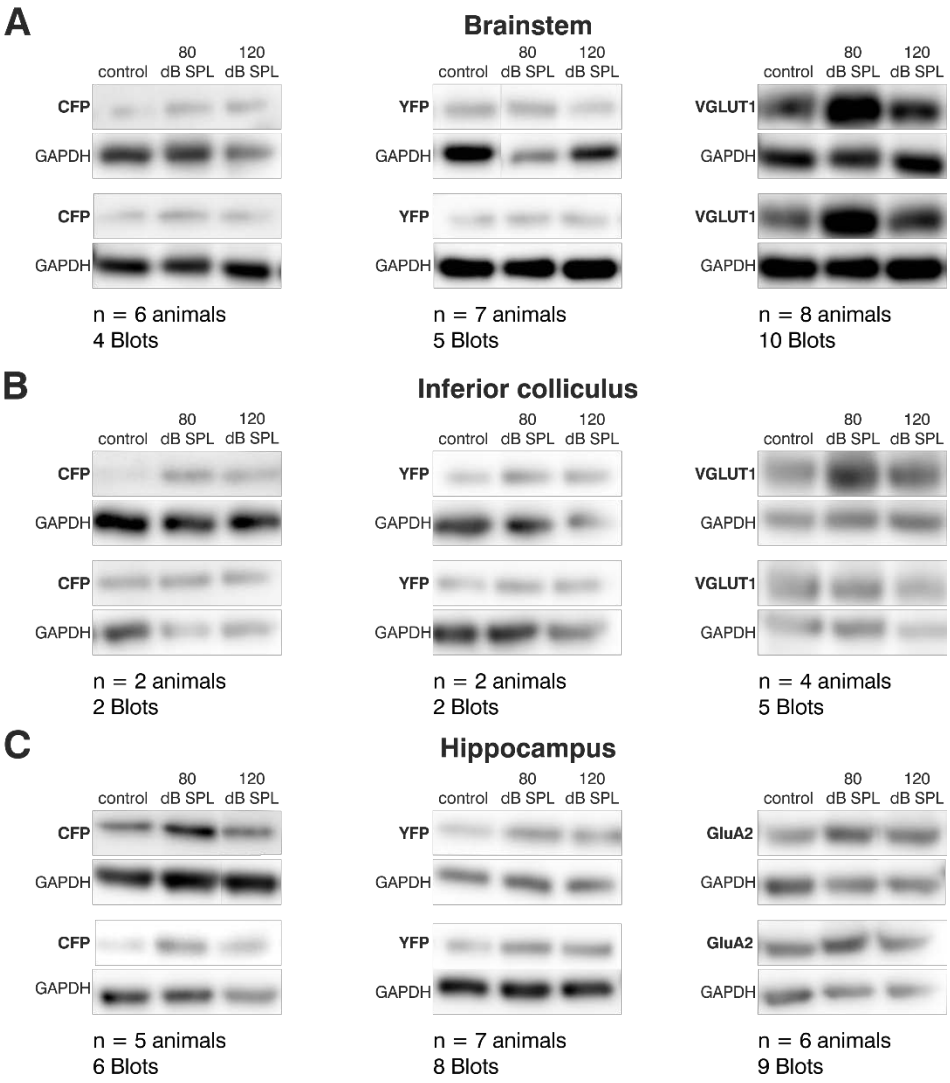
