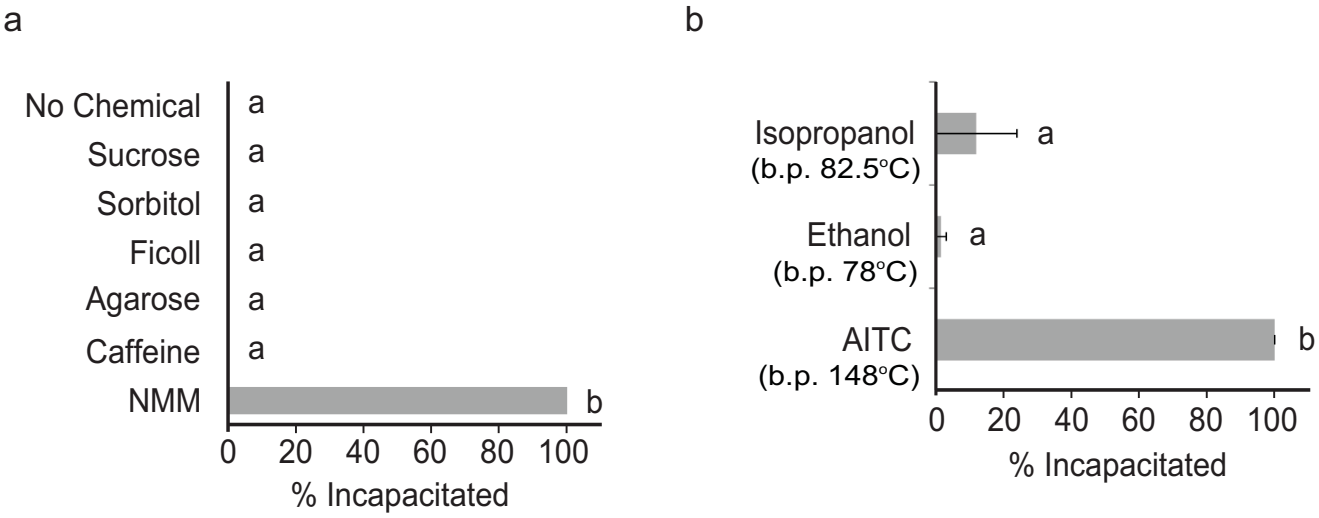
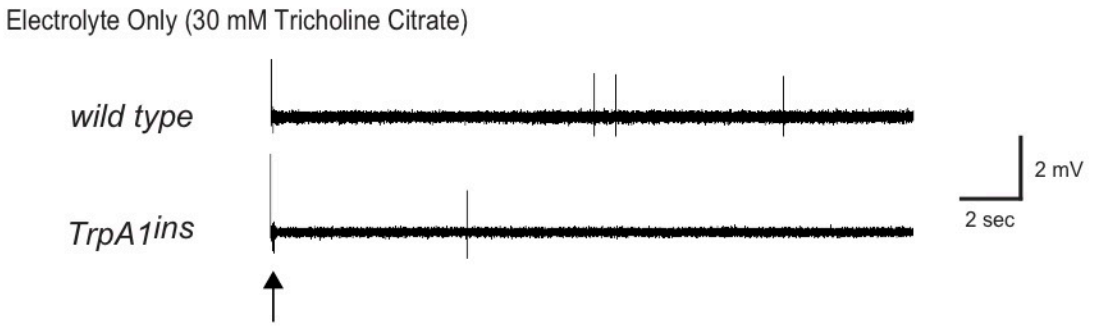


