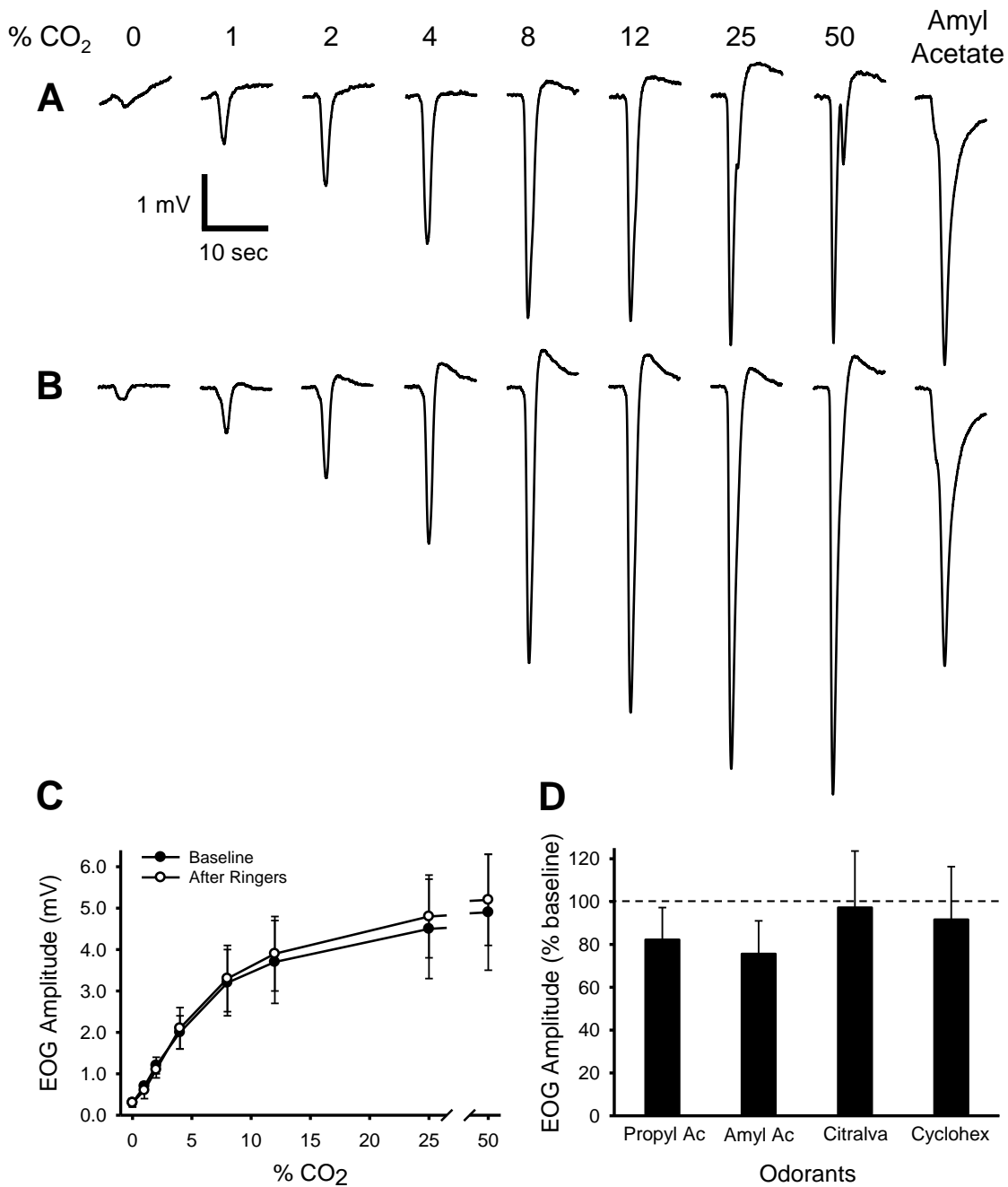
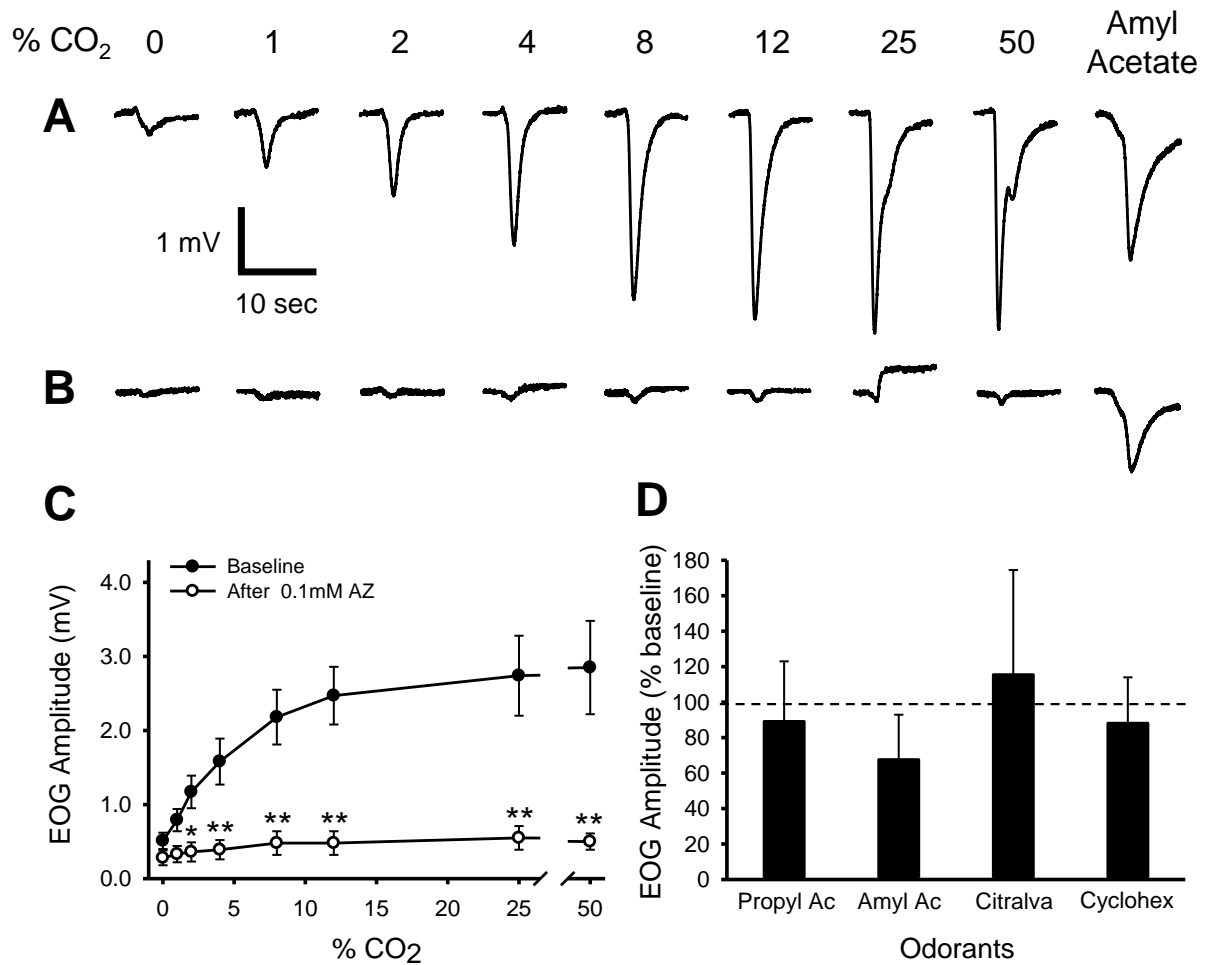


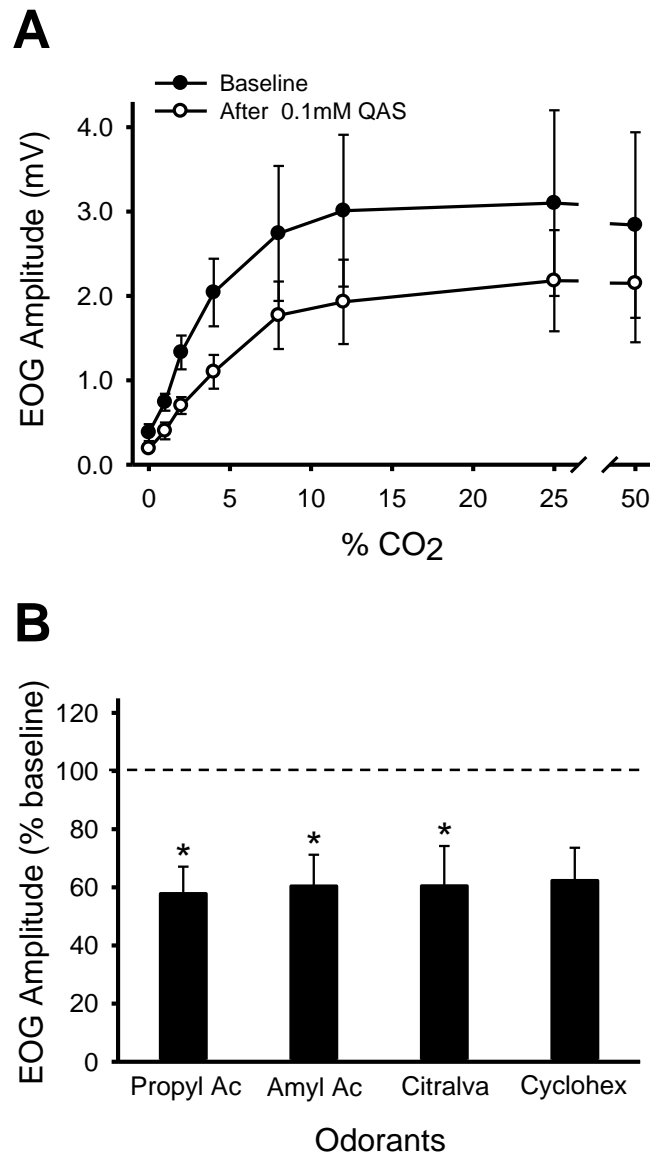
**Figure 1:** Examples of EOGs recorded in response to 8% (A,B,C,D) and 50% CO<sub>2</sub> (E). Each waveform is from a different site on the olfactory epithelium and from a different mouse. Only sites exhibiting a typical EOG waveform (A), in response to 8% CO<sub>2</sub>, were analyzed in the experiments.



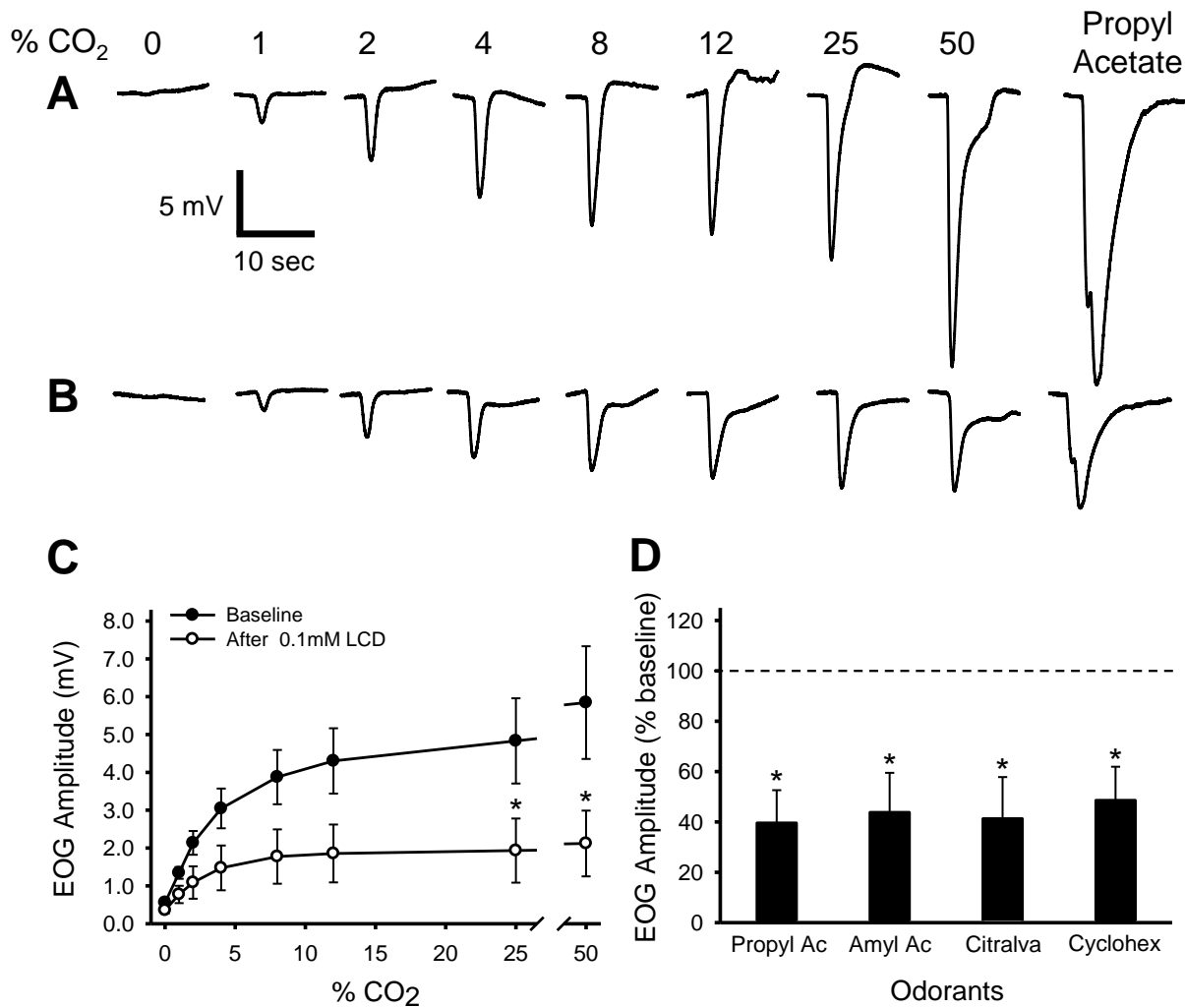
**Figure 2:** Typical EOG responses to CO<sub>2</sub> and amyl acetate before (A) and after (B) topical application of mammalian Ringers. C. Average ( $\pm$ SEM) baseline EOG responses to CO<sub>2</sub> (filled circles) and EOG responses to CO<sub>2</sub> after application of Ringers (open circles). N=6. D. Average ( $\pm$ SEM) EOG response to propyl acetate (N=7, P=0.191, baseline=5.5 $\pm$ 0.9mV, after Ringers=4.3 $\pm$ 0.9mV), amyl acetate (N=7, P=0.151, baseline=6.6 $\pm$ 2.2mV, after Ringers =4.9 $\pm$ 1.7mV), citralva (N=6, P=0.237, baseline=3.7 $\pm$ 1.9mV, after Ringers =2.6 $\pm$ 1.2mV), and cyclohexanone (N=5, P=0.235, baseline=3.9 $\pm$ 1.7mV, after Ringers =2.9 $\pm$ 1.1mV) after application of Ringers.



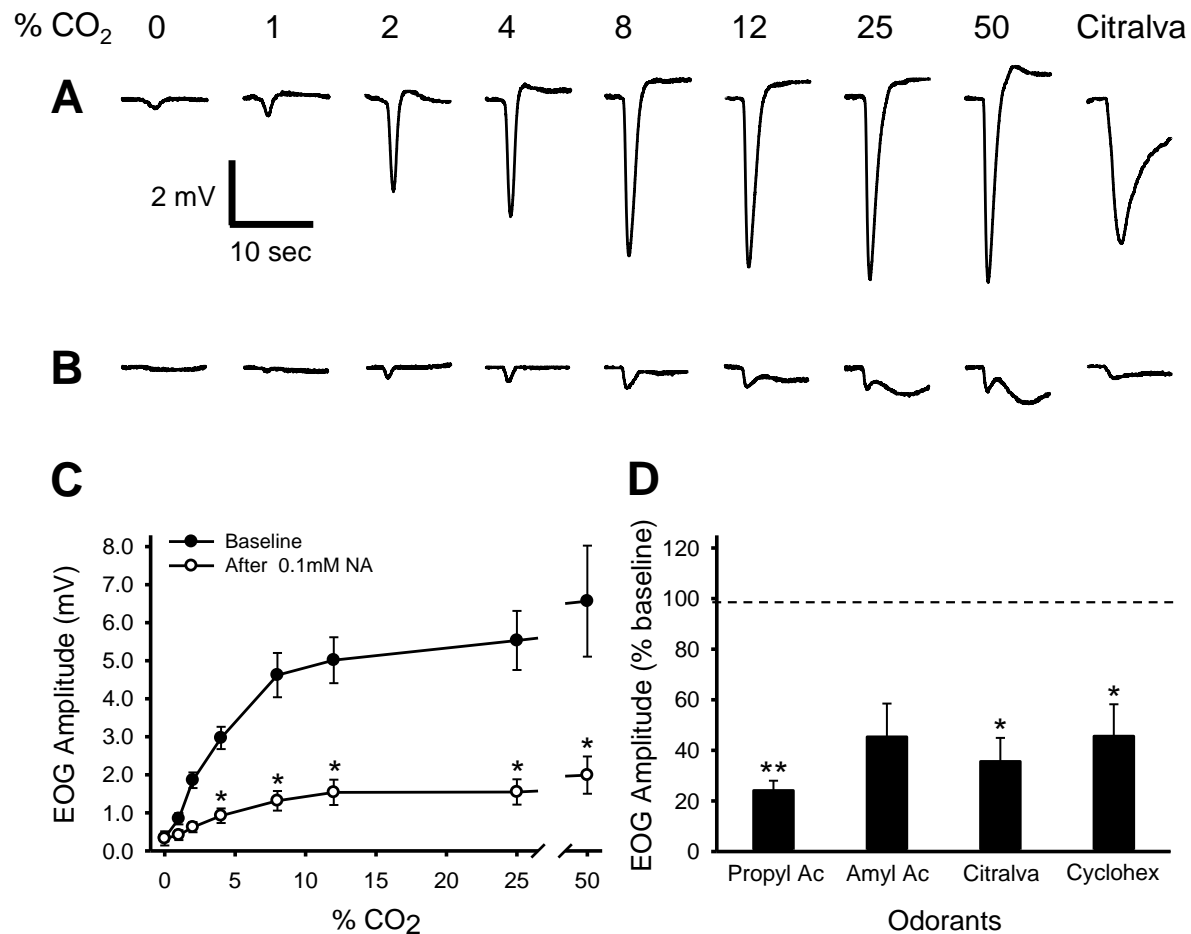
**Figure 3:** Typical EOG responses to CO<sub>2</sub> and amyl acetate before (A) and after (B) topical application of the membrane permeant CA inhibitor, acetazolamide (AZ). C. Average ( $\pm$ SEM) baseline EOG responses to CO<sub>2</sub> (filled circles) and after application of AZ (open circles). N=7. D. Average ( $\pm$ SEM) EOG response to propyl acetate (N=6, P=0.523, baseline=5.7 $\pm$ 1.1mV, after AZ=4.6 $\pm$ 1.4mV), amyl acetate (N=8, P=0.134, baseline=2.6 $\pm$ 0.4mV, after AZ =1.5 $\pm$ 0.5mV), citralva (N=4, P=0.999, baseline=2.5 $\pm$ 1.4mV, after AZ=2.5 $\pm$ 1.6mV), and cyclohexanone (N=6, P=0.266, baseline=2.6 $\pm$ 1.2mV, after AZ=1.6 $\pm$ 0.5mV) after application of AZ. \* = P<0.05. \*\* = P<0.001.



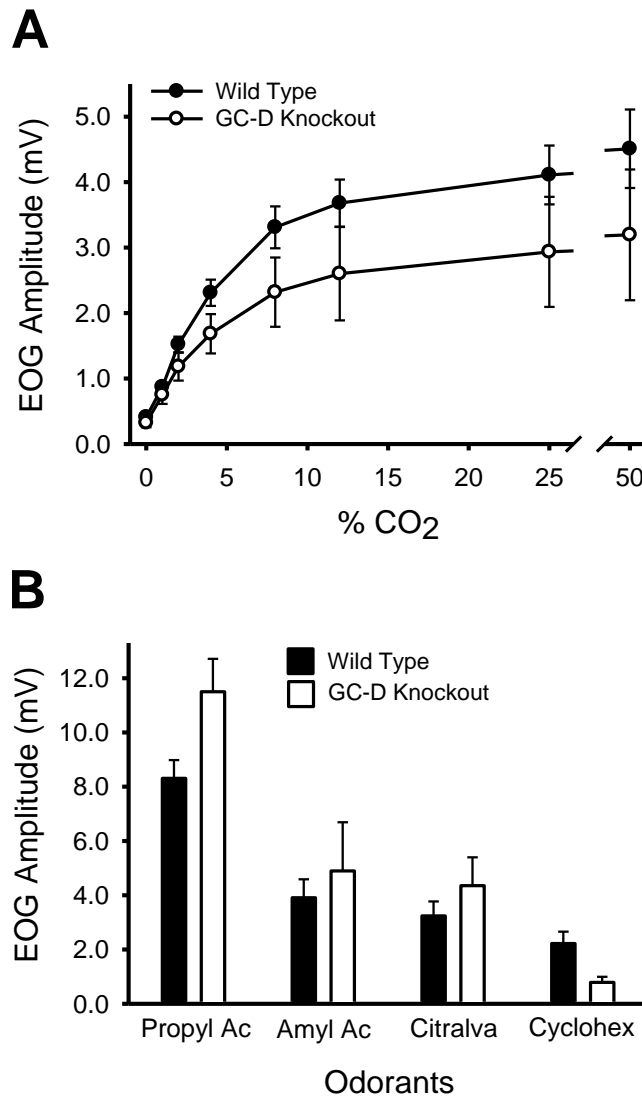
**Figure 4: A.** Average ( $\pm$ SEM) baseline EOG responses to CO<sub>2</sub> (filled circles) and after (open circles) topical application of the membrane impermeant CA inhibitor, quaternary ammonium sulfanilamide (QAS). There was no significant effect on EOG responses to CO<sub>2</sub> after treatment with QAS. N=6. **B.