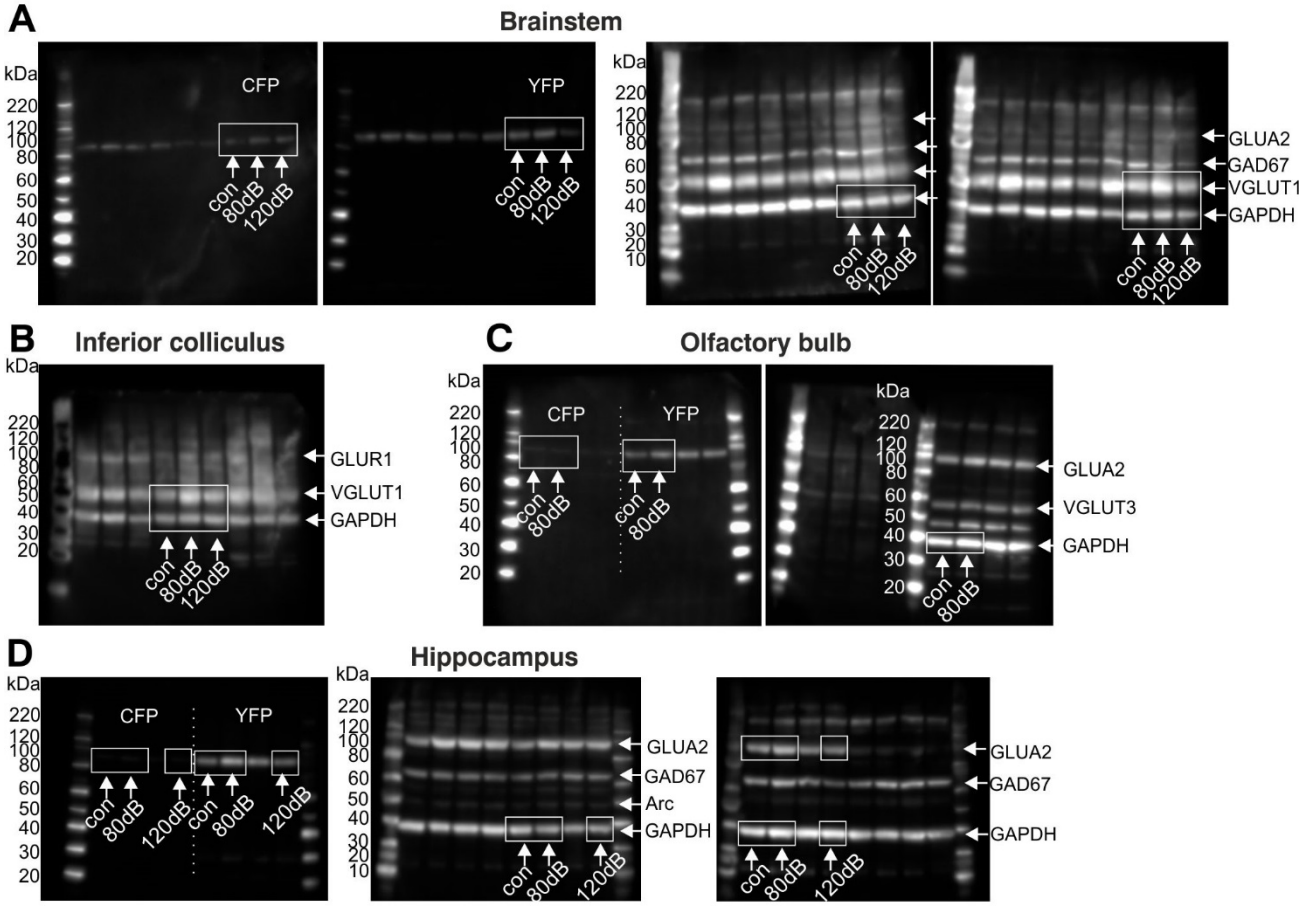
Supplementary Figure 1