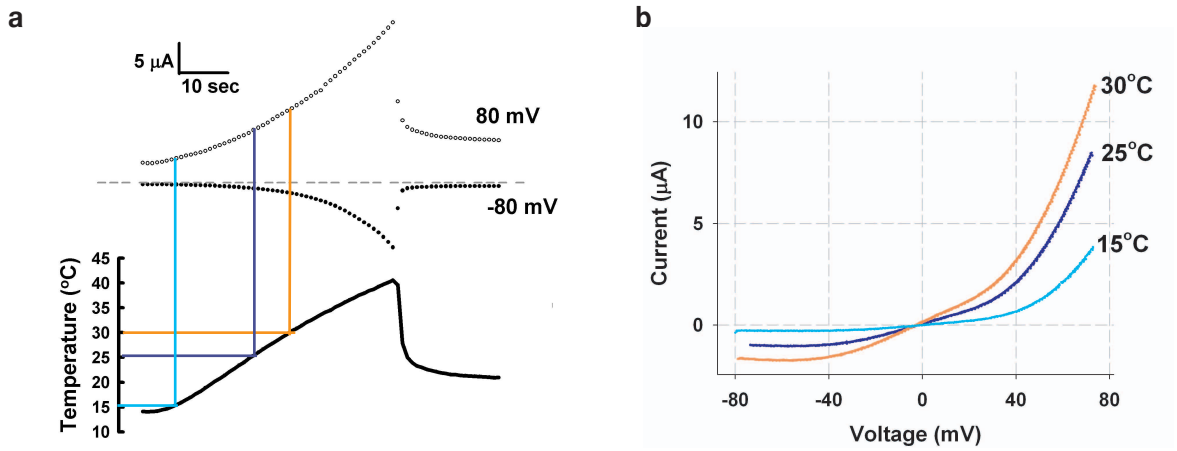
Supplementary Figure 1: Reactive electrophiles cause incapacitation in *Drosophila*. In all experiments, 15-30 flies were exposed to chemicals in 15 mL conical tubes. **a,** Solid chemicals were administered as ~50 mg powder for 5 min, tubes containing flies for testing were briefly vortexed to maximize exposure. "No Chemical" tubes were also vortexed as control. **b,** Undiluted Liquids were administered as ~50 µL drop applied to KimWipes for 1 min. b.p.= boiling point. **a-b,** **α=0.01, Tukey HSD. All data are mean +/- s.e.m. 15-30 flies/experiment, n=3 experiments/condition

Garrity_SuppFig. 2



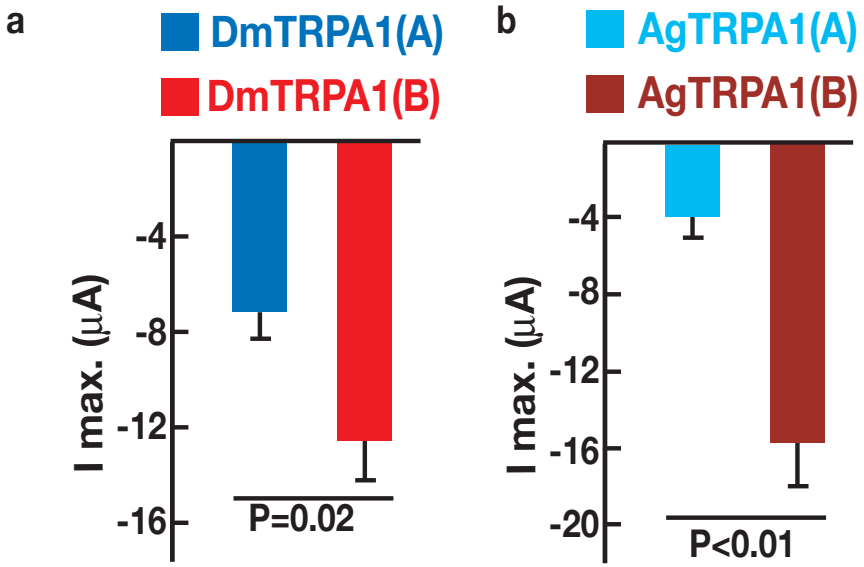
Supplementary Figure 2: Example responses from labellar gustatory bristles to electrolyte-only solution in wild type and *Trpa1*^{ins} mutants. Responses from berberine-sensitive i-type bristles. Arrow: artifact caused by initial contact with bristle.

