Supplementary material for Riabinina et al, 2019

Figure S1

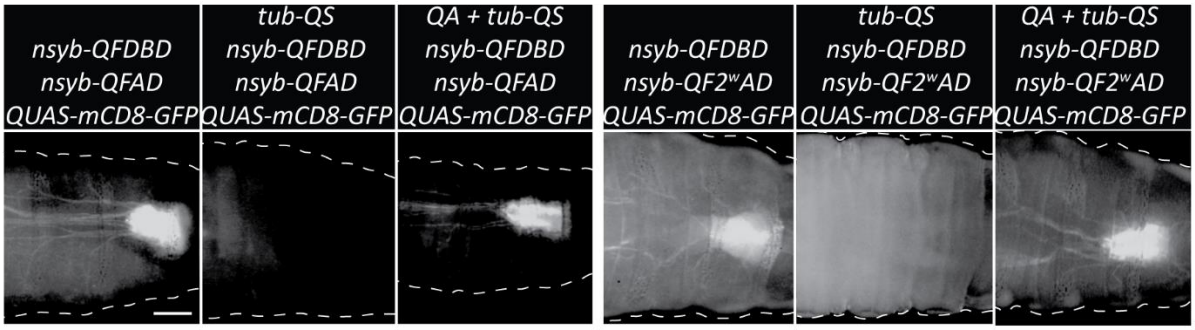

Figure S1. Quantification and validation of split-QF reagents. Pan-neuronal expression of GFP in the larval CNS by split-QF. Panels 1,2, 4 and 5 are the same as in Fig 1. Panels 3 and 6 show QA-induced de-repression. Scale bars, 200µm.