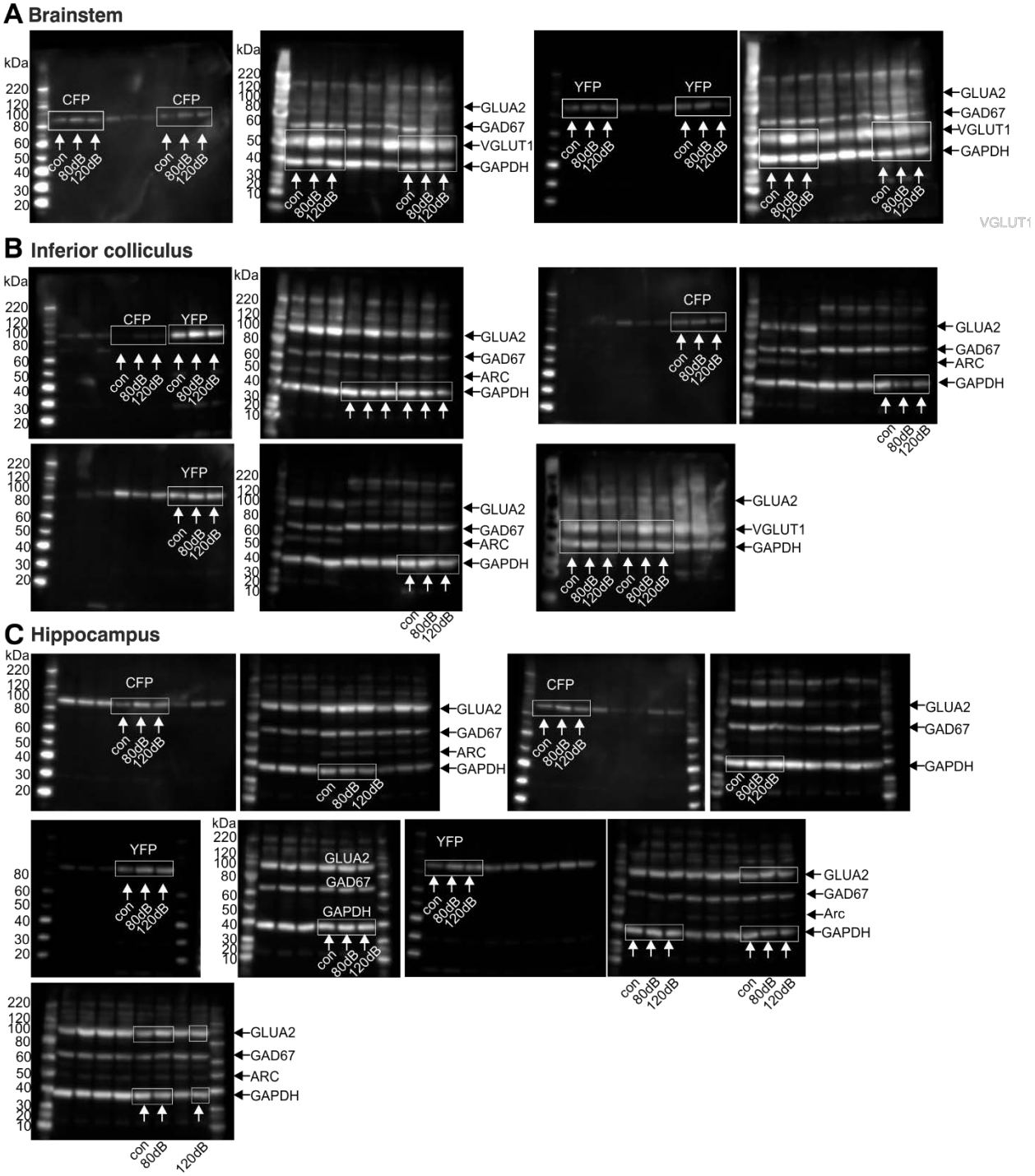
Supplementary Figure 1. Western blot analyses of CFP and YFP for (**A**) brainstem, (**B**) inferior colliculus and (**C**) hippocampus in control mice and mice exposed to 80 or 120 dB SPL. For brainstem and inferior colliculus, VGLUT1 was additionally analyzed, and for the hippocampus, GluA2 was additionally analyzed. Two examples are shown for each tissue and antibody. GAPDH is used as house-keeping gene. Note an increase of CFP, YFP, VGLUT1 and GluA2 in all tissues of mice exposed to 80 dB SPL. For originals see **Supplementary Figure 3**.

