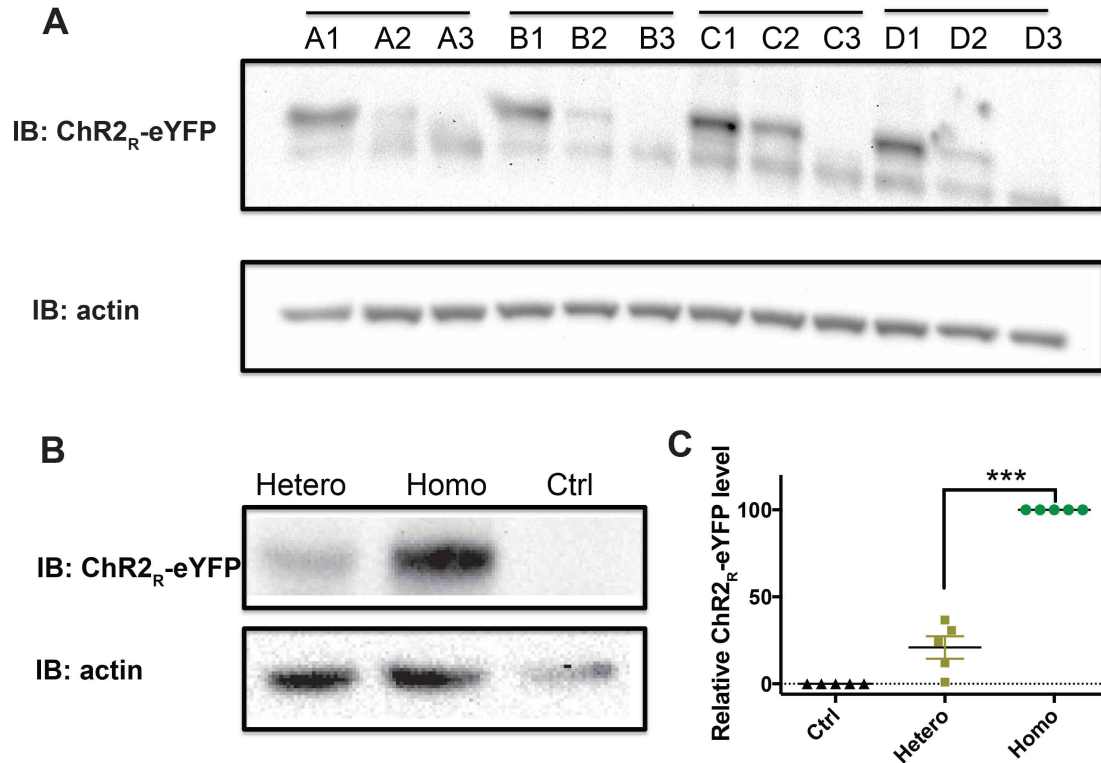
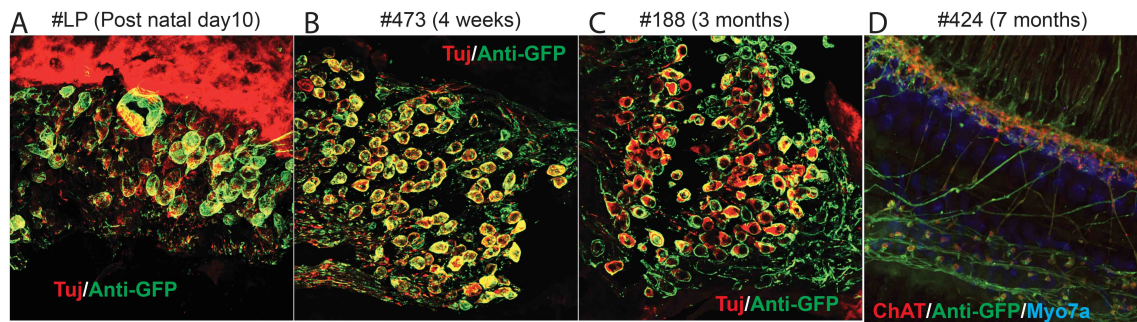