Figure S2

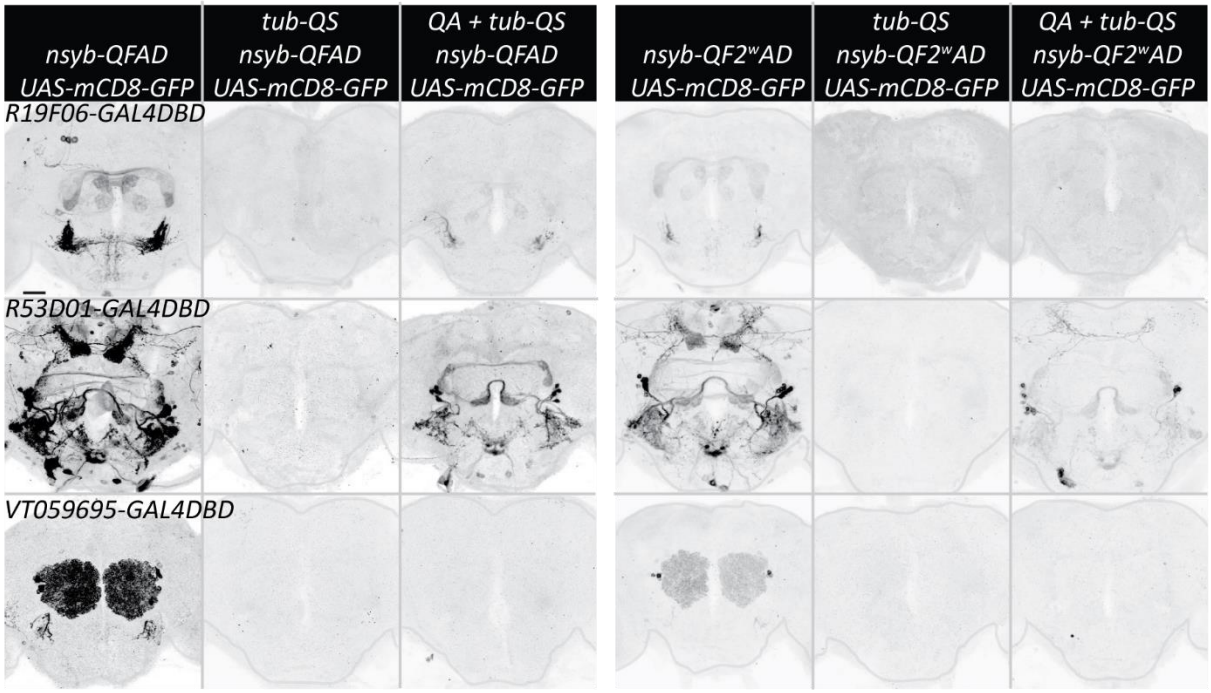

Figure S2. split-QF and split-GAL4. Expression of GFP in adult CNS, driven by *R19F06-GAL4DBD* (top), *R53D01-GAL4DBD* (middle), *VT059695-GAL4DBD* (bottom) and *nsyb-QFAD* (3 left columns) or *nsyb-QF2^{w}AD* (three right columns). Second and fifth columns show *tub-QS*-induced repression. Third and sixth columns show recovery of expression in adults that were fed quinic acid for 5 days. Scale bar, 50µm.

Figure S3

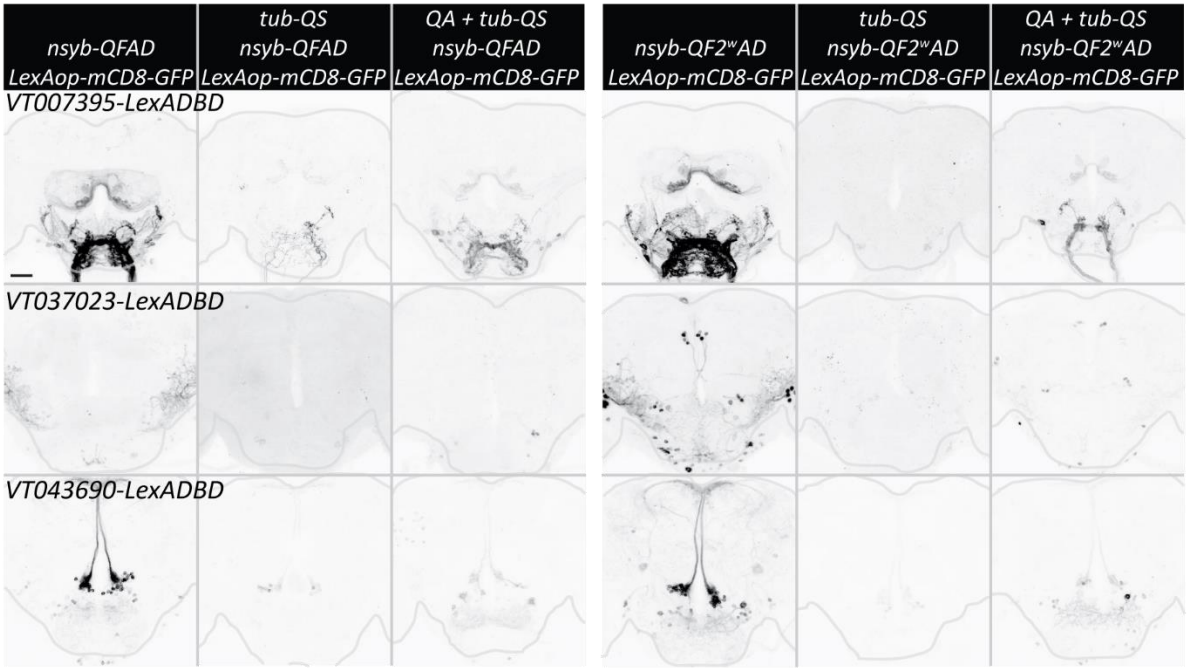

Figure S3. split-QF and split-LexA. Expression of GFP in adult CNS, driven by *VT007395-LexADBD* (top), *VT037023-LexADBD* (middle), *VT043690-LexADBD* (bottom) and *nsyb-QFAD* (3 left columns) or *nsyb-QF2^{w}AD* (three right columns). Second and fifth columns show *tub-QS*-induced repression. Third and sixth columns show recovery of expression in adults that were fed quinic acid for 5 days. Scale bar, 50µm.