Supplementary Figure 2



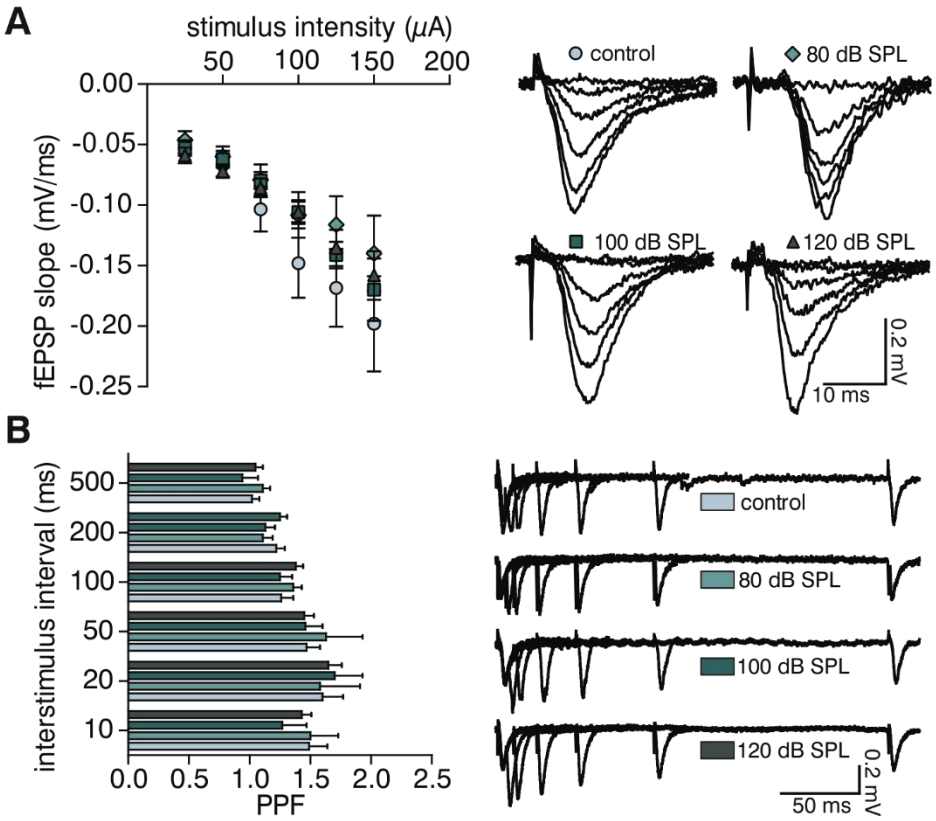
Supplementary Figure 2. Original Western blots for Figure 2 A (**A**-**C**) and Figure 3 A (**D**). (**A**) – (**D**) Arrows indicate bands used in Figures. Images were inverted and for better visibility the contrast was adjusted. All quantitative analyses were performed on original images (**A**) Original Western blots for CFP, YFP, vGlut1 and GAPDH in the brainstem. (**B**) Original Western blots for vGlut1 and GAPDH in the inferior colliculus. (**C**) Original Western bolts for CFP, YFP and GAPDH in the olfactory bulb. (**D**) Original Western blots for CFP, YFP, GluA2 and GAPDH in the hippocampus.

