Primeira Sessão: Ecologia e Fisiologia – Pôsteres

Metabolism underpins osmoregulatory capacity in the semi-terrestrial crab Minuca rapax (Brachyura, Ocypodidae)

Batista, Mariana Magnani Avelar (1); Klein, Wilfried (1); Faria, Samuel Coelho (2)

(1) Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da Universidade de São Paulo, FFCLRP/USP, Ribeirão Preto, SP, Brasil; (2) Centro de Biologia Marinha da Universidade de São Paulo, CEBIMar/USP, São Sebastião, SP, Brasil.

Gills are multifunctional organs that perform respiratory and osmoregulatory functions in crustaceans. During evolution, the number or surface area of anterior gills (respiration) was accompanied by an increase in the number or surface area of posterior gills (osmoregulation) as crustaceans colonized terrestrial environments, resulting from different selective pressures. Thus, there is a functional link between the two physiological processes in crustaceans that live alternately in the air and underwater, as a consequence of the tidal cycle. We hypothesized that oxygen consumption is associated with osmoregulatory capabilities because maintenance of osmotic gradients is correlated with available energy. Male crabs of the species Minuca rapax were collected at low tide from a small estuary in São Sebastião, São Paulo state, and acclimated to seawater salinity at 25 °C for 5 days. Oxygen consumption in air (VO2) and osmolality of hemolymph were determined at different osmotic media ranging from fresh water to 72‰ S, after 6 hours of exposure. In summary, M. rapax exhibited strong hyper-/hypo-osmoregulatory capabilities and maintained higher osmotic gradients at lower and higher salinities by salt uptake and secretion mechanisms, respectively, demonstrating a remarkable osmoregulatory versatility. There was an effect of salinity on VO) 2), with higher rates at the extreme osmotic conditions of 0‰ and 72‰ S. Therefore, as hypothesized, higher metabolic rates correlate with strong osmotic gradients, these typical conditions for semiterrestrial animals inhabiting unstable osmotic environments. Elevated metabolic rates provide an energy budget for hyperregulation when in dilute media and for hyporegulation when distant from water sources.

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