Table S1. Quantification of expression strength of split-QF reagents in larvae

Larval genotype	Relative luciferase activity, mean±SEM	N
nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	341 ± 17	10
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	15 ± 1	8
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc + QA	266 ± 61	5
nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	143 ± 33	10
tub-QS,nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	10 ± 1	10
tub-QS,nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc + QA	221 ± 29	10
nsyb-QFDBD, nsyb-p65AD, QUAS-Luc	654 ± 42	6
nsyb-QFDBD, nsyb-GAL4AD, QUAS-Luc	24 ± 4	5
nsyb-QF2, QUAS-Luc	767 ± 91	5
tub-QS,nsyb-QF2, QUAS-Luc	20 ± 2	5
tub-QS,nsyb-QF2, QUAS-Luc + QA	376 ± 75	6
nsyb-QF2^{w}, QUAS-Luc	431 ± 55	10
tub-QS,nsyb-QF2^{w}, QUAS-Luc	11 ± 1	10
tub-QS,nsyb-QF2^{w}, QUAS-Luc + QA	258 ± 33	10

Table S2. Quantification of expression strength of split-QF reagents in adults

Adult genotype	Relative luciferase activity, mean±SEM	N
Females		
nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	1076 ± 72	5
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	60 ± 3	5
nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	681 ± 40	5
tub-QS,nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	35 ± 2	5
nsyb-QFDBD, nsyb-p65AD, QUAS-Luc	1719 ± 74	5
nsyb-QFDBD, nsyb-GAL4AD, QUAS-Luc	30 ± 1	5
nsyb-QFDBD, QUAS-Luc	36 ± 1	5
nsyb-QFAD, QUAS-Luc	25 ± 1	5
nsyb-QF2^{w}AD, QUAS-Luc	23 ± 1	5
nsyb-QF2, QUAS-Luc	2207 ± 150	5
tub-QS,nsyb-QF2, QUAS-Luc	51 ± 23	5
nsyb-QF2^{w}, QUAS-Luc	973 ± 63	5
tub-QS,nsyb-QF2^{w}, QUAS-Luc	58 ± 2	5
Males		
nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	1337 ± 71	5
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	61 ± 1	3
nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	670 ± 37	4
tub-QS,nsyb-QFDBD, nsyb-QF2^{w}AD, QUAS-Luc	73 ± 13	4
nsyb-QFDBD, nsyb-p65AD, QUAS-Luc	2667 ± 202	5
nsyb-QFDBD, nsyb-GAL4AD, QUAS-Luc	54 ± 1	5
nsyb-QFDBD, QUAS-Luc	64 ± 4	5
nsyb-QFAD, QUAS-Luc	67 ± 4	5
nsyb-QF2^{w}AD, QUAS-Luc	45 ± 2	5
nsyb-QF2, QUAS-Luc	2410 ± 167	4
tub-QS,nsyb-QF2, QUAS-Luc	90 ± 3	5

nsyb-QF2^{w}, QUAS-Luc	1764 ± 95	5
tub-QS,nsyb-QF2^{w}, QUAS-Luc	83 ± 2	5

Table S3. Quantification of expression strength of split-QF + split-GAL4 reagents in larvae

Larval genotype	Relative luciferase activity, mean±SEM	N
elav-GAL4DBD, nsyb-QFAD, UAS-Luc	213 ± 16	6
tub-QS, elav-GAL4DBD, nsyb-QFAD, UAS-Luc	1.4 ± 0.1	3
tub-QS, elav-GAL4DBD, nsyb-QFAD, UAS-Luc + QA	44 ± 9	5
elav-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	167 ± 12	6
tub-QS, elav-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	1.6 ± 0.1	6
tub-QS, elav-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc + QA	60 ± 5	5
elav-GAL4DBD, nsyb-p65AD, UAS-Luc	lethal	0
elav-GAL4DBD, nsyb-GAL4AD, UAS-Luc	9 ± 1	6
nsyb-GAL4QF, UAS-Luc	319 ± 10	6
tub-QS,nsyb-GAL4QF, UAS-Luc	2.5 ± 0.2	6
tub-QS,nsyb- GAL4QF, UAS-Luc + QA	199 ± 21	6

Table S4. Quantification of expression strength of split-QF + split-GAL4 reagents in adults