Supplementary Figure 3



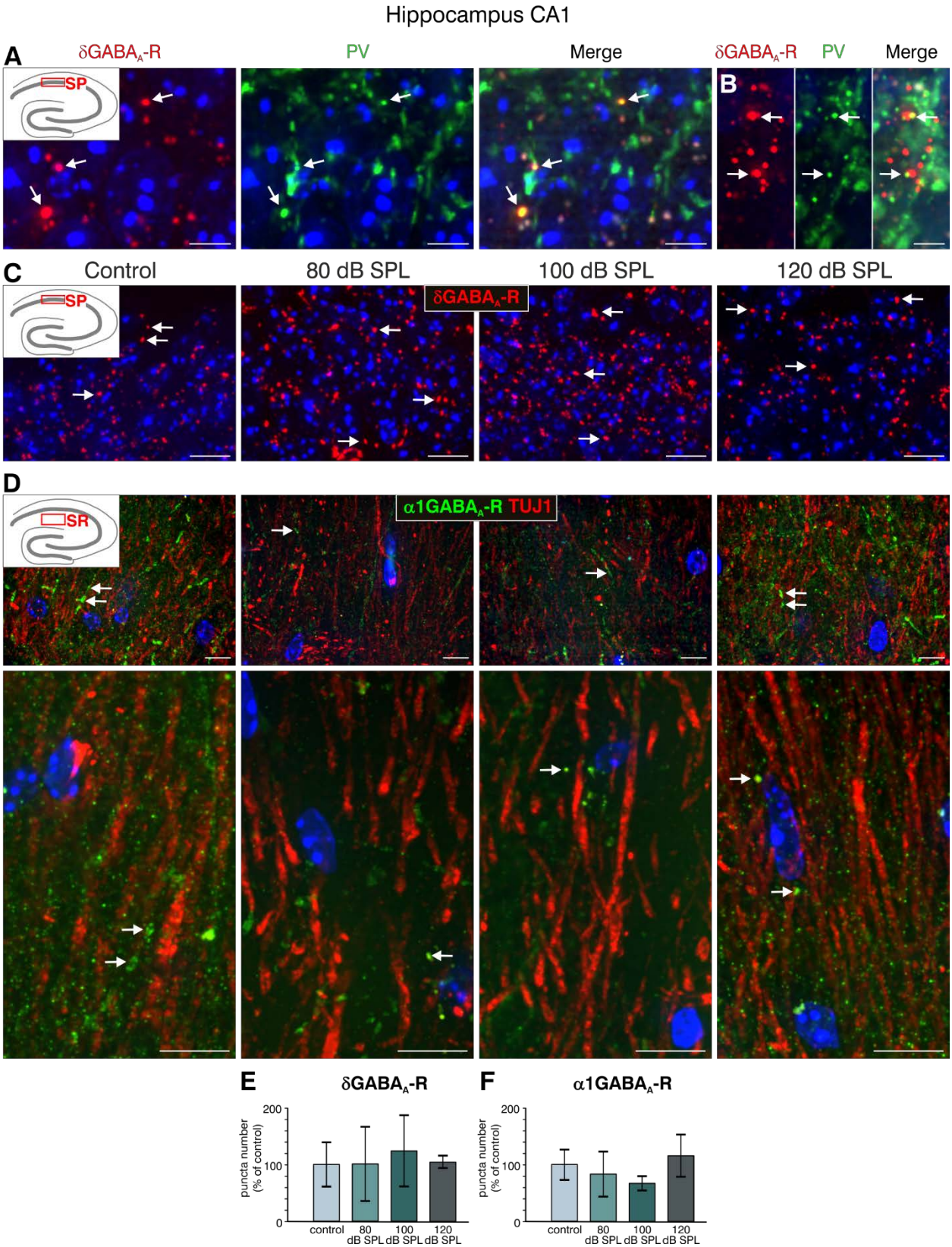
Supplementary Figure 3. Original Western blots for Supplementary Figure 1. Arrows indicate bands used in Supplementary Figure 1. Images were inverted and for better visibility the contrast was adjusted. All quantitative analyses were performed on original images (**A**) Original Western blots for CFP, YFP, vGlut1 and GAPDH in the brainstem. (**B**) Original Western blots for CFP, YFP, vGlut1 and GAPDH in the inferior colliculus. (**C**) Original Western blots for CFP, YFP, GluA2 and GAPDH in the hippocampus.

Supplementary Figure 4



Supplementary Figure 4. (**A, B**) Schaffer collateral fEPSPs were recorded from acute forebrain slices of 8-12-week-old mice. (**A**) Average fEPSP slope was plotted against stimulus intensity. No difference was observed between slices from controls or animals exposed to 80 dB SPL, 100 dB SPL, and 120 dB SPL. Traces from representative recordings are shown on the right. Data represented as mean ± SEM (con $n = 11$ slices, 80 dB SPL $n = 14$ slices, 100 dB SPL $n = 11$ slices, 120 dB SPL $n = 14$ slices.) (**B**) Paired-pulse facilitation (PPF) was not different between slices from controls or animals exposed to 80 dB SPL, 100 dB SPL, and 120 dB SPL for all inter-stimulus intervals (I.S.I.). Traces from representative recordings are shown on the right. Data represented as mean ± SEM (con $n = 10$ slices, 80 dB SPL $n = 13$ slices, 100 dB SPL $n = 11$ slices, 120 dB SPL $n = 15$ slices).

