

Figure S1 Quantification analyses for *P[SBP::trp]* transgenic flies. (A) Quantification of the relative TRP level in *P[SBP::trp]* flies, based on Western blot analyses represented in Figure 1A. $n=3$. *, $P < 0.05$ (Unpaired Student's *t*-tests). (B) Quantification of ERG data represented in Figure 1B. "Initial peak" indicated the peak receptor potential after the orange light is turned on. "Before light off" indicates the receptor potential just before the light is turned off. $n \geq 5$ for each genotype. **, $P < 0.01$ (one-way ANOVA with Holm-Sidak post-hoc analyses).

A

-----*inaF-C* promoter-----

D. melanogaster TGACAGCCAGGCACAAAAC**TAATCCGCTTT**GCTACGTG
D. ananassae TGACAGCCATGCACAAAAC**TAATCCGCTTT**GCTGCGTG
D. willistoni TGTCAGACTTGCACAAAAT**TAATCCGCTTT**TCCACGTT
D. mojavensis TGACAGGCACGCAGAAAAC**TAATCCGCTTT**AGCACCTA
D. virilis TGACAGACACGCATAAAAAC**TAATCCGCTTT**AGCACGTT
D. grimshawi TGACAGGCACGCACAAAAC**TAATCCGCTTT**AGCATGTG

** *** * *** *****
RCSI-like *

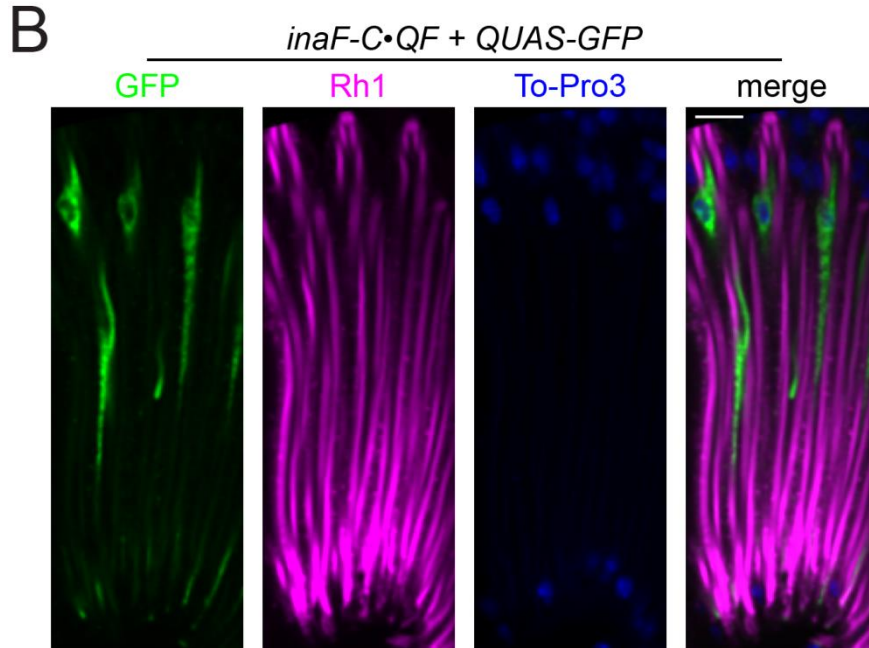


Figure S2 *inaF-C* promoter analyses. (A) Alignment of *inaF-C* promoter regions flanking the RCSI-like element (red) in various *Drosophila* species. * indicates nucleotides conserved among all species. (B) Longitudinal optical section of a compound eye from a fly that expresses *QF* under control of the wild-type *inaF-C* promoter (*inaF-C*•*QF*) to drive *QUAS-GFP*. The eye was stained with anti-GFP (green), anti-Rh1 (magenta), and a nuclear counterstain, To-PRO3 (blue). The scale bar indicates 10 μm .