** Average ( $\pm$ SEM) EOG response to propyl acetate (N=8, P=0.005, baseline=7.6 $\pm$ 1.3mV, after QAS=4.1 $\pm$ 0.9mV), amyl acetate (N=6, P=0.048, baseline=5.1 $\pm$ 1.9mV, after QAS=3.9 $\pm$ 2.0mV), citralva (N=6, P=0.049, baseline=2.7 $\pm$ 0.8mV, after QAS=1.9 $\pm$ 0.8mV), and cyclohexanone (N=5, P=0.099, baseline=3.1 $\pm$ 1.0mV, after QAS=2.2 $\pm$ 1.0mV) after application of QAS. \* = P<0.05.



**Figure 5:** Typical EOG responses to CO<sub>2</sub> and odorants before (**A**) and after (**B**) treatment with L-*cis*-diltiazem (LCD), an inhibitor of cGMP-sensitive CNG channels. **C.** Average ( $\pm$ SEM) baseline EOG responses to CO<sub>2</sub> (filled circles) and after (open circles) application of LCD. N=6. **D.** Average ( $\pm$ SEM) EOG response to propyl acetate (N=6, P=0.01, baseline=11.1 $\pm$ 1.0mV, after LCD=4.1 $\pm$ 1.2mV), amyl