

The BAG Sensory Neurons are Activated by Environmental Carbon Dioxide **Niels Ringstad**¹, Elissa Hallem², Paul Sternberg² and Bob Horvitz¹

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The BAG neurons are ciliated sensory neurons that recently have been shown to mediate avoidance behavior to carbon dioxide (CO₂) and to inhibit egg-laying behavior. To test whether the BAG neurons are CO₂ sensors, we generated transgenic animals expressing the high-affinity genetically encoded calcium sensor cameleon YC3.60 in the BAG neurons. We observed increases in BAG neuron calcium in response to application of as little as 0.1% CO₂ with half maximal increases evoked by application of 0.9% CO₂. The BAG neurons require the TAX-2 / TAX-4 cyclic nucleotide-gated cation channel to respond to environmental CO₂. The BAG neurons of *rgs-3* mutants, which lack a negative regulator of heterotrimeric G proteins, are defective for CO₂-evoked calcium responses, indicating that the BAG neurons are negatively regulated by a G protein signaling pathway. Using *in vivo* calcium imaging, we are seeking neurons that function downstream of the BAG sensory neurons in neuronal circuits that mediate CO₂ avoidance and the regulation of egg laying.

Talk

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