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Supplemental Data

A Tyramine-Gated Chloride Channel Coordinates Distinct Motor Programs of a *Caenorhabditis elegans* Escape Response

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Figure S1

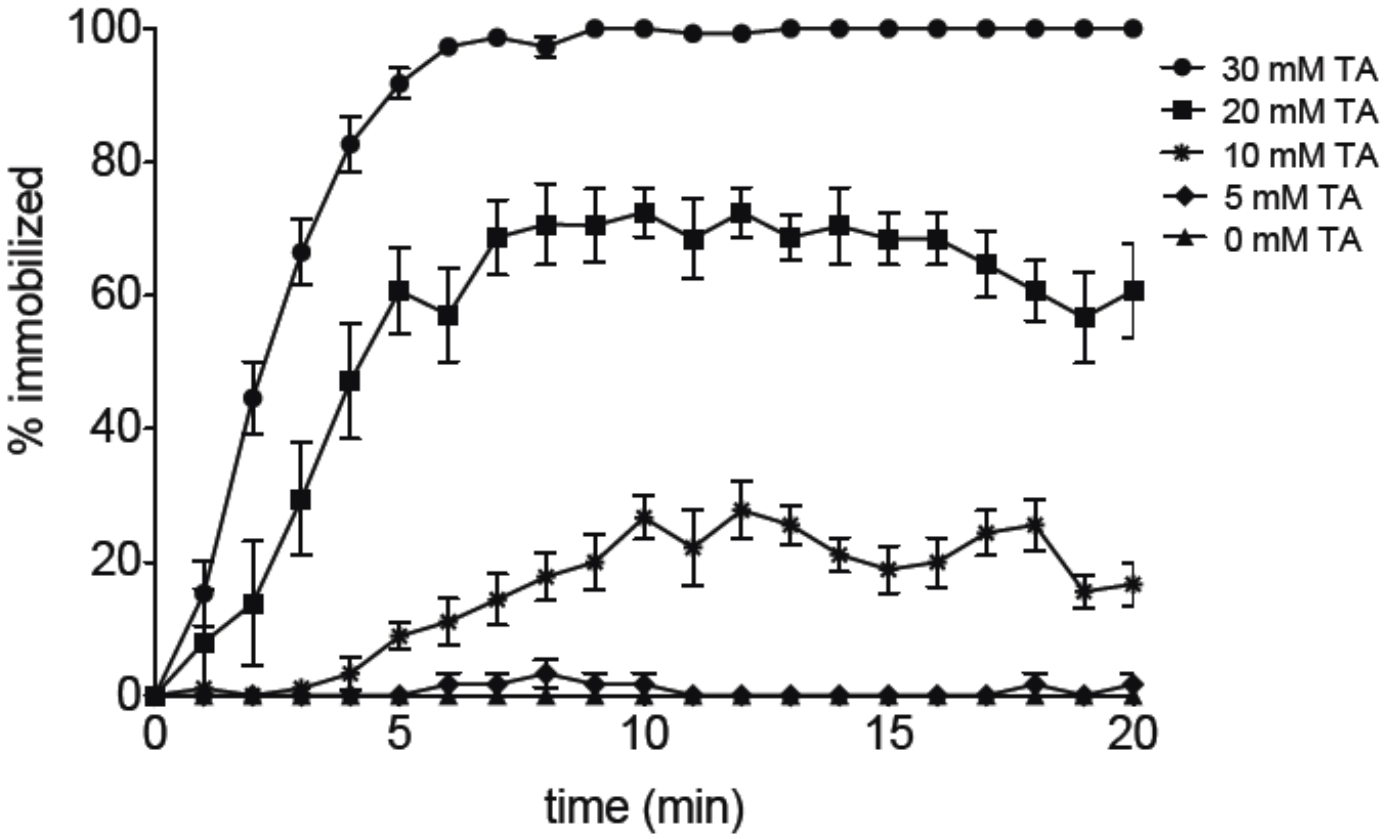

Figure S1. Wild-Type Animals Immobilize on Exogenous Tyramine

Dose dependent immobilization of wild-type animals on exogenous tyramine. The percentage of immobilized animals, at varying concentrations of exogenous tyramine, are depicted over a 20 minute period. Each data point represents the average ± SEM for at least five trials totaling at least 50 animals.

