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Poster title: MB-C1: An Understudied Large Inhibitory Neuron Type in *Drosophila* Mushroom Body

Abstract: The insect mushroom body (MB) is classically modeled as an expansion layer transforming dense projection neuron (PN) input into sparse, high-dimensional Kenyon cell (KC) representations to support downstream associative learning in the MB lobes. While the APL is well-studied as the primary inhibitory regulator of this circuit, another pair of large inhibitory neurons, MB-C1s, innervates specifically the MB calyx and some lateral horn regions with heavy projections onto γ KCs, yet remains functionally uncharacterized.

Connectivity Using connectome data, we find that MB-C1 receives direct input from a subset of PNs with a bias toward PNs relevant to narrowly-activating, high-salience odors, and preferentially targets γ KCs over αβ and α'β' subtypes, suggesting it may mediate odor-specific modulation of specific KC populations.

Tuning 2-photon calcium imaging reveals that MB-C1 displays category-specific odor response dynamics. Notably, aversive odors drive activation while attractive odors elicit inhibition followed by post-stimulus rebound. However, response dynamics may vary across flies, but are consistent within individual flies and stimulus category.

Function Preliminary KC recordings across a similar odor panel establish a baseline of population activity under normal conditions, laying the groundwork for directly testing how MB-C1 shapes odor coding in the MB via MB-C1 silencing experiment paired with KC population imaging.