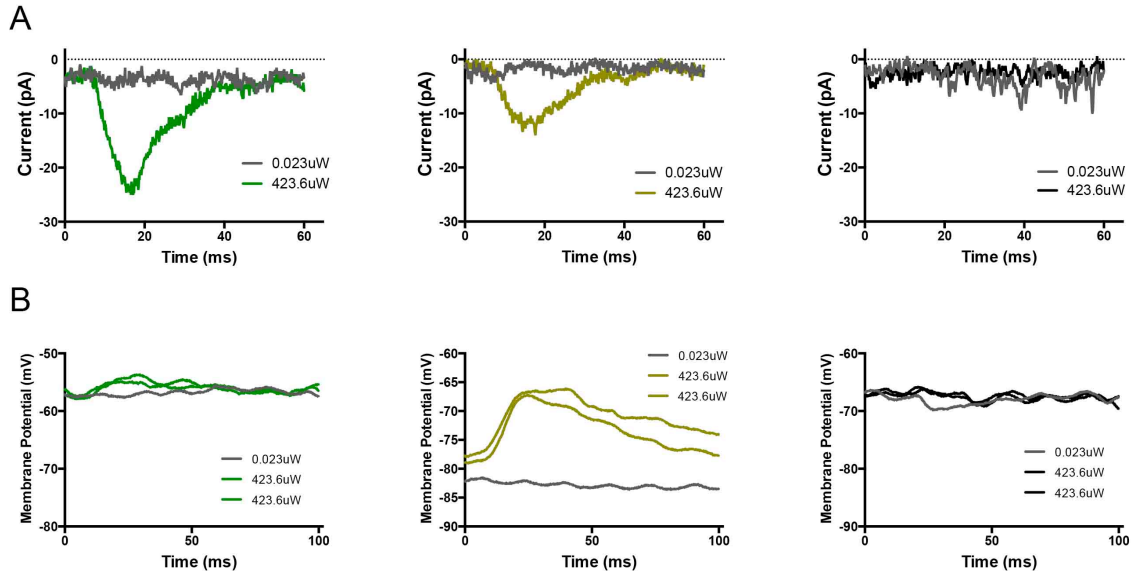
## Supplementary Files



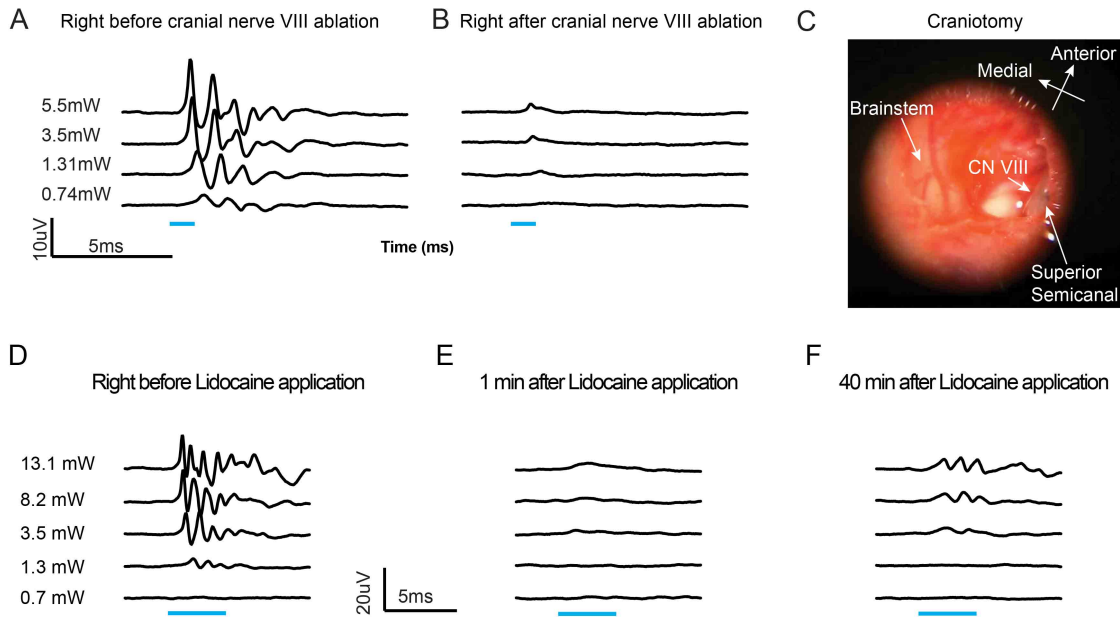
**Figure S1 (supplementary to Fig. 1). Expression level of ChR2<sub>R</sub>-eYFP in newborn mice. (A)** Western blot analysis of ChR2<sub>R</sub>-eYFP in cochlear explants from littermates: homozygotes (A1, B1, C1 and D1), heterozygotes (A2, B2, C2, and D2), and controls (A3, B3, C3 and D3). Blots were also probed with an actin-specific antibody. (B) Western blot of another 3 homozygous (Homo), heterozygous (Hetero), and control (Ctrl) littermates. (C) Quantitative analysis of ChR2<sub>R</sub>-eYFP expression between homozygous and heterozygous newborn ears (\*\*\*) indicates  $p=0.0003$ , one sample t-test,  $n=5$  for each group).



**Figure S2 (supplementary to Fig. 2). ChR2<sub>R</sub>-eYFP expression in the cochlea.** Whole mount staining of cochlear spiral segments at postnatal day 10 (A) and 203 (D), and cross-sections of the cochlear modiolus at postnatal day 35 (B) and 96 (C). The mouse ID is listed at the top of each figure. Tuji and GFP antibodies were used to identify the ChR2<sub>R</sub>-eYFP expression in SGNs in each preparation, except in Figure D where ChAT and Myo7a antibodies were used to label olivocochlear efferent fibers and hair cells.



**Figure S3 (supplementary to Fig. 3). Examples for photocurrents and photodepolarization in SGNs.** Photocurrent (A) and photodepolarization (B) were measured from homozygous (left, green), heterozygous (middle, dark yellow) and control (right, black) littermates. Light pulses (duration of 10 ms) were presented starting from time 0 in all cases.



**Figure S4 (supplementary to Fig. 6). Cranial nerve VIII ablation and lidocaine application.** (A, B) oABR before (A) and after (B) cochlear nerve ablation. Blue lines show the start of the 1 ms optical pulse. (C) Illustration of the craniotomy. (D, E and F) oABR waveforms were significantly diminished after ablation of the VIII<sup>th</sup> cranial nerve, indicating that the origin of oABR peak 1 was peripheral to the brainstem. oABR responses before (D), 1 minute after (E), and 40 minutes after (F) lidocaine application. Blue lines illustrate 4 ms optical pulses applied to the test ear. A small recovery in oABR was observed 40 minutes after lidocaine injection.