acetate (N=6, P=0.034, baseline=2.1 $\pm$ 0.4mV, after LCD=0.7 $\pm$ 0.2mV), citralva (N=6, P=0.042, baseline=4.4 $\pm$ 1.1mV, after LCD=1.2 $\pm$ 0.4mV), and cyclohexanone (N=6, P=0.048, baseline=1.3 $\pm$ 0.2mV, after LCD=0.5 $\pm$ 0.1mV) after application of LCD. \* = P<0.05.



**Figure 6:** Typical EOG responses to CO<sub>2</sub> and odorants (**A**) before and (**B**) after treatment with 0.1 mM niflumic acid (NA), an inhibitor of Ca<sup>2+</sup> activated Cl<sup>-</sup> channels. **C.** Average ( $\pm$ SEM) baseline EOG responses to CO<sub>2</sub> (filled circles) and after (open circles) application of NA. N=7. **D.** Average ( $\pm$ SEM) EOG response to the propyl acetate (N=7, P=0.0002, baseline=11.7 $\pm$ 1.4mV, after NA=2.6 $\pm$ 0.5mV), amyl acetate (N=7, P=0.104, baseline=3.2 $\pm$ 1.5mV, after NA=0.7 $\pm$ 0.3mV), citralva (N=7, P=0.018, baseline=2.7 $\pm$ 0.6mV, after NA=0.9 $\pm$ 0.3mV), and cyclohexanone (N=7, P=0.012, baseline=0.8 $\pm$ 0.2mV, after NA=0.5 $\pm$ 0.3mV) after application of NA. \* = P<0.05, \*\* = P<0.001.



**Figure 7:** EOG responses to CO<sub>2</sub> and odorants in wild type and GC-D KO mice. **A.** Average ( $\pm$ SEM) EOG responses to CO<sub>2</sub> of wild type (filled circles; N=32) and GC-D KO mice (open circles; N=6). The six GC-D mice exhibited significant ( $P < 0.0001$ , Repeated Measures ANOVA) EOG responses to CO<sub>2</sub>. **B.** Average ( $\pm$  SEM) EOG responses to odorants of wild type (solid bars; propyl acetate, N=34; amyl acetate, N=34; citralva, N=29; cyclohexanone, N=29) and GC-D KO mice (open bars; N=6 for all odorants).