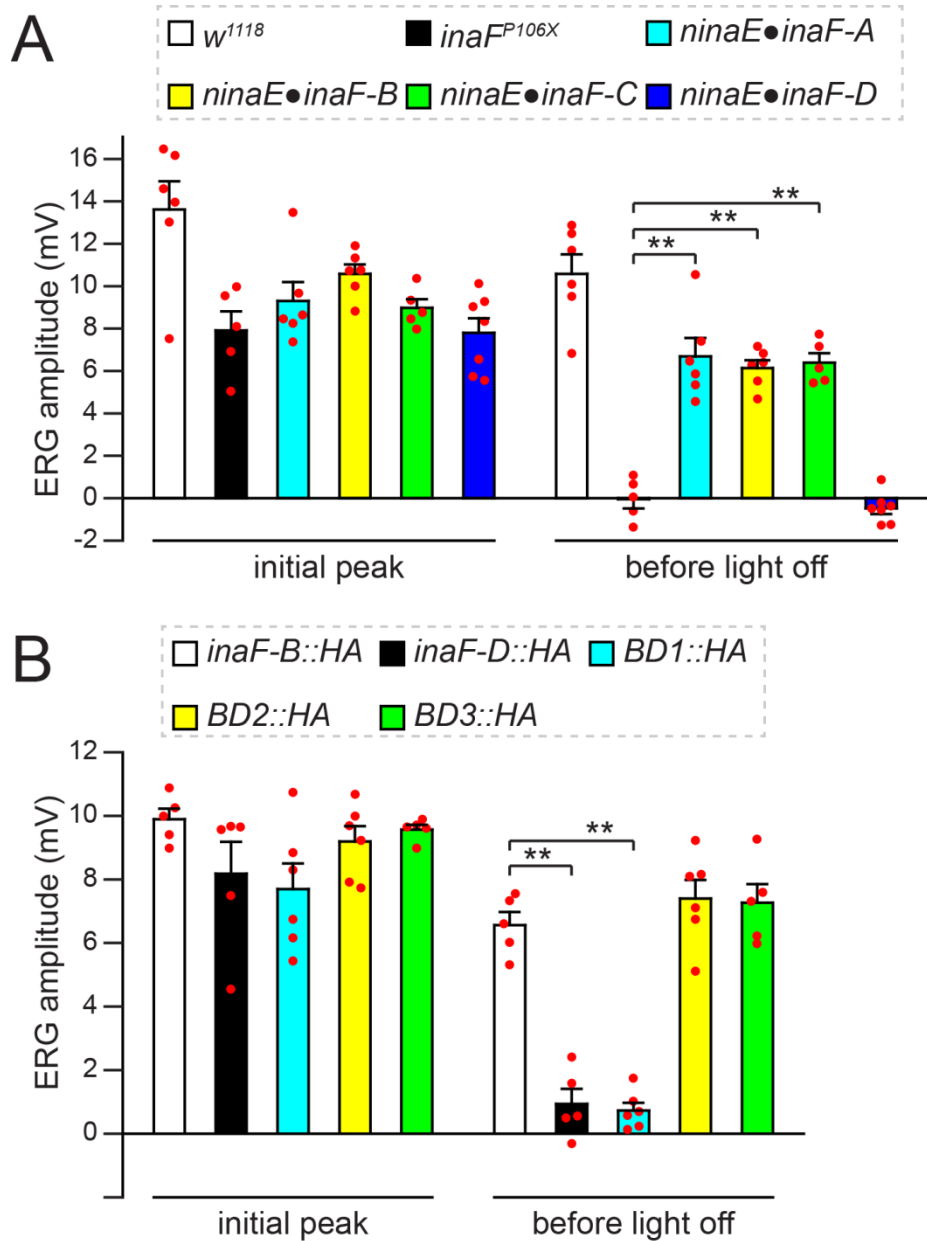


Figure S3 Quantification of ERG traces shown in Figure 7, C and H. “Initial peak” indicates the peak amplitude after the light is turned on. “Before light off” is the receptor potential just before the light is turned off. (A) Quantification of ERG data shown in Figure 7C. (B) Quantification of ERG data shown in Figure 7H. **, $P < 0.01$ (one-way ANOVA with Holm-Sidak post-hoc analyses). $n \geq 5$ for each genotype.

Protein	Mol. Weight (kD)	1 st mass spectrometry (Total Spectrum counts)		2 nd mass spectrometry (Total Spectrum counts)	
		control	SBP::TRP	control	SBP::TRP
TRP	140	8	178	31	704
INAD	75	0	45	5	252
INAC (PKC)	80	2	10	2	48
NORPA (PLC)	125	0	6	0	14
INAF-B	9	0	12	0	0
INAF-C	15	0	8	0	9

Table S1 Mass spectrometry to identify TRP-interacting proteins. Head extracts were prepared in duplicate from w^{1118} (**control**) and transgenic flies expressing SBP::TRP in all photoreceptor cells in a trp^{343} background (**SBP::TRP**). SBP::TRP was affinity purified using streptavidin resin, and the peptides were analyzed by mass spectrometry after trypsin digestion. The total numbers of peptide spectrum counts corresponding to the indicated proteins are shown.

