FIGEMA

Nutritional status affects the capacity of the snail *Concholepas concholepas* to synthesize Hsp70 when exposed to stressors associated with tidal regimes in the intertidal zone

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Abstract Synthesis of the heat shock protein Hsp70 is one of the most important physiological mechanisms that intertidal organisms possess to counteract damage to macromolecules caused by stressors associated with the tidal cycle. However, the synthesis and activity of Hsp70 involves an elevated energetic cost. We evaluated the effect of the nutritional status (fed vs. starved for 2 weeks) of juvenile *Concholepas concholepas* mollusc on their capacity to synthesize Hsp70 during emersion (i.e. low tide) and immersion (i.e. high tide) at high temperatures (24 °C, e.g. summer conditions) and at low temperatures (7 °C, e.g. winter conditions). In addition, we evaluated whether Hsp70 is induced directly upon exposure to stress (emersion) or during recovery (re-immersion). Starvation decreased the content of stored energy substrates of juveniles as well as their ability to synthesize Hsp70 during emersion under thermal stress, especially at high temperatures. Additionally, analysis of environmental factors associated with laboratory simulation of tidal regimes indicated that juveniles in starvation, in contrast to fed juveniles, did not significantly increase their levels of Hsp70 during cold emersion (7 °C) or warm emersion (24 °C) or upon re-immersion. Induction of Hsp70 occurred during exposure to stress (low-tide conditions) and not when juveniles returned to "normal" conditions (high-tide conditions). Thus, the synthesis of Hsp70 for the juveniles of this intertidal snail species was coordinated and adapted to the tidal cycle, and the species responds in a similar way to hot and cold emersion conditions. The observed levels of Hsp70 reflect the ability of the individual to synthesize these proteins, which is dependent on the nutritional status of the individual.

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