.

INTRODUCTION: The Malpighian tubules play a key role in insects osmoregulation. A transcriptional analysis of *Drosophila* tubules showed far more extensive roles than ion and water transport. The tubules also are involved in excretion of organic solutes and xenobiotics, and in unusual functions such as bioluminescence in Diptera. However, with the exception of a preliminar transcriptional survey of the *Zophobas morio* larval tubules, there are no detailed transcriptional analysis of this organ in Coleoptera. Previously we cloned a luciferase-like enzyme from the tubules of *Zophobas morio* which is a CoA-ligase that displays weak luminescence activity with firefly D-luciferin, a xenobiotic for this non-bioluminescent insect. Therefore, a detailed transcriptional analysis of tubules of *Zophobas* will bring a better general understanding about the physiological role of this organ in Coleoptera, and about the specific roles of CoA-ligases in this organ. **MATERIAL AND METHODS:** The cDNA library from tubules of *Z. morio* larvae was paired-end sequenced by the Illumina HiSeq 2500. The transcriptome reads were *de novo* assembled using Trinity. The assembled transcripts were subjected to similarity search against NCBI's non-redundant database using the BLASTp algorithm. **RESULTS AND DISCUSSION:** The *de novo* assembly showed 22,242 transcripts. Similar to *Drosophila* tubules the transcriptome of the *Zophobas* tubules also display organic and inorganic solutes transporters, V-ATPases, transcripts related to xenobiotic metabolism, several transcription factors, channels, pumps and others involved in tubules functions. Some transcripts are similar to the luciferase-like enzyme previously cloned from *Zophobas* tubules, indicating the importance of these enzymes in tubules physiology, and the existence of a possible link between CoA-ligases from tubules and the origin of bioluminescence in Diptera. **CONCLUSION:** The results confirm the physiological versatility of tubules in a vegetarian Coleopteran larvae, their involvement with osmoregulation, excretion and detoxification, and indicate the involvement of CoA-ligases in important roles for tubules physiology.

Key words: detoxification, excretion, luciferase like-enzymes

Financial Support: FAPESP (2013/09594-0 and 2012/25378-3) and CNPq (477616/2012-7)