Figure S2

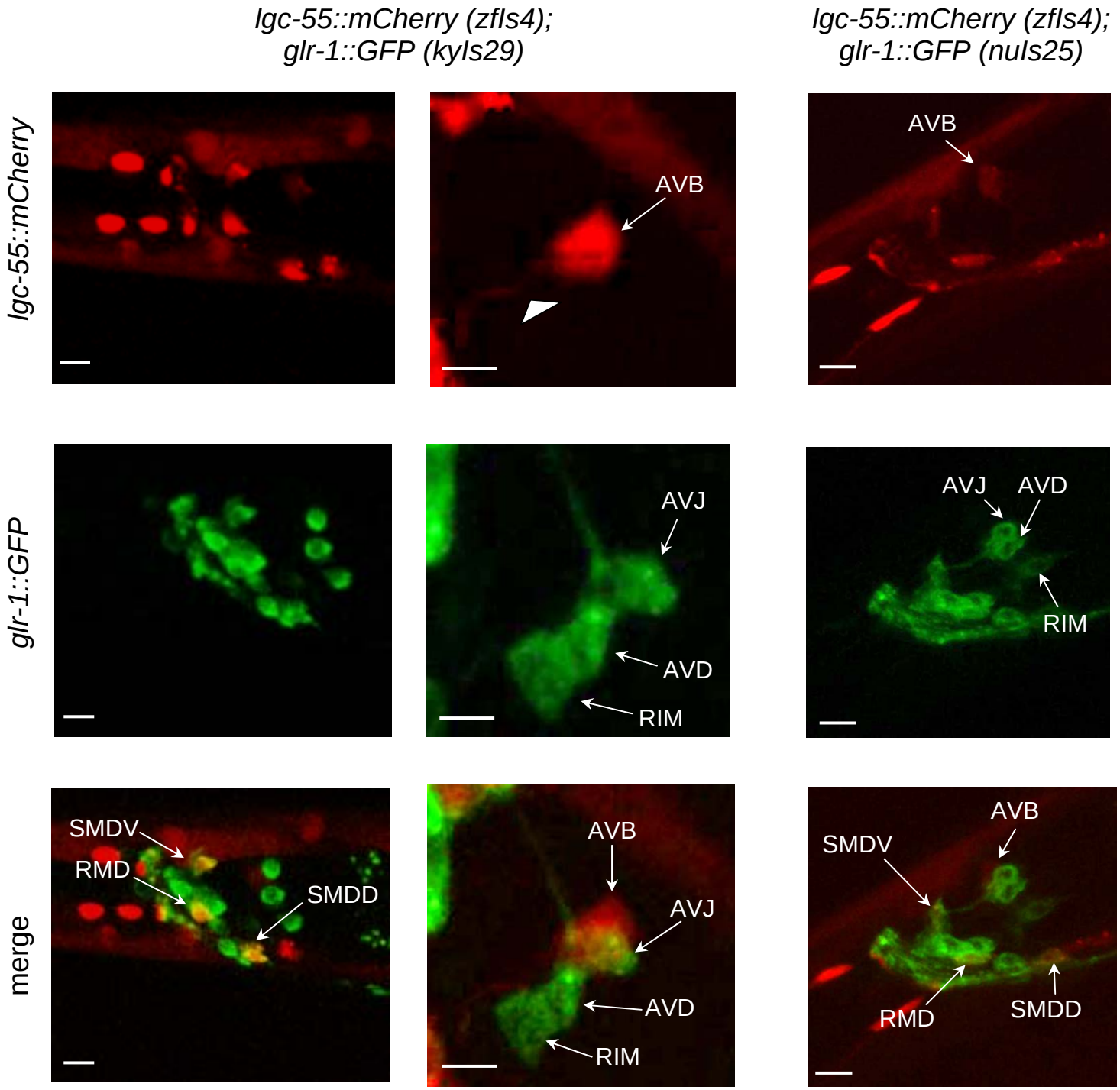

Figure S2. Coexpression of *lgc-55::*mCherry and *glr-1::*GFP

Co-expression of *lgc-55::*mCherry*(zfIs4)* with *glr-1::*GFP *(kyIs29)* (Maricq et al., 1995) and *glr-1::*GFP*(nuIs25)* (Hart et al., 1995). Confocal images show co-expression of LGC-55 and GLR-1 in the RMD, SMDD and SMDV. The AVB cell-body, similar to the cell labeled by *lgc-55*::mCherry, lies