Garrity_SuppFig. 3



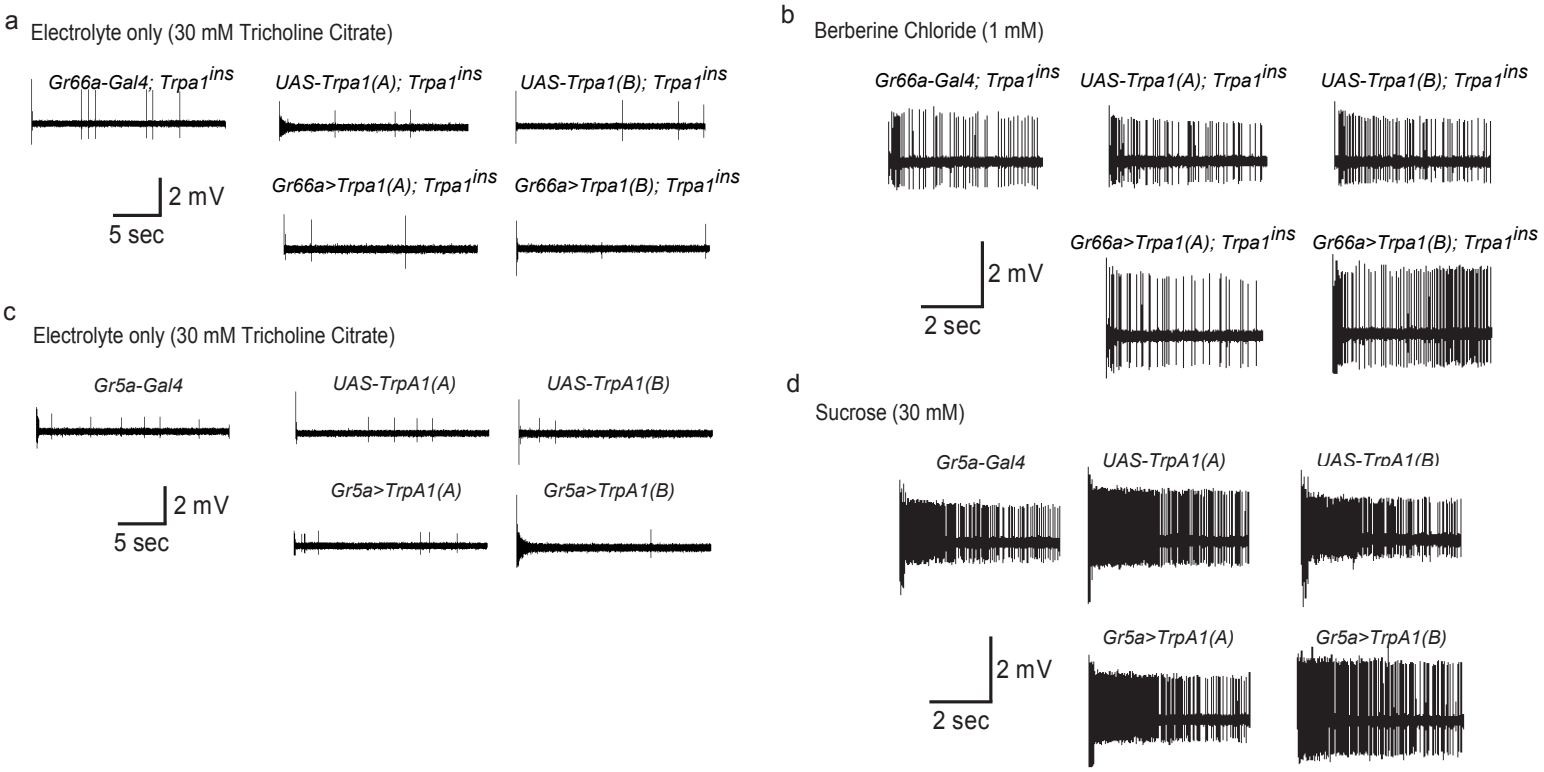
Supplementary Figure 3. TRPA1(A) currents below and above the transition temperature show similar reversal potentials and voltage dependences.
a. Temperature-dependent activity of TRPA1(A) at 80 and -80 mV in *Xenopus* oocytes. Voltage ramps between -80 and 80 mV were applied for 300 msec every second via two-electrode voltage clamp. Temperature was increased at ~0.5˚C/sec. *Light blue line* indicates current at 15˚C, while *purple and orange lines* currents at 25 and 30˚C, respectively.
b. Current-voltage relationships of TRPA1(A) activity at 15, 25 and 30˚C marked in ***(a)***.