Supplementary Figure 5



Supplementary Figure 5. Expression of δ subunit containing $GABA_A$ receptors ($\delta GABA_A$-R) and α subunit containing $GABA_A$ receptor ($\alpha 1GABA_A$-R) in the hippocampal CA1 region. (**A-C**) Hippocampal CA1 region with magnification of the stratum pyramidale (SP) stained for $\delta GABA_A$-R (red) and parvalbumin (PV, green). (**A**) Note the co-localization of PV with $\delta GABA_A$-R-positive dots (arrows). Scale bars: 5 µm. (**B**) $\delta GABA_A$-R-positive dots are contacted by PV-positive dendrites (arrows) of CA1 interneurons. Scale bars: 2.5 µm. (**C**) No obvious changes are observed in $\delta GABA_A$-R expression (red, arrows) between the different treatment groups. Scale bars: 10 µm. (**D**) Hippocampal CA1 region with magnification of the stratum radiatum (SR)

stained for αGABA$_A$-R (green, arrows) and TUJ1 (red). Note the dynamic change in αGABA$_A$-R expression dependent on sound exposure (green, arrows). Bottom panel: High-power examination of the SR. Changes in αGABA$_A$-R expression around TUJ1-positive neurons can be observed. Scale bars: 10 µm. (n = 4-5 animals /group). (**E**) Quantification of δGABA$_A$-R (1-way ANOVA: F(3, 14) = 0.22 p = 0.88; con, 80 dB SPL n = 5 animals; 100 dB SPL, 120 dB SPL n = 4 animals) and (**F**) αGABA$_A$-R fluorescence in the CA1 region. Data represented as mean ± SD (1-way ANOVA: F(3, 16) = 2.08 p = 0.14; n = 5 animals / group 2-3 repetitions).

Supplementary Table 1 Antibody information for immunohistochemistry and Western blot

Primary Antibodies						
Immunohistochemistry	Antibody	Protein name	Product number	Source	Dilution	Protein size
Cochlea / Brain sections	rabbit anti-CtBP2/ RIBEYE	CtBP2/RIBEYE	10-P1554	American research Products, Inc.,	1:1,000	
	rabbit anti-parvalbumin	Parvalbumin	ab11427	Abcam	1:2,000	
	mouse anti-parvalbumin	Parvalbumin	P3088	Sigma-Aldrich	1:500	
	guinea pig anti-α1GABA$_A$-receptor	Gamma-aminobutyric acid type A receptor α subunit	224204	Synaptic Systems	1:500	
	rabbit anti-δGABA$_A$-receptor	Gamma-aminobutyric acid type A receptor δ subunit	AB9752	Millipore	1:1,500	
	guinea pig anti-VGLUT1	Vesicular glutamate transporter 1	135304	Synaptic Systems	1:1,500	
Western blot	rabbit anti-RCFP	Reef coral fluorescent protein pan antibody	632475	Clontech	1:1,000	30-35 kDa
	guinea pig anti-VGLUT1	Vesicular glutamate transporter 1	135304	Synaptic Systems	1:5,000	50 kDa
	rabbit anti-GluA2	Glutamate receptor AMPA 2	182103	Synaptic Systems	1:1,500	100 kDa
	mouse anti-GAPDH	Glyceraldehyde 3-phosphate dehydrogenase	ab8245	Abcam	1:10,000	40 kDa
Secondary antibodies						
Immunohistochemistry	Antibody	Protein name	Product number	Source	Dilution	Protein size
Cochlea / Brain sections	Cy3-conjugated goat anti-rabbit antibody		111-166-003	Jackson ImmunoResearch Laboratories	1:1,500	
	Alexa488-conjugated anti-mouse antibody		A11001	Molecular Probes, MoBiTec	1:500	
	Alexa488-conjugated anti-guinea pig antibody		A11073	Molecular Probes, MoBiTec	1:500	
Western blot	ECL anti-mouse IgG HRP linked		NA 931-100µl	GE Healthcar	1:2,500	

				e UK Limited		
	ECL anti-rabbit IgG HRP linked		NA 934-100µl	GE Healthcare UK Limited	1:2,500	
	Goat anti-gionea pig IgG-HRP		Sc-2438	Santa Cruz Biotechnology Inc.	1:7,000	

