

Supplemental Table 1. *C. elegans* strains used in this study

Strain	Genotype	Description	Plasmid
IZ2489	<i>ufIs34; vsIs48</i>	GABA-specific (including DD + VD) transcriptional reporter (red); Cholinergic-specific transcriptional reporter (green)	<i>Punc-47::mCherry (pPRB5), lin-15+(pL15Ek); Punc-17::GFP, lin-15+(pL15Ek)</i>
IZ1481	<i>ina-1(gm144)III;ufIs34;vsIs48</i>	hypomorphic <i>ina-1</i> allele; GABA-specific (including DD + VD) transcriptional reporter (red), cholinergic-specific transcriptional reporter (green)	<i>Punc-47::mCherry (pPRB5), lin-15+(pL15Ek); Punc-17::GFP, lin-15+(pL15Ek)</i>
IZ1310	<i>ufEx432</i>	DVA specific transcriptional reporter	<i>Pnlp-12::mCherry (pCL27)</i>
IZ1430	<i>ina-1(gm144); ufEx432</i>	hypomorphic <i>ina-1</i> allele; DVA specific transcriptional reporter	<i>Pnlp-12::mCherry (pCL27)</i>
IZ2288	<i>oxIs12; ufIs128</i>	DD-specific transcriptional reporter (red); GABA-specific (including DD + VD) transcriptional reporter (green)	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31)</i>
IZ3727	<i>ina-1(gm144)III;oxIs12;ufIs128</i>	<i>ina-1</i> hypomorphic allele; DD-specific transcriptional reporter (red); GABA-specific (including DD + VD) transcriptional reporter (green)	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31)</i>
IZ3786	<i>ina-1(gm144)III;oxIs12;ufIs128; ufEx1582</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); endogenous <i>ina-1</i> promoter driving <i>ina-1</i> + rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Pina-1::ina-1cDNA (pDO91)</i>
IZ3787	<i>ina-1(gm144)III;oxIs12;ufIs128; ufEx1583</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); endogenous <i>ina-1</i> promoter driving <i>ina-1</i> + rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Pina-1::ina-1cDNA (pDO91)</i>



IZ3790	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1586</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); pan-neuronal promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Prgef-1::ina-1cDNA (pDO81)</i>
IZ3778	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1577</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); pan-neuronal promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Prgef-1::ina-1cDNA (pDO81)</i>
IZ3833	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1611</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); pan-neuronal promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Prgef-1::ina-1cDNA (pDO81)</i>
IZ3817	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1604</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); GABAergic promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Punc-47::ina-1cDNA (pDO117)</i>
IZ3814	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1601</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); GABAergic promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Punc-47::ina-1cDNA (pDO117)</i>
IZ3831	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1610</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); GABAergic promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Punc-47::ina-1cDNA (pDO117)</i>
IZ3832	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1611</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); GABAergic promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Punc-47::ina-1cDNA (pDO117)</i>
IZ3784	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1580</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); cholinergic promoter driving <i>ina-1+</i> rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP; Pflp-13::mCherry (pAP31); Punc-17β::ina-1cDNA (pDO75)</i>



IZ3782	<i>ina-1(gm144)III;oxIs12;ufls128;ufEx1579</i>	GABA-specific (including DD + VD) transcriptional reporter (green); DD-specific transcriptional reporter (red); cholinergic promoter driving <i>ina-1</i> + rescue in <i>ina-1(gm144)</i> background	<i>Punc-47::GFP</i> ; <i>Pflp-13::mCherry</i> (pAP31); <i>Punc-17β::ina-1cDNA</i> (pDO75)
IZ3791	<i>ufEx1587;ufls34</i>	Transcriptional <i>ina-1</i> reporter (green); GABAergic transcriptional reporter (red)	pDO119 (<i>Pina-1::GFP</i>) <i>Punc-47::mCherry</i> (pPRB5), <i>lin-15+(pL15Ek)</i>
IZ3770	<i>ufEx1574;ufls43</i>	Transcriptional <i>ina-1</i> reporter (green); cholinergic transcriptional reporter (red)	pDO119(<i>Pina-1::GFP</i>); <i>Pacr-2::mCherry</i> (pPRB6)
IZ1876	<i>gmIs5;ufls34</i>	Translational INA-1 reporter (green); GABA-specific (including DD + VD) transcriptional reporter (red)	<i>Pina-1::GFP + rol-6(su1006)</i> ; <i>Punc-47::mCherry</i> (pPRB5), <i>lin-15+(pL15Ek)</i>
IZ3754	<i>gmIs5;ufls43</i>	Translational INA-1 reporter (green); cholinergic-specific transcriptional reporter (red)	<i>Pina-1::GFP + rol-6(su1006)</i> ; <i>Pacr-2::mCherry</i> (pPRB6)

