Title:	FLP-18 Functions through the G-Protein-Coupled Receptors NPR-1 and NPR-4 to Modulate Reversal Length in Caenorhabditis elegans
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Abstract:	Animal behavior is critically dependent on the activity of neuropeptides. Reversals, one of the most conspicuous behaviors in Caenorhabditis elegans, plays an important role in determining the navigation strategy of the animal. Our experiments on hermaphrodite C. elegans show the involvement of a neuropeptide FLP-18 in modulating reversal length in these hermaphrodites. We show that FLP-18 controls the reversal length by regulating the activity of AVA interneurons through the G-protein-coupled neuropeptide receptors, NPR-4 and NPR-1. We go on to show that the site of action of these receptors is the AVA interneuron for NPR-4 and the ASE sensory neurons for NPR-1. We further show that mutants in the neuropeptide, flp-18, and its receptors show increased reversal lengths. Consistent with the behavioral data, calcium levels in the AVA neuron of freely reversing C. elegans were significantly higher and persisted for longer durations in flp-18, npr-1, npr-4, and npr-1 npr-4 genetic backgrounds compared with wild-type control animals. Finally, we show that increasing FLP-18 levels through genetic and physiological manipulations causes shorter reversal lengths. Together, our analysis suggests that the FLP-18/NPR-1/NPR-4 signaling is a pivotal point in the regulation of reversal length under varied genetic and environmental conditions.
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