Involvement of the Protein Kinase B (AKT) on the Mitochondrial Hexokinase in the *Rhipicephalus microplus* Tick Embryos

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INTRODUCTION: Glucose is converted to pyruvate through glycolysis, yielding ATP in the process. The cytosolic hexokinase (HK) catalyses the first step of glycolysis, where it phosphorylates glucose into glucose-6 phosphate. This enzyme may also be associated with the outer mitochondrial membrane, reducing the H2O2 rate in the hyperglycemia conditions, or acting in the reduction of reactive oxygen species (ROS). In vertebrates, it is well-known that the glucose flux into the cell is provided by exogenous factors, regulated by the insulin signaling pathway. One of the key enzymes of the insulin cascade is the protein kinase B (AKT), regulating growth and development of the organism. Whether AKT and HK interact in invertebrate mitochondria is unknown, thus we used *R. microplus* embryogenesis as a model system to investigate this putative regulation. **OBJECTIVE:** This Work aims to study an hexokinase (HK) in the mitochondrial fraction of the *R. microplus* tick eggs, and investigate if AKT acts as a regulator of this enzyme in the embryogenesis. **METHODS:** Tick embryos were homogenized and fractionated to obtain mitochondrial and cytoplasmic fractions. HK activity was determined in these fractions, both in the presence and absence of specific inhibitor for AKT (10-DEBC). The effect of AKT- RNAi treatment by electroporation in HK activity was also analyzed **RESULTS:** HK activity was reduced in mitochondrial and cytoplasmic fractions, when tick *R. microplus* embryos were subjected to treatment with 10-DEBC. In the AKT silenced embryos a decrease in the HK activity was only observed on the mitochondrial fraction. **CONCLUSION:** Our results offer a novel perspective on the study of energy metabolism during embryo development of *R. microplus*, and will enable us to understand aspects of the regulation of glucose metabolism and the nutrient dynamics during tick embryogenesis.

Keywords: Metabolism, Tick, Hexokinase, Embryogenesis, AKT, 10-DEBC

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