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| Title: | Study of reversal behavior in Caenorhabditis elegans |
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| Abstract: | Animals have different foraging strategies to find new sources of food. In Caenorhabditis elegans, these strategies are governed by changing the frequency and duration of the basic locomotor patterns, which include forward movement, reversals and omega turns. Although previous work has identified the neuronal circuits that control the worm locomotion, how the signaling across these circuits can be modulated is only partially understood. Here, I will first show you the function of RIG-3 an immunoglobulin superfamily protein that is expressed in the AVA command interneuron. Mutants lacking rig-3 have an increase in reversal frequency in OFF food conditions, which alters the local search behaviour in worms. RIG-3 functions through the glutamate receptor, GLR-1, to maintain reversal frequency during local search. Further rig-3 mutants show increase in GLR-1::GFP levels in the AVA command interneuron, which confers increased glutamatergic signalling through this neuron leading to increase in reversal frequency. These results suggest that RIG-3 plays an important role in maintaining signalling across reversal circuits to execute appropriate local search for food in worms. In the second part, I will explain how the FLP-18 neuropeptide fluctuates with food availability, which in turn modulates the reversal circuitry in C. elegans. In this study we have found that FLP-18 modulates the reversal length through its receptors NPR-1 and NPR-4 through ASE and AVA during local search behaviour. We further observed that the levels of FLP-18 increased after 24 hours of starvation, which causes decrease in reversal length. Similar effect was observed in mutants lacking functional CREB-1/CRH-1, a transcription factor that likely regulates FLP-18 expression. These results suggest that FLP-18 reduces AVA activity to limit the reversal duration, which might facilitate the local search behaviour of worms. |
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