Functional Characterization of a Fatty Acid Transport Protein (FATP) in the Insect T*ribolium castaneum* by qPCR

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Absorption of fatty acids by the insect midgut has been shown to be efficient, but the mechanism of uptake remains unknown. Fatty acid transport protein (FATP) is an evolutionarily conserved membrane-bound protein that facilitates the uptake of extracellular long chain fatty acids into the cell. In insects, FATP homologues are reportedly strongly expressed in the midgut of Bombyx mori, Eilema japonica and Drosophila melanogaster. The flour beetle, Tribolium castaneum, is generally found as a pest of grain stores and has been the subject of a wide range of behavioural and genetic studies. The objective of this study was to identify by qPCR FATP counterparts in the genome T. castaneum and its transcriptional profile in tissues and insect development stages. The sequences TcasFATP were identified in the genome of T. castaneum assembly using proteins sequences from other organisms are available on GenBank as queries in a Blastn. The expression profiles of TcasFATP in larvae were investigated by qPCR. The quantification of triacylglycerol was carried out over the insect development stages. Two sequences TcasFATP were identified in the genome of T. castaneum. Comparison of this sequence with FATPs of the arthropods and mouse showed high identity and similarity among them. The expression profiles of TcasFATP in larvae were investigated by qPCR and showed the transcript was strongly expressed in the midgut and fat body. The concentration of triacylglycerol (TAG) over the insect development stages were also evaluated and the observed profile shows higher levels of TAG in the larval stage and decreases when moving to adulthood. The results obtained in qPCR and TAG profile analysis in tissues show the importance of lipids and FATPs in insect development. Subsequent analysis by qPCR will be necessary and the role of the midgut FATPs in the uptake of dietary fatty acids will require further investigation.

Keywords: FATP, Lipids, Midgut, *Tribolium castaneum,* qPCR.

Supported by: CNPq, FAPEAL