Neuromodulatory peptides of *Biomphalaria glabrata* and their relationship with snail locomotor behavior and susceptibility to *Schistosoma mansoni* infection

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In Brazil, *Biomphalaria glabrata* is the most important snail host species of *Schistosoma mansoni*, the etiological agent of schistosomiasis. The geographical distribution of *B. glabrata* is often associated with schistosomiasis, a disease that requires efficient efforts for eradication. In this context, studies aiming to control the snail population and reduce/block the *S. mansoni* replication/transmission are extremely relevant. One approach to achieving these goals is to deepen our understanding of the snail's nervous system. The FMRFamide belongs to a class of neuromodulatory peptides (FaRPs) that affect the locomotion, circadian cycle, and physiology of many invertebrates. Therefore, these peptides have a potential for the development of molluscicides of low or no toxicity to non-target organisms. Our study investigated the relationship among FaRPs, the circadian cycle, and the locomotory behavior of infected and uninfected *B. glabrata*. Snails were studied using gene expression analysis, behavioral activity, and gene silencing. Behavioral activity was evaluated by filming snails, and quantifying movement patterns. For gene silencing mediated by RNAi, dsRNA was injected into snails followed by phenotypic, behavioral, and gene expression evaluation. Our results suggest that the FaRP gene expression is perturbed by *S. mansoni* infection; and may indicate a possible link between the gene function and the snail locomotor behavior; the infected snails displayed reduced movement compared to controls. Behavioral analysis also provided insights into the circadian cycle, suggesting that snails may be more active at night. Preliminary gene silencing experiments induced a gene expression knock-down, an important achievement given the challenges of gene expression perturbation approaches in snails. These findings highlight the significance of combined molecular and behavioral studies in producing insight that may lead to the development of future control strategies.

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