Supplementary Table 2 Statistical information of the results

		Statistical test	**Test value**	**Degrees of freedom**	***p*-value**	**Post-hoc test with *p*-value**		**n-number**
Fig. 1A	Click-ABR TTS post AT	1-way ANOVA	F(3, 129) = 92.67		p < 0.0001	Bonferroni's test con vs. 80 dB SPL con vs. 100 dB SPL con vs. 120 dB SPL	 p<0.0001	con n = 19 animals 80 dB SPL n= 19 animals 100 dB SPL n = 16 animals 120 dB SPL n = 19 animals
	Click-ABR 14d post AT	1-way ANOVA	F(3, 144) = 54.72		p < 0.0001	con vs. 120 dB SPL	p <0.0001	
Fig. 1B	noise-ABR 14d post AT	1-way ANOVA	F(3, 142) = 75.45		p < 0.0001	con vs. 120 dB SPL	p < 0.0001	
Fig. 1C	f-ABR	2-way ANOVA	F(3, 597) = 79.9		p < 0.0001	con vs. 120 dB SPL	p < 0.05	
Fig. 1E	ribbon number	2-way ANOVA	F(3, 60) = 11.08		p < 0.0001	1-sided unpaired Student's t-tests middle turn: con vs. 80 dB SPL con vs. 120 dB SPL midbasal turn: con vs. 100 dB SPL con vs. 120 dB SPL	 p < 0.05 p < 0.01 p < 0.05 p < 0.01	n = 6 ears from 4 animals per group, 1-3 repetitions each, 8-24 IHCs per turn and group
Fig. 1F	CorF	1-way ANOVA	F(3, 131) = 17.51		p < 0.0001	Tukey's Multiple Comparison test: con vs. 120 dB SPL 80 dB SPL vs. 120 dB SPL 100 dB SPL vs. 120 dB SPL	 p < 0.001 p < 0.001 p < 0.01	con n = 8 animals, 15 ears; 80 dB SPL n = 9 animals, 18 ears 100 dB SPL n = 5 animals, 10 ears; 120 dB SPL n = 9 animals, 17 ears
Fig. 1G	wave I control	2-way ANOVA	F(1, 1031) = 0.003		p = 0.955			n = 18 mice/group
	wave I 80 dB SPL	2-way ANOVA	F(1, 890) = 6.02		p = 0.0143			n = 16 mice/group
	wave I 100 dB SPL	2-way ANOVA	F(1, 836) = 28.59		p < 0.0001			n = 15 mice/group

Fig. 1H	wave I 120 dB SPL	2-way ANOVA	F(1, 396) = 185.8		p < 0.0001		n = 18 mice/group
	wave I V control	2-way ANOVA	F(1, 1034) = 1.296		p = 0.2551		n = 18 mice/group
	wave I V 80 dB SPL	2-way ANOVA	F(1, 951) = 0.89		p = 0.3446		n = 16 mice/group
	wave I V 100 dB SPL	2-way ANOVA	F(1, 743) = 0.09		p = 0.7706		n = 15 mice/group
	wave I V 120 dB SPL	2-way ANOVA	F(1, 452) = 82.88		p < 0.0001		n = 18 mice/group
Fig. 2A/B							n = 5 - 6 mice/group 2 - 10 Western blots each
Fig. 2C/D	VGLUT1	two-tailed student's t-test	t = 3.63 df = 10		p = 0.0046		n = 6 mice/group 2 - 3 repetitions
Fig. 3A							n = 5 mice/group 2 - 10 Western blots each
Fig. 3B	fEPSP	1-way ANOVA	F(3, 19) = 4.99		p = 0.01	Bonferroni's test baseline/tetanized (b/t) control 80 dB SPL 100 dB SPL 120 dB SPL tetanized/tetanized (t/t) con vs. 80 dB SPL con vs. 100 dB SPL con vs. 120 dB SPL	 p < 0.01 p < 0.001 p < 0.001 p < 0.01 p < 0.01 p< 0.01 n.s.	n = 4 animals /group con 7 slices 80 dB SPL 7 slices 100 dB SPL 6 slices 120 dB SPL 5 slices
Fig. 3C	con	repteaed measure ANOVA	F = 2.56	DF = 5	p = 0.033	Bonferroni's test day 1 vs. day 2 day 1 vs. day 3 day 1 vs. day 4 day 1 vs. day 5 day 1 vs. day 6	 n.s. 	con n= 18 animals 80 dB SPL n = 17 animals
	80dB SPL		F = 5.85	DF = 5	p < 0.001	day 1 vs. day 2 day 1 vs. day 3 day 1 vs. day 4 day 1 vs. day 5 day 1 vs. day 6	n.s. p = 0.013 p = 0.054 p = 0.006 p < 0.001	