on the dorsal side of the animal just anterior to the posterior pharyngeal bulb and has a process that runs ventrally through the amphid commissure (indicated by arrow head) before turning anteriorly and entering the nerve ring (White et al., 1986). It was previously reported that *glr-1* is expressed in the AVJ, RIM, AVD and AVB (Hart et al., 1995; Maricq et al., 1995). In the adult animal, we observe *glr-1::*GFP expression (middle panels) in three cells just anterior to the posterior bulb. The dorsal most cell in this group is slightly ventral compared to the *lgc-55*::mCherry neuron and has a process that extends anteriorly into the nerve ring, similar to the cell body position and axon morphology of the AVJ. Based on cell body position, axon morphology, which includes a process that runs through the amphid commisure and co-expression with *sra-11*::GFP (See Figures S3-S4), we conclude *lgc-55* is expressed in the AVB. Anterior is to the left. Scale bar, 10 µm.

Figure S3

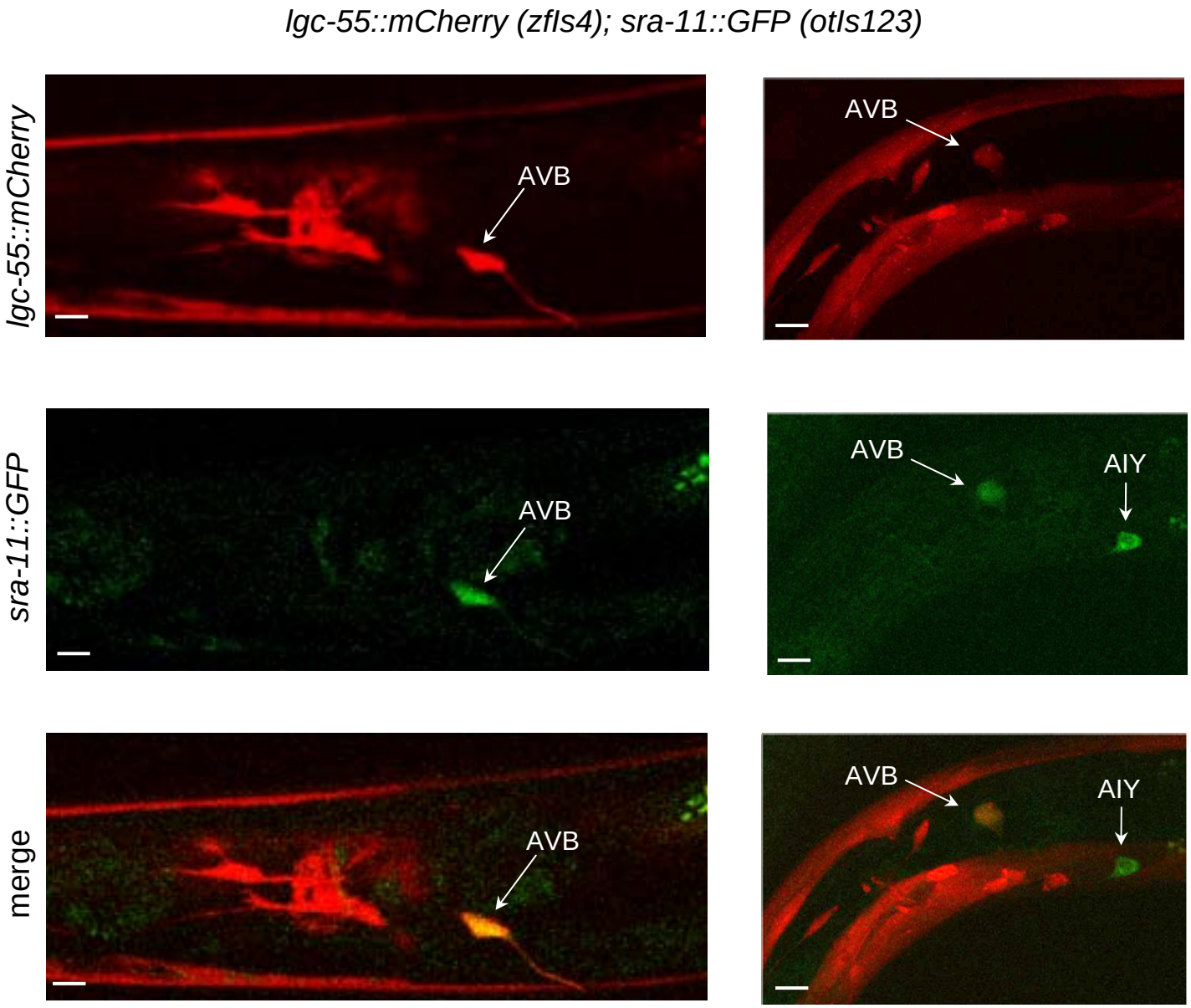

Figure S3. Coexpression of *lgc-55::*mCherry and *sra-11*::GFP

Co-expression of *lgc-55::*mCherry*(zfIs4)* with *sra-11*::GFP(*otIs123*) (Altun-Gultekin et al., 2001). Confocal images show LGC-55 expression in the AVB. Co-expressing cell is on the dorsal side of the animal just anterior to the posterior pharyngeal bulb and has a process the projects ventrally before turning anteriorly and entering the nerve ring in both sets of images. Anterior is to the left. Scale bar, 10 µm.

