

Exopolyphosphatases in Nuclear and Mitochondrial Fractions During Embryogenesis of the Hard Tick *Rhipicephalus (Boophilus) microplus*

Eldo Campos¹, Arnaldo R. Façanha², Evenilton P. Costa¹, Aoi Masuda³, Itabajara Vaz Jr.³ and Carlos Logullo¹

¹Laboratório de Química e Função de Proteínas e Peptídeos, UENF; ²Laboratório de Biologia Celular e Tecidual, UENF; ³Centro de Biotecnologia, UFRGS.

The present work evaluated polyphosphate (polyP) metabolism in nuclear and mitochondrial fractions during *Rhipicephalus microplus* embryogenesis. Nuclear polyP decreased and activity of exopolyphosphatase (PPX) increased after embryo cellularization until the end of embryogenesis. The utilization of mitochondrial polyP content occurred between embryo cellularization and segmentation stages. Increasing amounts of total RNA extracted from eggs progressively enhanced nuclear PPX activity, whereas it exerted no effect on mitochondrial PPX activity. The decline in total polyP content after the 7th day of embryogenesis does not reflect the free P_i increase and the total polyP chain length decrease after embryo cellularization. The Kmapp utilizing poly P_{3,15 and 65} as substrate was almost the same for the nuclear fraction, while the affinity for substrate in mitochondrial fraction was around 10 times higher for polyP₃ than for polyP_{15 and 65}. PPX activity was stimulated by a factor of two by Mg²⁺ and Co²⁺ in the nuclear fraction and only by Mg²⁺ in the mitochondrial fraction. Heparin inhibited nuclear and mitochondrial PPX activity in about 90 and 95% respectively. Together, these data are consistent with the existence of two different PPX isoforms operating in the nuclei and mitochondria of the hard tick *R. microplus* with distinct metal dependence, inhibitor and activator sensitivities. The data also shed new light on polyP biochemistry during arthropod embryogenesis, opening new routes for future comparative studies on the physiological roles of different polyP pools distributed over cell compartments. This work was supported by grants from CNPq, PRONEX, FAPERJ and CAPES.