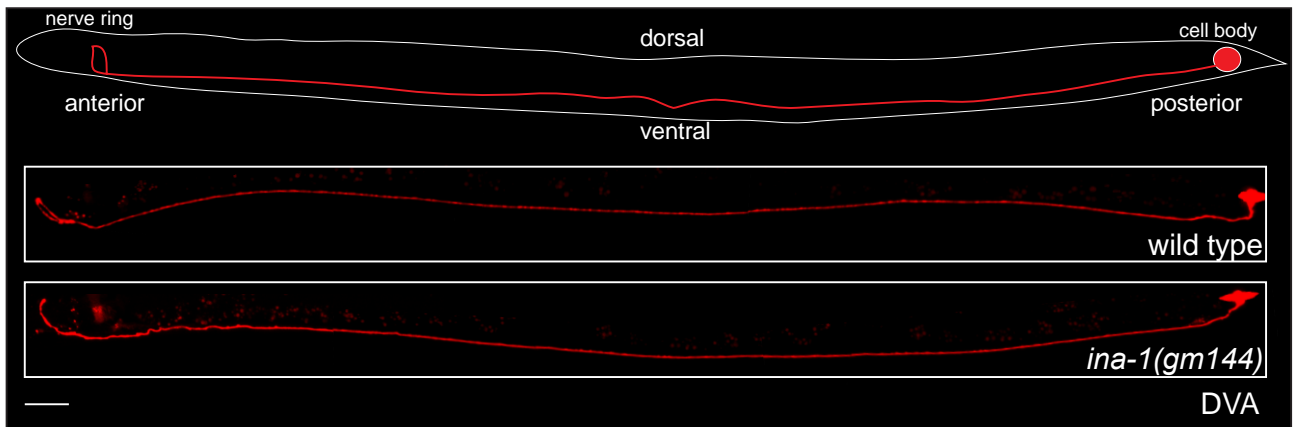


Figure S1. DVA develops independently of *ina-1*.

Top, Schematic of the DVA neuron. *Bottom panels*, Confocal images of DVA axon in wild type (n=28) and *ina-1(gm144)* animals (n=28). Scale bar, 20 μ m.

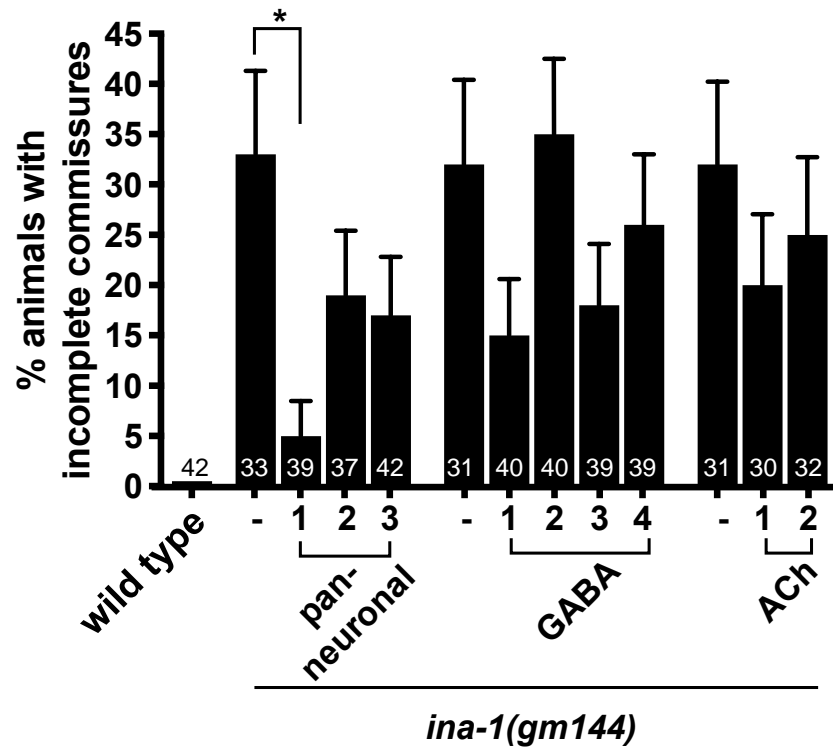


Figure S2. Quantification of incomplete commissures with cell-specific expression of wild type *ina-1* in *ina-1(gm144)* mutants. Promoters for pan-neuronal (*Prgef-1*), GABAergic (*Punc-47*), or cholinergic (*Punc-17β*) were used to drive expression of wild *ina-1* cDNA in *ina-1(gm144)* mutants. Data are plotted as the percentage of incomplete GABAergic commissures for each genotype. Error bars indicate standard error of the proportion. Pan-neuronal expression line #1 provided significant rescue. * $p < 0.02$, Fisher's exact test with Bonferroni correction for multiple comparisons.