Figure S4

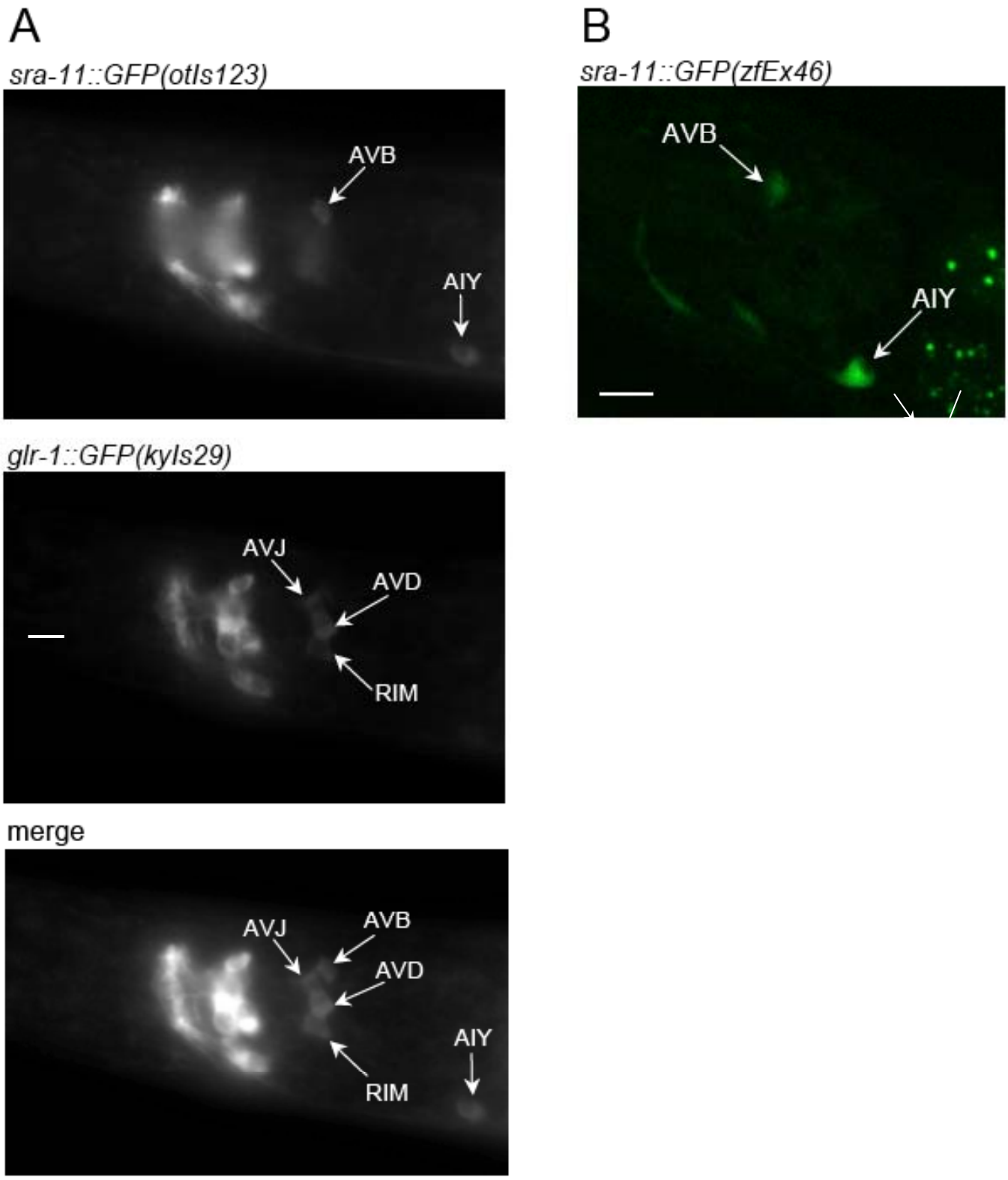

Figure S4. *sra-11::*GFP and *glr-1*::GFP Label Different Subsets of Neurons

(A) Fluorescence microscopy of animals expressing both *glr-1*::GFP(*kyIs29*) and *sra-11*::GFP(*otIs123*). Animals expressing both GFP markers were examined to determine the

presence expression in the AVB. If *sra-11*::GFP and *glr-1*::GFP are both expressed in the AVB, three cells should be visible in animals expressing both transgenes. Here, four cells are visible suggesting that *sra-11*::GFP and *glr-1*::GFP label different subsets of neurons. (B) Confocal image of *sra-11*::GFP(*zfEx46*). Promoter is the same as *sra-11*::LGC-55, and shows expression in AVB and AIY similar to *sra-11*::GFP(*otIs123*).