Garrity_SuppFig. 4



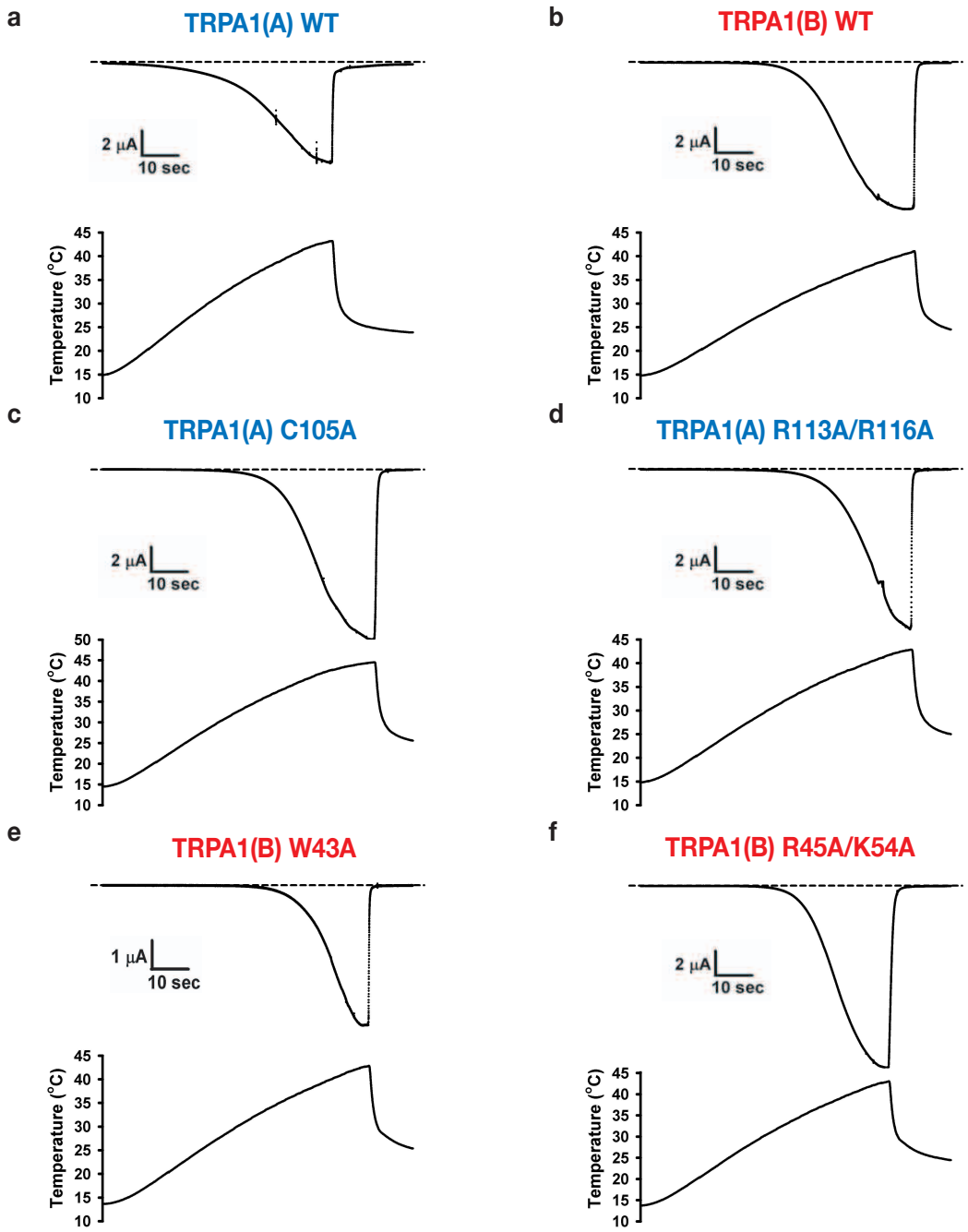
Supplementary Fig. 4. Comparison of maximum heat-responsive current amplitudes for wild type TRPA1(A) and TRPA1(B) channels from *Drosophila melanogaster* and *Anopheles gambiae.* **a, b,** Maximum TRPA1-dependent currents generated by temperature increase for *Drosophila* (**a**) and *Anopheles* (**b**) channels. Statistical comparisons by unpaired t-test

