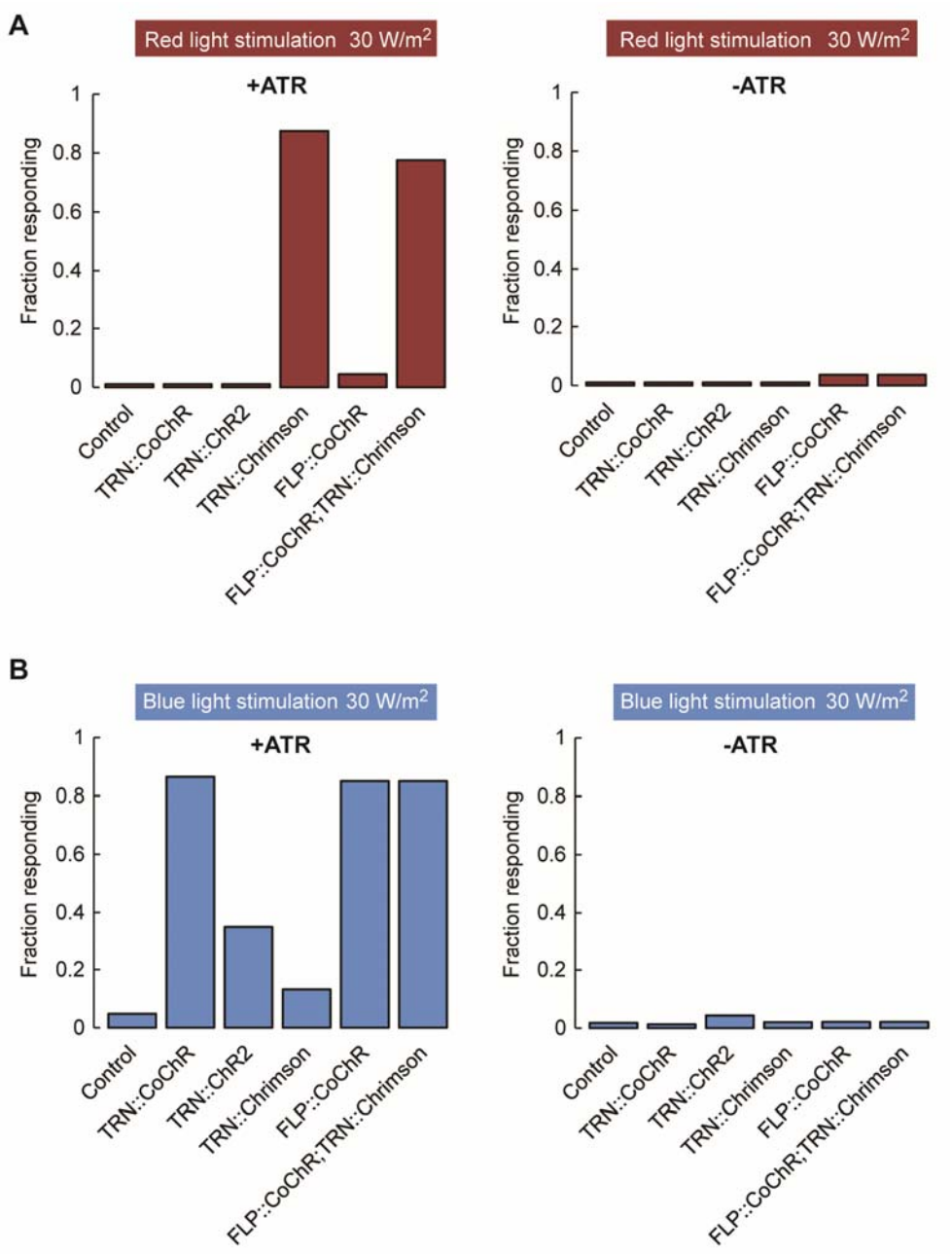

Figure S1 All-*trans*-retinal (ATR) is required for light-evoked behavior in Chrimson and CoChR expressing animals

(A, B) Backing behavior as in Figure 1B and C, in the presence (left panel) or the absence (right panel) of all-*trans*-retinal(ATR) in the growth medium; +ATR: $n \geq 33$ animals; -ATR: $n \geq 20$.

