Localization of Fulicin-like Immunoreactivity in *Biomphalaria glabrata*: Evidence for a Role in Reproductive Behavior

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About 10% of the world's population lives at risk of contracting the parasitic disease schistosomiasis. *Schistosoma mansoni,* the digenetic trematode that causes the most widespread form of intestinal schistosomiasis, employs the freshwater snail *Biomphalaria glabrata* as its primary intermediate host. It has been shown that infection of *B. glabrata* by *S. mansoni* causes profound behavioral changes in the snail host, including parasitic castration, a reduction in reproductive behaviors. In this study, a neural transcriptomics approach was undertaken to identify precursor prohormones that could encode neuropeptides involved in *Biomphalaria* reproductive behaviors. A transcript (1616 nucleotides) was found to encode a putative precursor polypeptide (316 amino acids) that could give rise to the neuropeptide fulicin (Phe-D-Asn-Glu-Phe-Val-NH2) and five additional related peptides. For this investigation, affinity purified polyclonal antibodies (rabbit) were generated against the predicted fulicin neuropeptide. Antibody specificity was confirmed with dot blots and preabsorbtion control experiments. Fulicin-like immunoreactivity was observed throughout the central nervous system (CNS) and in specific peripheral tissues. Double-labeling experiments (biocytin backfill x fulicin immunohistochemistry) identified three groups of fulicin-like immunoreactive neurons that project to penile nerve. These included two large (20 - 30 µm) cells in the anterior lobe of the cerebral ganglion, 5-6 medium-sized (15 - 20 µm) cells in the anteromedial quadrant of the left parietal ganglion, and 7-8 smaller (10 - 15 µm) cells in the posterolateral quadrant of the left parietal ganglion. No double-labeled cells were detected in the anterior lobe of the cerebral ganglion. Within the left parietal and visceral ganglia, clusters of large prominent cells were shown to give rise to axons projecting to the anal and intestinal nerves. In the periphery, fulicin-like immunoreactivity was present in tissues associated with male reproduction, e.g. the ovisperm duct, sperm duct and prostate gland. Fulicin-like immunoreactive fibers were also present in the lip, mantle and foot. These results suggest that fulicin and other peptides derived from the fulicin precursor could regulate behaviors related to reproduction that are altered during the course of infection in this host-parasite system.