Garrity_SuppFig. 5



Supplementary Figure 5: Example responses from labellar gustatory bristles for TRPA1 rescue and gain-of-function. a, b, Responses of *TrpA1*^{ins}mutant, berberine-sensitive i-type bristles expressing different TRPA1 isoforms. **a, c,** Typical responses of bristles to electrolyte-only solution (30 mM tricholine citrate). **b, d,** Typical responses to positive control solutions used to confirm preparation viability. Berberine-sensitive i-type bristles confirmed with 1 mM berberine chloride **(b)** and L-type bristles confirmed with 30 mM sucrose **(d)**.

Garrity_SuppFig. 6



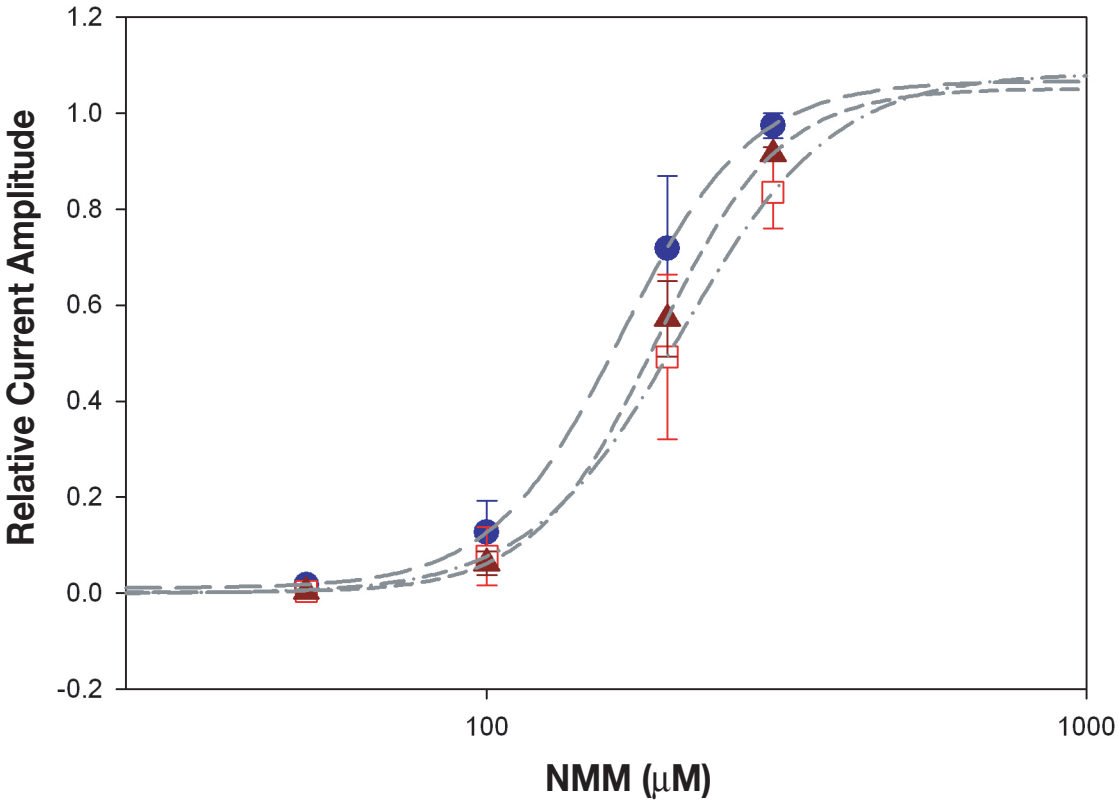
Supplementary Figure 6. Representative current recordings of wild type TRPA1 isoforms and TRPA1(A) mutants. Lower traces show temperature ramps from 15 to 45°C (~0.5°C/sec) applied to frog oocytes expressing TRPA1 channels as indicated. Currents were recorded at -60 mV held by two-electrode voltage clamp. ***a-d.*** The corresponding arrhenius plots are presented in Figure 4.