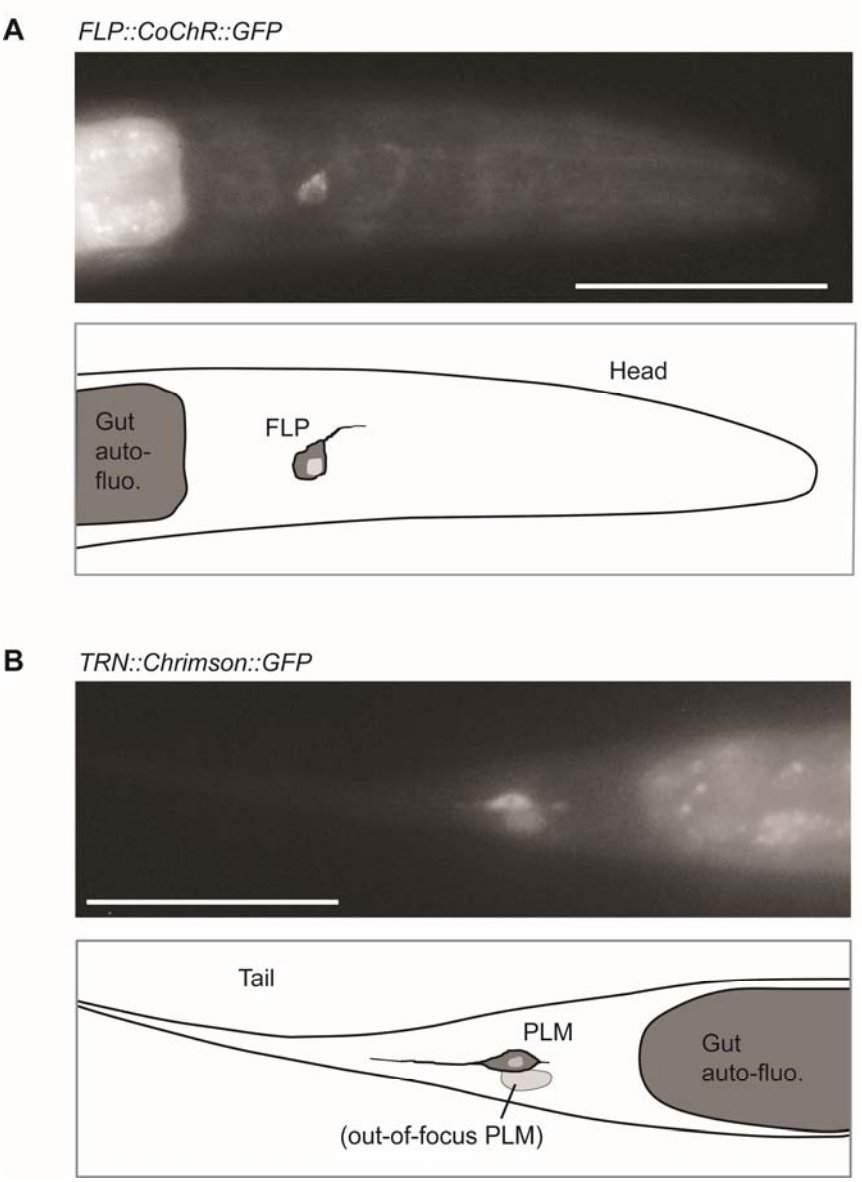

Figure S2 Expression of Chrimson::GFP and CoChR::GFP

(A, B) Representative fluorescence photomicrographs and corresponding schematic interpretations of transgenic animals expressing CoChR::GFP and Chrimson::GFP. Scale bars: 80 µm

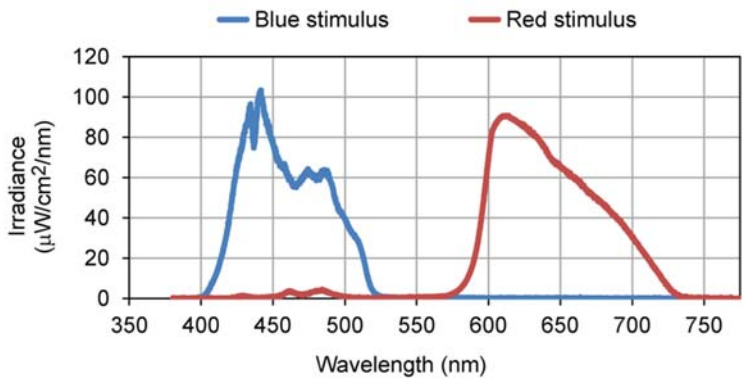

Figure S3 Excitation spectra of blue and red light stimuli

Comparison of the excitation spectra of blue and red light stimuli used in this study.

