

FIGURE S1.—Comparison of CB4856 and N2 in isothermal controls for the *noxious heat thermogradient assay*. The distribution of N2 (blue) and CB4856 (maroon) animals at constant temperature in the absence or presence of the attractant cocktail. (A)  $T = 21^\circ\text{C}$ . (B)  $T = 31^\circ\text{C}$ . Results are the mean of at least three independent 15-minute assays.

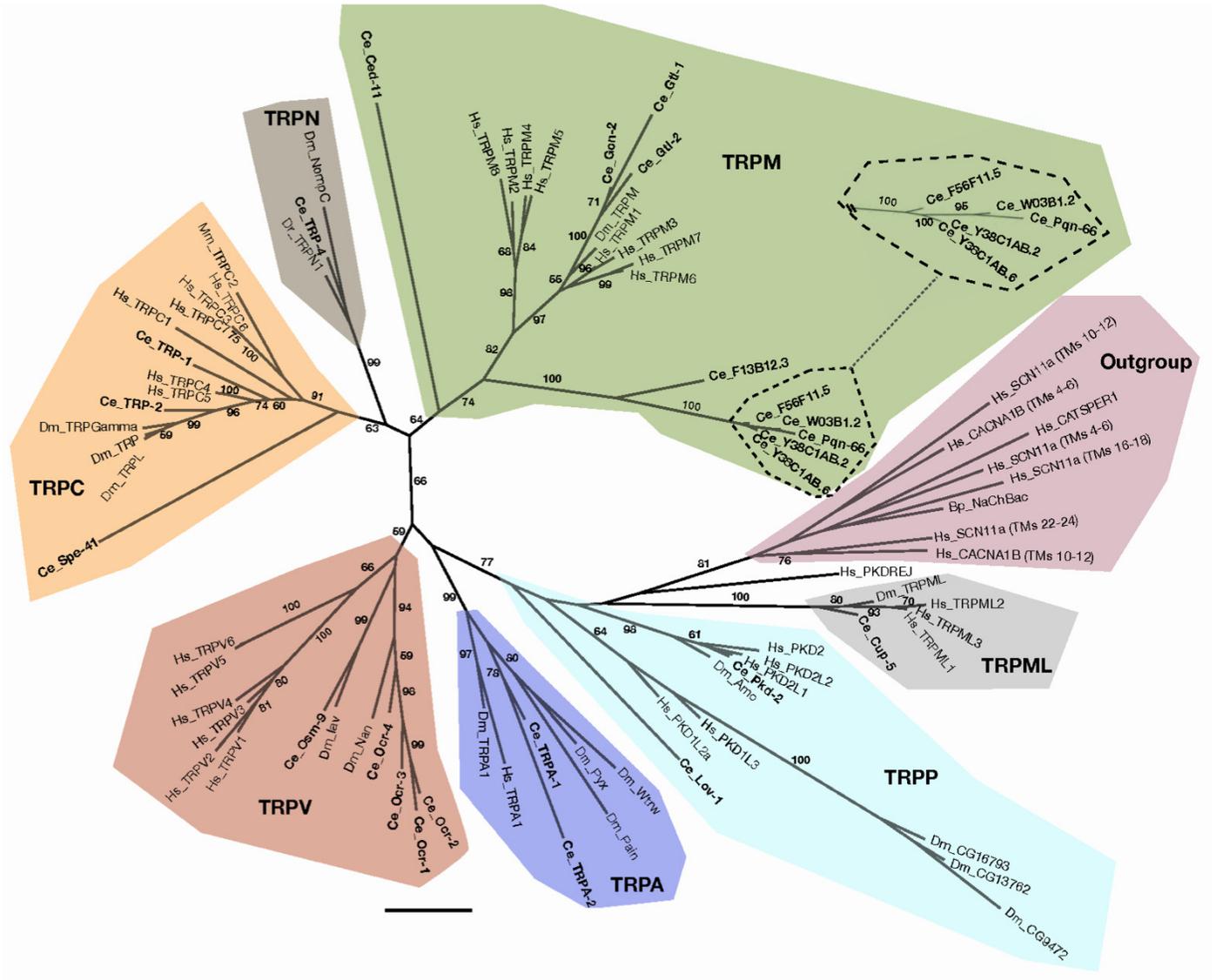


FIGURE S2.—*C. elegans* TRP phylogeny. Phylogeny of *C. elegans* (Ce) transient receptor potential (TRP) channels, with *D. melanogaster* (Dm) and vertebrate TRPs for comparison. Inset shows five closely related *C. elegans* TRPMs. Tree was rooted using *Bacillus pseudofirmus* (Bp) NaChBac and *H. sapiens* (Hs) CACNA1B (N-type voltage-gated calcium channel), SCN11A (voltage-gated sodium channel), and CATSPER1. Vertebrate TRPs are *H. sapiens* (Hs), except for TRPC2 (*M. musculus*, Mm) and TRPN1 (*D. rerio*, Dr). (Hs TRPC2 is a pseudo gene and there is no mammalian ortholog of TRPN1.) CACNA1B and SCN11A contain 24 transmembrane or TM domains; only the TMs indicated were used. Internal branches are labeled with bootstrap percentages. Branches with bootstrap percentages below 55% are unlabeled. Scale bar is 0.8 substitutions per site for main phylogeny, 0.3 for inset.

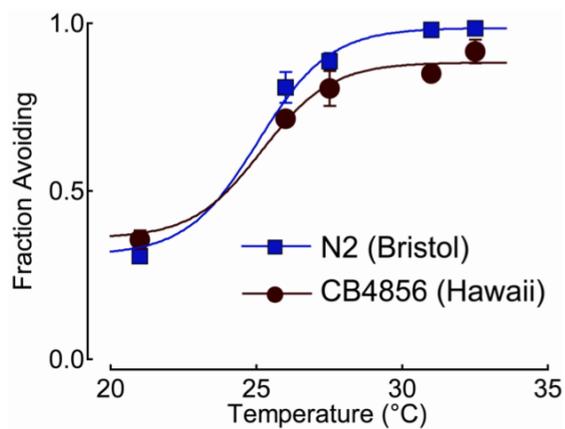


FIGURE S3.—Comparison of CB4856 and N2 in the *noxious heat barrier assay*. Fraction of worms that avoid the heat barrier *vs.* temperature in N2 (blue) and CB4856 (maroon). Adult animals were scored by counting the fraction of the population remaining to the left of the barrier (fraction avoiding) in a 10-minute assay.  $T = 21^{\circ}\text{C}$  is the control situation where the metal tube is not heated. Results are the mean of at least three independent assays; error bars are s.e.m. and are smaller than symbols in some cases.