Adult genotype	Relative luciferase activity, mean±SEM	N
Females		
ChAT-GAL4DBD, nsyb-QFAD, UAS-Luc	488 ± 50	5
tub-QS, ChAT-GAL4DBD, nsyb-QFAD, UAS-Luc	10 ± 3	5
ChAT-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	366 ± 8	5
tub-QS, ChAT-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	6 ± 1	5
ChAT-GAL4DBD, nsyb-p65AD, UAS-Luc	1763 ± 217	5
ChAT-GAL4DBD, nsyb-GAL4AD, UAS-Luc	12 ± 4	5
ChAT-GAL4DBD, UAS-Luc	4.2 ± 0.6	5
nsyb-QFAD, UAS-Luc	8 ± 2	5
nsyb-QF2^{w}AD, UAS-Luc	2.8 ± 0.4	5
nsyb-GAL4QF, UAS-Luc	798 ± 274	5
tub-QS, nsyb-GAL4QF, UAS-Luc	16 ± 2	5
Males		
ChAT-GAL4DBD, nsyb-QFAD, UAS-Luc	606 ± 56	5
tub-QS, ChAT-GAL4DBD, nsyb-QFAD, UAS-Luc	15 ± 1	5
ChAT-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	459 ± 6	5
tub-QS, ChAT-GAL4DBD, nsyb-QF2^{w}AD, UAS-Luc	6.3 ± 0.3	5
ChAT-GAL4DBD, nsyb-p65AD, UAS-Luc	2803 ± 330	5
ChAT-GAL4DBD, nsyb-GAL4AD, UAS-Luc	27 ± 2	5
ChAT-GAL4DBD, UAS-Luc	5.8 ± 0.7	5
nsyb-QFAD, UAS-Luc	6.3 ± 0.7	5
nsyb-QF2^{w}AD, UAS-Luc	8 ± 3	5
nsyb-GAL4QF, UAS-Luc	1377 ± 139	5
tub-QS, nsyb-GAL4QF, UAS-Luc	12 ± 1	5

Table S5. Quantification of repression by QS and KZip$^+$

Adult genotype	Relative luciferase activity, mean±SEM	Repression, fold	N
Females			
nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	823 ± 70		5
nsyb-QFDBD, nsyb-QFAD, nsyb-LexAQF, lexAop-KZip+, QUAS-Luc	226 ± 18	3.6	4
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	52 ± 10	15.8	5
elav-QFDBD, nsyb-QFAD, UAS-Luc	737 ± 93		5
elav-QFDBD, nsyb-QFAD, nsyb-LexAQF, lexAop-KZip+, UAS-Luc	61 ± 32	12	5
tub-QS,elav-QFDBD, nsyb-QFAD, UAS-Luc	17 ± 2	43	5
Males			
nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	818 ± 30		5
nsyb-QFDBD, nsyb-QFAD, nsyb-LexAQF, lexAop-KZip+, QUAS-Luc	99 ± 16	8.3	5
tub-QS,nsyb-QFDBD, nsyb-QFAD, QUAS-Luc	61 ± 3	13.4	4
elav-QFDBD, nsyb-QFAD, UAS-Luc	1464 ± 46		5
elav-QFDBD, nsyb-QFAD, nsyb-LexAQF, lexAop-KZip+, UAS-Luc	56 ± 13	26	5
tub-QS,elav-QFDBD, nsyb-QFAD, UAS-Luc	36 ± 4	41	5

Table S6. Optogenetic experiments in GAL4DBD + QF2^{w}AD larvae

Genotype	Number of spikes	N	Number of escapes	N
VGlut-GAL4DBD, nsyb-QF2^{w}AD,UAS-ChR2	43 ± 6	7	5.9 ± 0.6	10
tub-QS, VGlut-GAL4DBD, nsyb-QF2^{w}AD,UAS-ChR2	0 ± 0	5	11.1 ± 0.5	15
tub-QS, VGlut-GAL4DBD, nsyb-QF2^{w}AD,UAS-ChR2 + QA	10 ± 5	7	9.3 ± 0.4	10
VGlut-GAL4, UAS-ChR2	51 ± 6	7	0.2 ± 0.1	10

