**SUPPLEMENTARY INFORMATION**

**SUPPLEMENTARY FIGURE LEGENDS**

**Suppl. Figure S1: VGLU-2 does not colocalize with VHA-5.** Epidermal VGLU-2::GFP, expressed in *vglu-2*(*syb362[vglu-2::gfp]*) signals do not overlap with VHA-5::RFP (transgene *mcIs52*). Right panel represents a blow-up of white stippled box in left panel. Scale bar = 50 m

**Suppl. Figure S2: *gfp* tagging does not affect *vglu-2* function.**

The bleach resistance assay shown in **Fig. 6B** was used to test whether there are any defects in wild-type or *vglu-2::gfp* animals. *him-5(e1490)* was present in both backgrounds.

**Suppl. Figure S3: *vglu-2* mutants display normal cuticle morphology and hypo-osmotic sensitivity**

Cuticle morphology in *vglu-2* mutants. Expression and distribution of the collagen marker COL-19::GFP (Liu at al., 1995) and QUA-1 (Hao et al., 2006) is not affected in 2-day old *vglu-2* mutant animals. See strain list for details.

Scale bar = 10 µm

**Suppl. Figure S4: *vglu-2* expression in AIA is required for normal induction of reversals in response to diacetyl removal.**

Change in cumulative probability of initiating reversals within 5 seconds of diacetyl removal from the indicated concentrations (X-axis) relative to the probability in response to buffer-buffer transitions (control). Error bars are standard deviations. Significance was calculated by bootstrap with FDR correction for multiple hypotheses (concentrations). ns: not significant, \* p<0.05, \*\* p<5x10-3, \*\*\* p< 5x10-5. See **Fig. 7** legend for number of animals.