File S1

Blue light-evoked backing behavior in a *FLP::CoChR* animal

The video shows the behavioral response of a *FLP::CoChR* animal crawling at the surface of a food-containing NGM plate and repeatedly stimulated with blue light.

Available for download as a .wmv file at www.genetics.org/lookup/suppl/doi:10.1534/genetics.115.177956/-/DC1

Table S1 Plasmids used in this study

Plasmid	Description
GH50	GFP::unc-54UTR in slot3 Entry vector, gift from Erik Jorgensen
pMH473	unc-54UTR in slot3 Entry vector, gift from Mark Hammarlund
mg207	pDEST_R4R3, gift from Miriam Goodman
mg277	SL2::mCherry::unc-54UTR in slot3 Entry vector, gift from Miriam Goodman
dg9	unc-122p::RFP
dg68	mec-3 promoter in slot1 Entry vector
dg229	QUAS promoter in slot1 Entry vector
dg239	mec-4 promoter (2kb) in slot1 Entry vector
dg240	QF in slot2 Entry vector
dg241	QS in slot2 Entry vector
dg243	[mec-3p::QF], generated by LR recombination between mg207, pMH473, dg68 and dg240
dg245	[mec-4p::QS::SL2mCherry], generated by LR recombination between mg207, mg277, dg241, and mg239
dg260	[mec-4p::Chrimson::GFP], generated by LR recombination between mg207, GH50, mg239, and dg263
dg262	[mec-4p::CoChR::GFP], generated by LR recombination between mg207, GH50, mg239, and dg265
dg263	Chrimson, codon optimized and containing artificial introns in slot2 Entry vector, generated through gene synthesis in the pUC57-Kan backbone
dg264	Chronos, codon optimized and containing artificial introns in slot2 Entry vector, generated through gene synthesis in the pUC57-Kan backbone
dg265	CoChR, codon optimized and containing artificial introns in slot2 Entry vector, generated through gene synthesis in the pUC57-Kan backbone
dg276	[QUAS::CoChR::GFP], generated by LR recombination between mg207, GH50, mg229, and dg265

Table S2 Strains used in this study

Strain name	Genotype	Comment
N2	wild type	
KG1180	*lite-1(ce314)* X	Mutant displaying no behavioral response to UV and intense blue light.
AQ2313	*ljIs123[mec-4p::ChR2 codon optimized; unc-122p::rfp]*	*TRN::ChR2*
DAG252-255	*lite-1(ce314)* X; *domEx252-255[mec-4p::Chrimson::GFP, unc-122p::rfp]*	*TRN::Chrimson* Injected plasmids: dg260 (20 ng/μl), dg9 (20 ng/μl). We observed similar behavioral responses with all four independent lines and Figure 1 reports aggregated data.
DAG260-263	*lite-1(ce314)* X; *domEx260-263[mec-4p::CoChR::GFP, unc-122p::rfp]*	*TRN::CoChR* Injected plasmids: dg262 (20 ng/μl), dg9 (20 ng/μl). We observed similar behavioral responses with all four independent lines and Figure 1 reports aggregated data.
DAG272	*lite-1(ce314)* X; *domEx272[mec-3p::QF, mec-4p::QS, QUAS::CoChR::GFP, unc122p::RFP]*	*FLP::CoChR* Injected plasmids: dg243 (5 ng/μl), dg245 (40 ng/μl), dg276 (20 ng/μl), dg9 (20 ng/μl).
DAG342-344	*lite-1(ce314)* X; *domEx342-344[mec-4p::Chrimson::GFP, mec-3p::QF, mec-4p::QS, QUAS::CoChR::GFP, unc122p::RFP]*	*FLP::CoChR;TRN::Chrimson* Injected plasmids: dg243 (5 ng/μl), dg245 (40 ng/μl), dg276 (20 ng/μl), dg260 (20 ng/μl), dg9 (20 ng/μl). We observed similar behavioral responses with all three independent lines and Figure 2 reports aggregated data.
DAG355	*lite-1(ce314)* X; *domIs355[mec-3p::QF, mec-4p::QS, QUAS::CoChR::GFP, unc122p::RFP]*	*FLP::CoChR* DAG272 was integrated and outcrossed twice with KG1180 *lite-1(ce314)* to produce DAG355.
DAG356	*domIs355[mec-3p::QF, mec-4p::QS, QUAS::CoChR::GFP, unc122p::RFP]*	*FLP::CoChR* DAG355 was crossed with N2 to remove the *lite-1* mutation and create DAG356.