Table S7. Optogenetic experiments in split-QF larvae

Genotype	Number of escapes	N
nsyb-QFDBD, nsyb-QFAD,QUAS-ChR2	0 ± 0	10
tub-QS, nsyb-QFDBD, nsyb-QFAD,QUAS-ChR2	7.4 ± 0.7	10
tub-QS, nsyb-QFDBD, nsyb-QFAD,QUAS-ChR2 + QA	0.3 ± 0.2	10
nsyb-QFDBD, nsyb-QF2^{w}AD,QUAS-ChR2	0 ± 0	10
tub-QS, nsyb-QFDBD, nsyb-QF2^{w}AD,QUAS-ChR2	8 ± 0.8	7
tub-QS, nsyb-QFDBD, nsyb-QF2^{w}AD,QUAS-ChR2 + QA	0.1 ± 0.1	9

Table S8. Thermogenetic experiments in split-QF adults

Time, min	**Number of flies on the bottom of the vial**			
	nsyb-QFDBD, nsyb-QFAD,QUAS-shibire^{TS} (N=5)	*tub-QS, nsyb-QFDBD, nsyb-QFAD,QUAS-shibire^{TS} (N=4)*	*nsyb-QFDBD, nsyb-QF2^{w}AD,QUAS-shibire^{TS} (N=5)*	*tub-QS, nsyb-QFDBD, nsyb-QF2^{w}AD,QUAS-shibire^{TS} (N=4)*
0	0 ± 0	0 ± 0	0.2 ± 0.2	0 ± 0
0.5	0.4 ± 0.2	0 ± 0	0 ± 0	0 ± 0
1	0.4 ± 0.2	0 ± 0	0 ± 0	0 ± 0
1.5	0.6 ± 0.4	0 ± 0	0 ± 0	0.5 ± 0.3
2	1.2 ± 0.6	0 ± 0	0.2 ± 0.2	0.25 ± 0.25
2.5	1.6 ± 0.8	0 ± 0	0.2 ± 0.2	0.25 ± 0.25
3	1.8 ± 0.8	0 ± 0	0.8 ± 0.6	0.25 ± 0.25
3.5	2.4 ± 1.1	0 ± 0	0.8 ± 0.6	0.5 ± 0.3
4	3.2 ± 1.2	0 ± 0	1 ± 0.5	0.75 ± 0.25
4.5	3.6 ± 1.3	0 ± 0	1.4 ± 0.7	0.75 ± 0.25
5	4 ± 1.3	0 ± 0	1.2 ± 0.7	0.75 ± 0.25
5.5	4.4 ± 1.4	0.25 ± 0.25	1.6 ± 0.7	0.5 ± 0.3
6	4.2 ± 1.4	0.25 ± 0.25	2 ± 0.7	0.75 ± 0.25
6.5	5.8 ± 1.4	0.25 ± 0.25	3 ± 1.2	1 ± 0.4
7	7 ± 1	0.25 ± 0.25	3 ± 1.4	0.5 ± 0.3
7.5	7.4 ± 0.8	0.25 ± 0.25	3.6 ± 1.3	0.5 ± 0.3
8	7.8 ± 0.7	0 ± 0	3.8 ± 1.3	0.5 ± 0.3
8.5	9 ± 0.5	0.25 ± 0.25	4.8 ± 1	0.5 ± 0.3
9	9.4 ± 0.2	0 ± 0	5.2 ± 1.3	0.75 ± 0.5
9.5	9.8 ± 0.2	0 ± 0	5.8 ± 1	0.75 ± 0.5
10	9.8 ± 0.2	0.5 ± 0.5	6.4 ± 1	1.3 ± 0.9
10.5	9.8 ± 0.2	0.5 ± 0.5	7.4 ± 1	1 ± 1
11	10 ± 0	0.25 ± 0.25	8 ± 0.6	0.5 ± 0.3
11.5	10 ± 0	0 ± 0	8.2 ± 0.7	0.25 ± 0.25
12	10 ± 0	0 ± 0	8.4 ± 0.7	0.3 ± 0.3
12.5	10 ± 0	0 ± 0	8.8 ± 0.5	0 ± 0
13	10 ± 0	0 ± 0	9.2 ± 0.5	0 ± 0
13.5	10 ± 0	0 ± 0	9.4 ± .4	0 ± 0
14	10 ± 0	0 ± 0	9.2 ± 0.5	0 ± 0
14.5	10 ± 0	0 ± 0	9.8 ± 0.2	0 ± 0
15	10 ± 0	0 ± 0	10 ± 0	0 ± 0