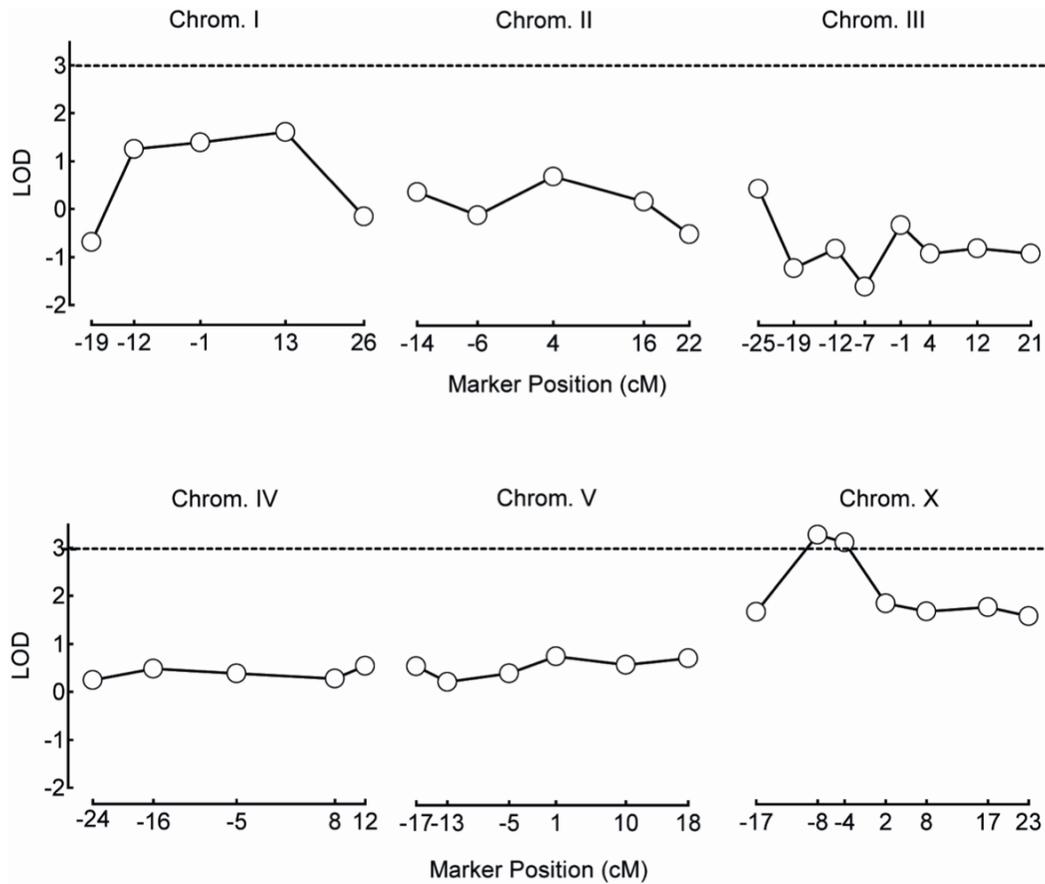


FIGURE S4.—Genome scale SNP mapping analysis. LOD scores derived from SNP marker mapping analyses for each chromosome. See *Materials and Methods* and Figure 5B legend for details. The threshold for significant association was set to 3 (dotted line). Significant linkage was detected only for chromosome X.

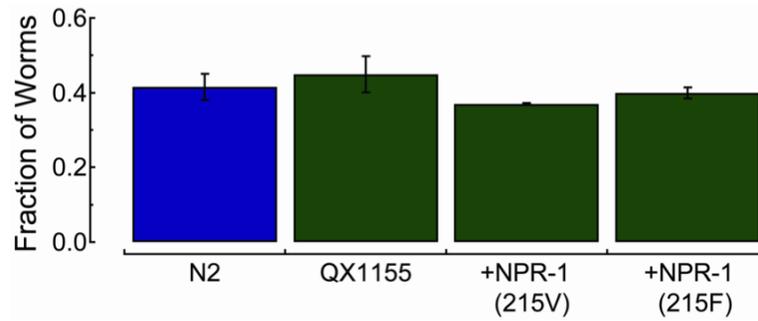


FIGURE S5.—Transgenic animal expressing NPR-1(215V) and NPR-1(215F) behaves like N2 at constant temperature. Worms from indicated genotypes were tested in an isothermal (21°C) environment in the presence of attractants, as depicted in Figure 2B. Scores are presented as fraction of worms that are found to the right of the position corresponding to a temperature of 33°C when temperature gradient is applied. There was no significant effect of genotype: one-way ANOVA,  $F_{(3,19)}=0.22$ ,  $p = 0.88$ . Bars are mean  $\pm$  s.e.m. of at least three independent assays.

