Correlation between AKT/GSK/TOR targets with embryonic development in the cattle tick *Rhipicephalus microplus*

Camila Fernanda Waltero Orjuela, Rodrigo Nunes da Fonseca, Itabajara da Silva Vaz Junior, Carlos Logullo

Embryogenesis has been classically described as an energy-consuming process. *Rhipicephalus microplus* embryogenesis is a metabolically intensive process developed under tightly controlled conditions. The role of three metabolic targets has been identified: AKT (Protein kinase B), GSK3β (Glycogen Synthase Kinase 3 beta) and TOR (Target of Rapamycin). These targets are involved in cell viability, glycogen metabolism and tick development. Otherwise, recent findings have provided fundamental concepts about tick embryonic development and have established particular techniques for its study. However, correlations between metabolic signaling pathways (MSP) and signaling pathways in embryonic development (SPED) has not been detailed. This work aims to identify the possible correlations between MSP and SPED in the tick *R. microplus* during embryogenesis. Nucleotide sequences for targets of the SPED were searched in our *R. microplus* transcriptome database (RmINCT-EM). Functional characterization of TOR was performed by double-stranded (ds) RNA injections in partially engorged females. Thus far, 48 cDNA sequences were found in the *R. microplus* transcriptome for SPED targets, described as putative of Notch/Wnt/Toll/Beta-catenin signaling pathways. Seven sequences are similar to the Toll receptors, 18 with Notch, 5 with Beta-catenin and 18 with Wnt signaling pathway. However, their specific functions during tick embryogenesis still need to be studied. Our data shown that female ticks treated with RNA interference have significant differences in ovarian development, oviposition and egg hatching. Whether reduction in the expression of AKT/GSK/TOR targets leads to functional changes in the Notch/Wnt/Toll/Beta-catenin signaling pathways will be addressed through the observation of phenotypic and metabolic changes during *R. microplus* embryogenesis. Altogether, our studies might significantly influence the knowledge of embryo metabolism as well as its correlation with the morphological and regulatory events during embryonic development.

Keywords: AKT/GSK/TOR signaling pathway, embryonic development, *Rhipicephalus microplus*

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