Garrity_SuppFig. 7

	Imax (heat)	Imax (NMM)	Imax (heat)/Imax (NMM)
TRPA1(A) WT	-7.3 +/- 1.1	-20.3 +/- 2.1	0.36
TRPA1(A) C105A	-7.9 +/- 2.1	-14.1 +/- 2.4	0.56
TRPA1(A) R113A/R116A	-7.8 +/- 1.4	-13.1 +/- 1.9	0.59
TRPA1(B) WT	-12.4 +/- 1.7	-24.2 +/- 0.6	0.51
TRPA1(B) W43A	-3.7 +/- 0.4	nd	---
TRPA1(B) R45A/K54A	-8.7 +/- 1.5	nd	---

Supplementary Fig. 7. Comparison of maximum current responses for wild-type and mutant TRPA1 channels. Maximum TRPA1-dependent currents generated by temperature increase and by 300 μM NMM application in oocytes. For comparison to wild type channels, the heat responses of mutant channels that exhibited increased thermal sensitivity by Q10 (TRPA1(A)C105A and TRPA1(A) R113A/R116A) were normalized by dividing maximum heat responses by maximum NMM responses.

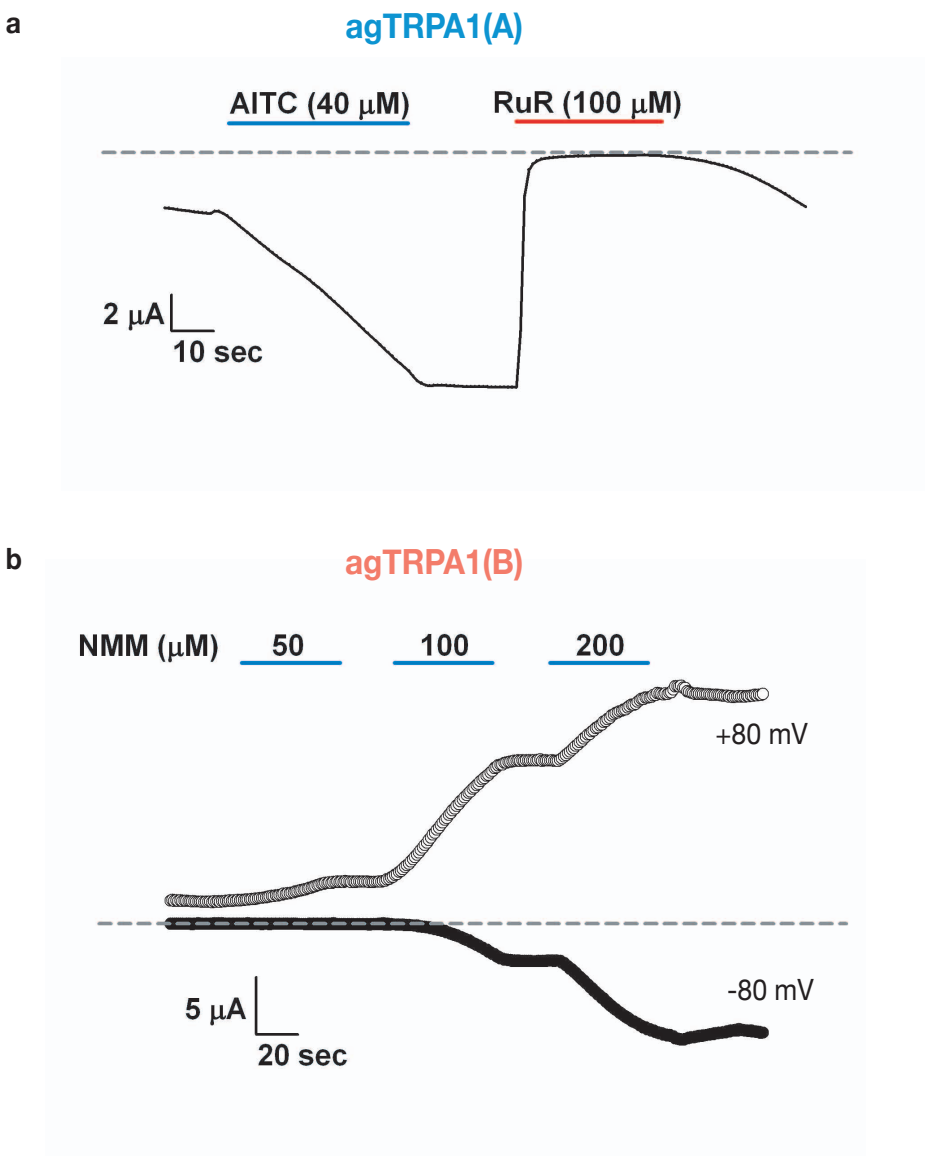
Garrity_SuppFig. 8



	EC50 (μM)	Hill Coefficient
TRPA1(A) WT	168+/-21	4.0+/-1.6
TRPA1(A) C105A	211+/-73	3.4+/-2.6
TRPA1(A) R113A/R116A	192+/-13	4.3+/-1.3

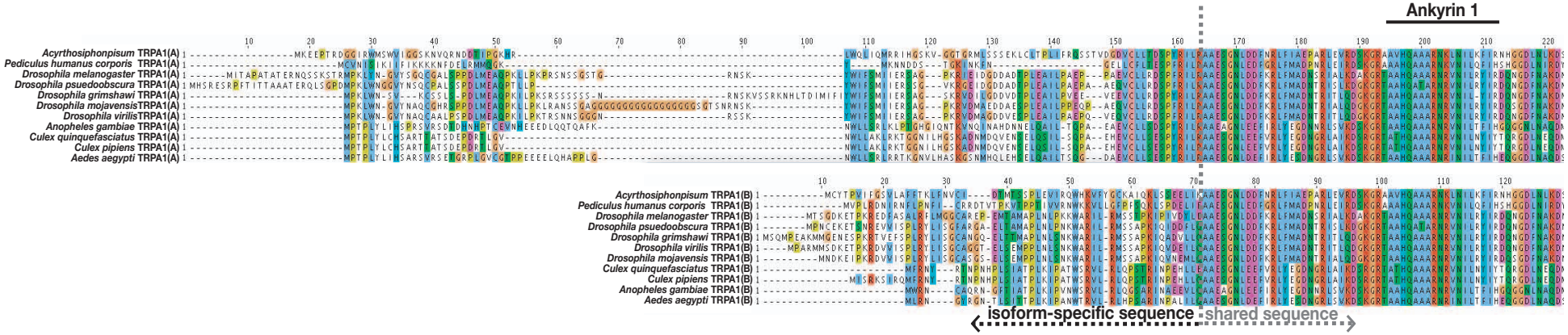
Supplementary Figure 8. NMM sensitivities of TRPA1(A) mutants are similar to that of wild type TRPA1(A).
A series of NMM concentrations from 50 to 300 μM was applied to *Xenopus* oocytes expressing wild type and mutant forms of TRPA1(A). The data were collected following 1-min perfusion of each NMM concentration at -80 mV, and fitted to the Hill equation. All data are means; error bars indicate +/-SEM

Garrity_SuppFig. 9



Supplementary Figure 9. Both agTRPA1(A) and agTRPA1(B) robustly respond to reactive electrophiles.
***a*.** A frog oocyte expressing agTRPA1(A) was perfused with 40 μM allylisothiocyanate (AITC) for 1 min, and washed for 30 sec. Subsequently, the AITC-evoked current was blocked by 100 μM ruthenium red (RuR). The current was recorded at -60 mV held by two-electrode voltage clamp (TEVC).
b. Three concentrations of NMM from 50 to 200 μM were sequentially exposed to a oocyte expressing agTRPA1(B) with 30 sec washing intervals as indicated. Currents were recorded while 300 msec-voltage swipes between -80 and 80 mV were applied every second via TEVC.

Garrity_SuppFig. 10



Supplementary Figure 10. Conservation of TRPA1 diversity in insect pests. Multiple sequence alignments of insect TRPA1 isoforms. Position of ankyrin repeat #1 in TRPA1 is noted.