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Neuromodulation in *C. elegans* and *unc-34* suppressors

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*C. elegans*alters its behavior in response to environmental changes. How is this behavioral plasticity achieved? In many invertebrates, neuromodulators such as histamine help to achieve behavioral flexibility. Using an anti-histamine antibody we identified histamine-like immunoreactivity in adult *C. elegans.* We also identified a putative histidine decarboxylase (HD), an enzyme that synthesizes histamine from histidine. A transcriptional GFP fusion of this HD gene colocalizes with histamine-staining in head neurons, which we have tentatively identified as RIH, URX and AFD. We also observed GFP expression in the HSN neurons.

We have tested histamine antagonists, including H1, H2 and H3 antagonists, for their effects on *C. elegans*behavior. H1 antagonists inhibit pharyngeal pumping and egg-laying, suggesting that histamine may modulate feeding and egg-laying in *C. elegans.* To determine whether the putative histidine decarboxylase synthesizes histamine, we will ectopically express HD in the mechanosensory neurons and will test for histamine-staining in these neurons. We will also examine the behavioral effects of ablating the HD-GFP expressing head neurons.

We are also interested in understanding how the neural networks that generate behavior are assembled and in identifying key molecules involved in the assembly process. *unc-34* mutants display defects in axonal outgrowth and fasciculation. *unc-34* is a homolog of *Drosophila enabled*(G. Garriga, personal communication). First identified as a genetic modifier of *abl, enabled* functions in axonal outgrowth[1]. Six suppressors of the locomotor abnormalities of *unc-34* animals were previously identified[2]. We are presently mapping these suppressors and screening for additional suppressors.

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1. Gertler, F.B., Doctor, J. S., Hoffmann, F. M. Science. 248:857-60, 1990.

2. Bloom, L. Ph.D. Thesis, MIT, 1993.