Figure S5

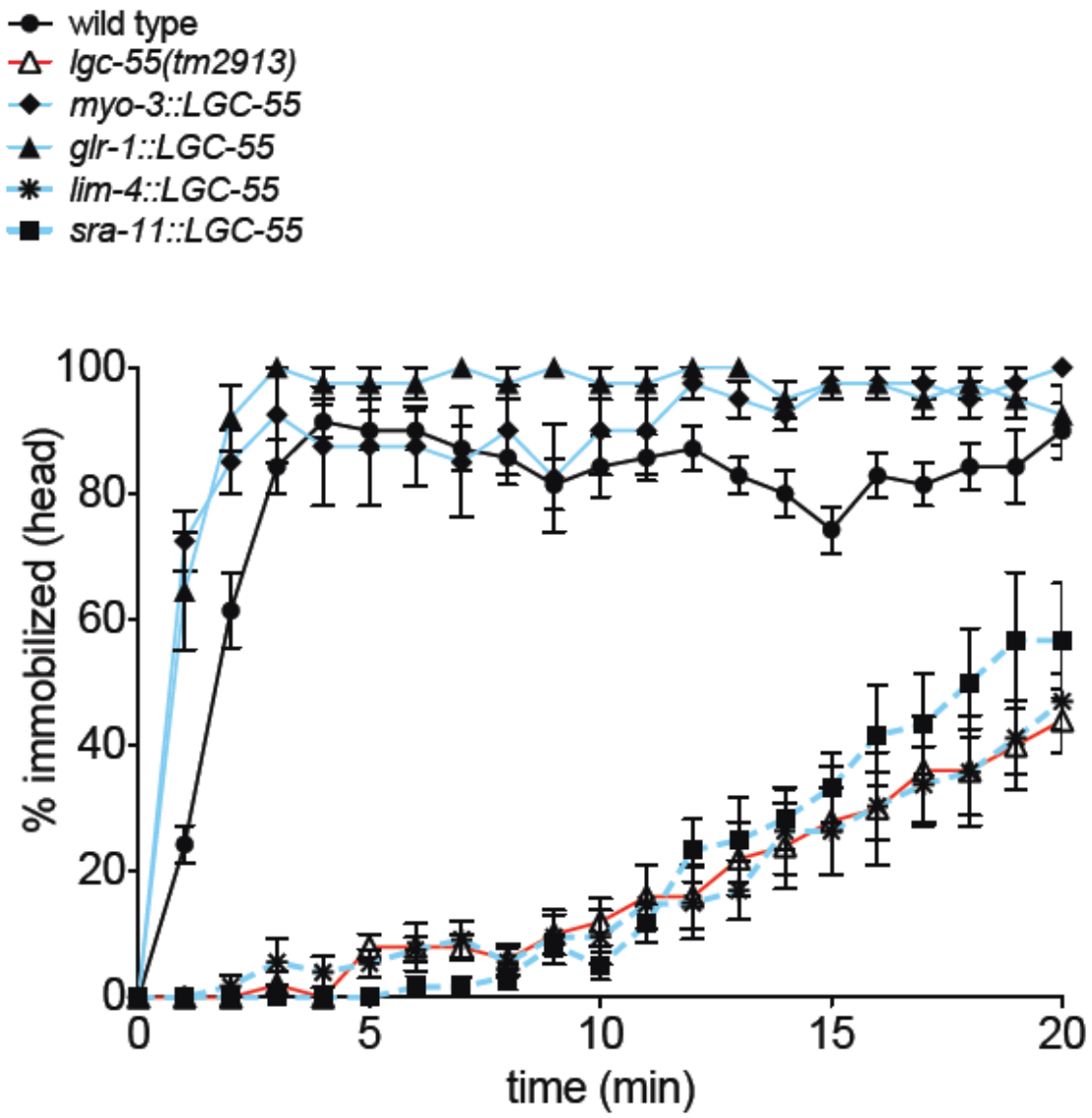

Figure S5. LGC-55 Expression in the RMD and SMD Neurons or Neck Muscles Restores Sensitivity to Exogenous Tyramine

Quantification of head movements of tissue specific rescue lines on 30 mM tyramine. Expression of *lgc-55* in muscle (*myo-3*::LGC-55), RMD and SMD (*glr-1*::LGC-55) restores sensitivity to exogenous tyramine. Animals expressing *lgc-55* in AVB (*sra-11*::LGC-55) and RMD alone (*lim-4*::LGC-55) are resistant to exogenous tyramine.