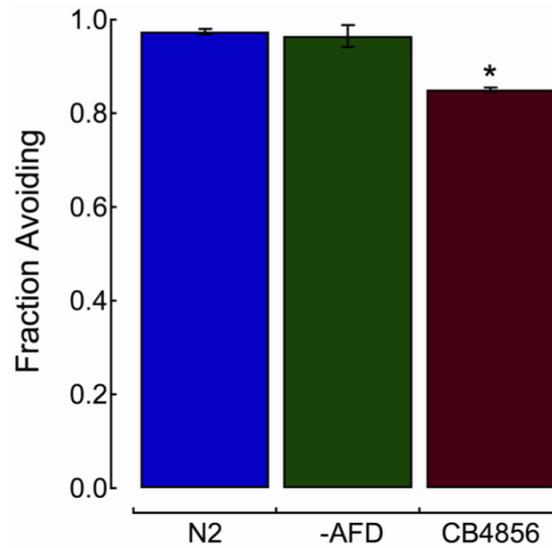


FIGURE S6.—Animals lacking the AFD neurons behave like N2 in *thermal barrier assays*. Fraction of worms with AFD ablated avoiding the barrier in *thermal barrier assays*. A barrier temperature of 31.5°C was used. Bars are the mean ( $\pm$  s.e.m.) of at least four independent assays. The CB4856 score is shown for comparison and was significantly decreased compared to N2. \*,  $p < 0.01$  by Student's t-test.

**TABLE S1**  
**SNP marker survey in CSSXB (*aka* GN360)**

Chromosome	Marker Position (cM)	Variant Type
I	-19	CB4856
	-12	N2
	-6	N2
	-1	CB4856
	5	CB4856
	14	CB4856
	26	CB4856
II	-18	CB4856
	-14	CB4856
	-6	CB4856
	1	CB4856
	11	CB4856
	16	CB4856
III	-25	CB4856
	-25	CB4856
	-12	CB4856
	-7	CB4856
	4	CB4856
	12	CB4856
IV	21	CB4856
	-24	CB4856
	-16	CB4856
	-5	CB4856
	1	CB4856
V	8	CB4856
	14	CB4856
	-17	CB4856
	-13	CB4856
	-5	CB4856
	1	CB4856
	6	CB4856
	10	CB4856
	13	CB4856
	18	CB4856

---

	-17	N2
	-8	N2
	-4	N2
X	8	N2
	11	N2
	17	N2
	23	N2

---