Light pulse	Event	Amplitude (mV) (mean \pm SEM, for Figure 1, G-K)				
		<i>w</i> ¹¹¹⁸	<i>trp</i> ³⁴³	<i>inaF</i> ^{P106X}	<i>inaF</i> ^{AB}	<i>inaF</i> ^{AA}
1 st	initial peak	12.9 \pm 1.6	9.5 \pm 0.6	8.6 \pm 1.6	8.8 \pm 1.0	12.5 \pm 2.0
	before light off	10.2 \pm 1.2	0.1 \pm 0.3	0.9 \pm 0.3	0.3 \pm 0.3	11.1 \pm 1.6
	5 s after light off	0.7 \pm 0.3	0.3 \pm 0.3	0.4 \pm 0.2	0.1 \pm 0.1	0.2 \pm 0.4
2 nd	initial peak	13.0 \pm 1.5	9.5 \pm 0.6	8.1 \pm 1.0	7.8 \pm 1.0	12.6 \pm 2.1
	before light off	11.2 \pm 1.3	0.1 \pm 0.2	1.4 \pm 0.3	3.3 \pm 0.6	12.8 \pm 2.2
	5 s after light off	7.9 \pm 1.0	0.4 \pm 0.2	0.5 \pm 0.1	0.6 \pm 0.3	9.7 \pm 1.7
3 rd	initial peak	16.3 \pm 2.5	4.1 \pm 0.4	4.8 \pm 0.9	9.5 \pm 1.4	17.5 \pm 3.0
	before light off	12.7 \pm 1.8	0.6 \pm 0.2	0.1 \pm 0.2	3.1 \pm 0.7	13.5 \pm 2.0
	5 s after light off	8.3 \pm 1.5	0.9 \pm 0.4	0.2 \pm 0.2	0.4 \pm 0.4	9.8 \pm 1.8
4 th	initial peak	10.8 \pm 1.5	2.5 \pm 0.4	2.7 \pm 0.5	4.7 \pm 0.7	12.8 \pm 2.1
	before light off	8.1 \pm 1.3	-0.3 \pm 0.4	-0.4 \pm 0.2	0.1 \pm 0.5	10.7 \pm 1.8
	5 s after light off	2.0 \pm 0.6	-0.1 \pm 0.4	0.1 \pm 0.1	0.4 \pm 0.3	0.4 \pm 0.5
5 th	initial peak	11.8 \pm 1.5	4.1 \pm 0.7	3.8 \pm 0.6	3.8 \pm 0.7	12.7 \pm 2.0
	before light off	8.6 \pm 1.2	-0.1 \pm 0.3	-0.3 \pm 0.3	-0.2 \pm 0.5	10.7 \pm 1.8
	5 s after light off	-0.5 \pm 0.6	-0.2 \pm 0.2	-0.1 \pm 0.2	-0.4 \pm 0.2	-0.1 \pm 0.3

Light pulse	Event	Amplitude (mV) (mean \pm SEM, for Figure 1, L-O)			
		<i>inaF</i> ^{AD}	<i>inaF</i> ^{AC}	<i>inaF</i> ^{AABD}	<i>inaF</i> ^{ABC}
1 st	initial peak	12.3 \pm 1.6	13.0 \pm 1.6	8.7 \pm 1.1	9.4 \pm 0.8
	before light off	10.0 \pm 1.5	10.1 \pm 1.4	1.0 \pm 0.4	0.3 \pm 0.3
	5 s after light off	0.8 \pm 0.6	-0.4 \pm 0.4	0.9 \pm 0.4	0.7 \pm 0.2
2 nd	initial peak	13.3 \pm 2.2	13.6 \pm 1.6	8.1 \pm 0.8	9.5 \pm 1.2
	before light off	11.3 \pm 1.6	12.1 \pm 1.5	3.1 \pm 0.4	1.1 \pm 0.4
	5 s after light off	8.4 \pm 1.2	8.7 \pm 1.1	0.6 \pm 0.2	0.7 \pm 0.2
3 rd	initial peak	14.9 \pm 1.5	15.6 \pm 1.7	9.2 \pm 0.9	6.2 \pm 1.1
	before light off	10.6 \pm 1.2	11.6 \pm 1.1	2.6 \pm 0.5	-0.1 \pm 0.2
	5 s after light off	6.9 \pm 1.1	8.4 \pm 0.9	0.1 \pm 0.3	0.2 \pm 0.2
4 th	initial peak	10.6 \pm 0.8	10.6 \pm 1.2	5.0 \pm 0.6	4.5 \pm 0.8
	before light off	8.2 \pm 0.8	8.5 \pm 0.9	0.7 \pm 0.1	-1.1 \pm 0.3
	5 s after light off	-0.4 \pm 0.4	-0.8 \pm 0.4	0.6 \pm 0.3	-0.4 \pm 0.3
5 th	initial peak	11.4 \pm 1.5	12.2 \pm 1.4	4.3 \pm 0.7	4.8 \pm 0.6
	before light off	8.9 \pm 1.6	10.0 \pm 1.7	0.6 \pm 0.2	-1.0 \pm 0.4
	5 s after light off	-0.6 \pm 0.3	-0.7 \pm 0.7	0.6 \pm 0.1	-0.8 \pm 0.4

Table S2 Quantification of light stimulated responses shown in Figure 1, G—O. The “initial peak” is the peak receptor potential after the light is turned on. “Before light off” is the receptor potential immediately before cessation of the light stimulus. “5 s after light off” is the receptor potential 5 sec after the light is turned off (afterpotential). The amplitudes (in mV) for the five consecutive light pulses (1st, orange; 2nd, blue; 3rd, blue; 4th, orange; 5th, orange) that comprise each PDA analysis are means \pm SEMs. The genotypes are indicated. $n \geq 5$.