Figure S6

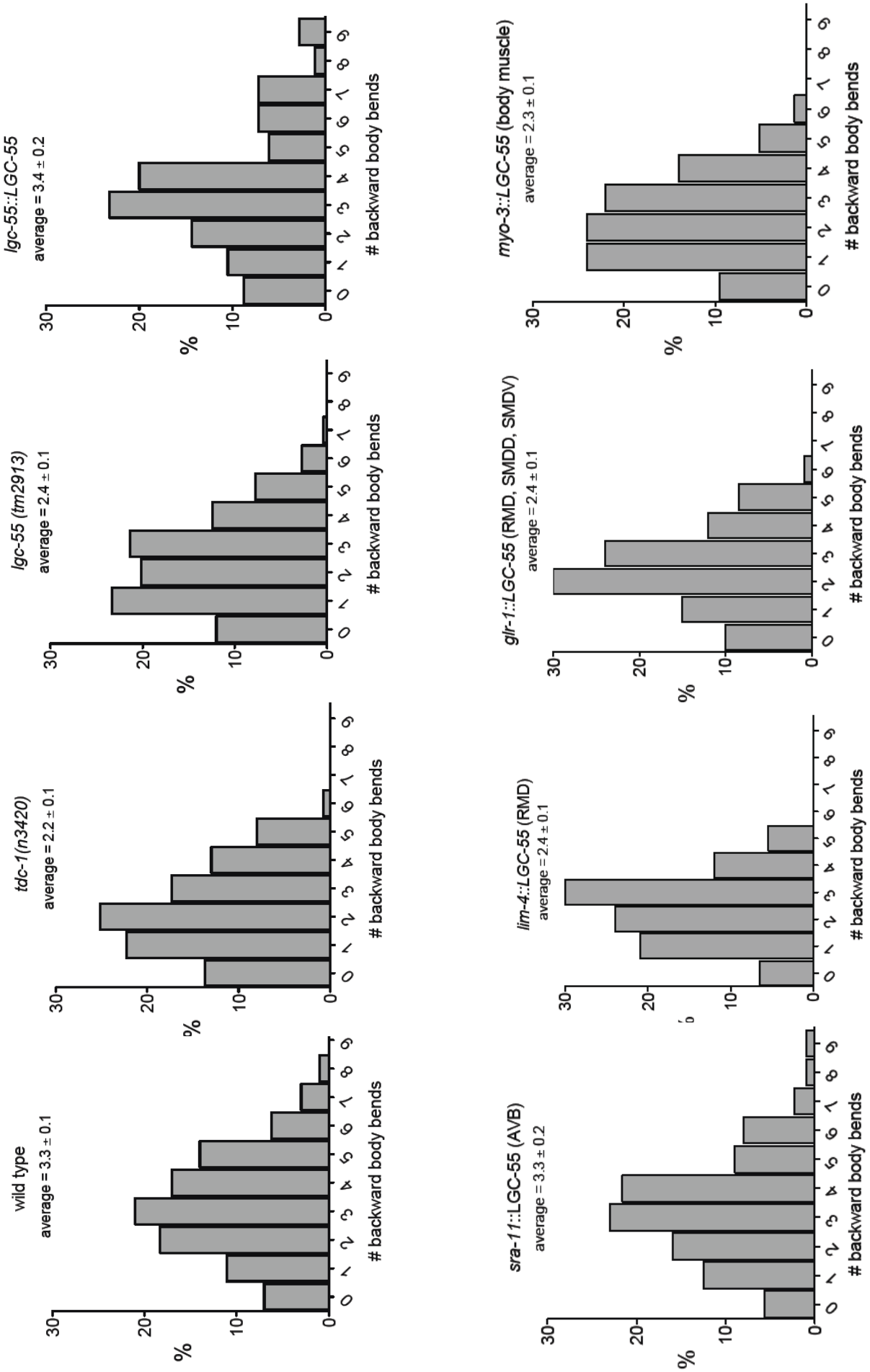
wild type
average = 3.3 ± 0.1
tdc-1(n3420)
average = 2.2 ± 0.1
lgc-55 (tm2913)
average = 2.4 ± 0.1
lgc-55::LGC-55
average = 3.4 ± 0.2
sra-11::LGC-55 (AVB)
average = 3.3 ± 0.2
lim-4::LGC-55 (RMD)
average = 2.4 ± 0.1
glr-1::LGC-55 (RMD, SMDD, SMDV)
average = 2.4 ± 0.1
myo-3::LGC-55 (body muscle)
average = 2.3 ± 0.1
%
backward body bends

Figure S6. *lgc-55* Mutants Have Defects in Reversal Behavior

Distribution of number of backward body bends in response to anterior touch of wild type (n= 317), *tdc-1(n3420)* (n=139), *lgc-55(tm2913)* (n=257), *lgc-55* rescue [*lgc-55(tm2913); zfEx2,* (n=204)], *sra-11*::LGC-55 [*lgc-55(tm2913); zfEx37*, (n=190)], *lim-4*::LGC-55 [*lgc-55(tm2913); zfEx44*, (n=108)], *glr-1*::LGC-55 [*lgc-55(tm2913); zfEx42*, (n=133)], and *myo-3*::LGC-55 [*lgc-55(tm2913); zfEx31*, (n=157)] animals. See also Figure 7A.

Supplemental References

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