Fig. 4A-C							n = 6 animals/group
Fig. 4D	CFP	1-way ANOVA	F(3, 19) = 10.5	p < 0.0003	Bonferroni's test con vs. 80 dB SPL con vs. 100 dB SPL con vs. 120 dB SPL 80 dB SPL vs. 120 dB SPL 100 dB SPL vs. 120 dB SPL	 p = 0.0013 n.s. n.s. p < 0.0001 p = 0.0072	con n= 6 animals; 1-4 repetitions 80 dB SPL n = 6 animals; 1-6 repetitions 100 dB SPL n = 5 animals; 2-5 repetitions 120 dB SPL n = 6 animals; 1-3 repetitions
Fig. 4E	YFP	1-way ANOVA	F(3, 11) = 6.96	p = 0.0068	Bonferroni's test con vs. 80 dB SPL 80 dB SPL vs. 120 dB SPL	 p < 0.01 p < 0.01	con n = 4 animals 80 dB SPL n = 3 animals 100 dB SPL n = 3 animals 120 dB SPL n = 5 animals; 3 repetitions each
	CFP	1-way ANOVA	F(3, 11) = 2.37	p = 0.13			
	PV	1-way ANOVA	F(3, 11) = 10.07	p = 0.0017	con vs. 80 dB SPL 80 dB SPL vs. 120 dB SPL	p < 0.01 p < 0.01	
Fig. 5A-C							n = 6 animals/group
Fig. 5D	CFP	1-way ANOVA	F(3,25) = 22.44	p < 0.0001	Bonferroni's test con vs. 80 dB SPL 80dB SPL vs. 120 dB SPL	 p < 0.001 p < 0.0001	n=6 animals / group 4-6 repetition each
	YFP	1-way ANOVA	F(3, 25) = 3.32	p = 0.036	80 dB SPL vs. 120 dB SPL	p < 0.05	
Fig. 6A-C							n = 6 animals/group
Fig. 6D		1-way ANOVA	F(3, 19) = 5.96	p = 0.0049	Bonferroni's test con vs. 80 dB SPL con vs. 100 dB SPL con vs. 120 dB SPL 100 vs. 120 dB SPL	 n.s. p = 0.0301 n.s. p = 0.01	con n= 6 animals 80 dB SPL n = 6 animals 100 dB SPL n = 5 animals 120 dB SPL n = 6 animals; 4-6 repetitions
Fig. 6E		1-way ANOVA	F(3, 19) = 4.61	p = 0.0138	Bonferroni's test con vs. 80 dB SPL con vs. 100 dB SPL	 p < 0.05 p < 0.05	con n = 6 animals 80 dB SPL n = 5 animals 100 dB SPL n = 6 animals 120 dB SPL n= 6 animals 2 repetitions each
Fig. 6G		1-way ANOVA	F(3, 19) = 5.24	p = 0.005	Bonferroni's test baseline/wash-in con 80 dB SPL 100 dB SPL	 p < 0.001 n.s. n.s.	n = 4 animals / group; 9 slices / group

					120 dB SPL	p < 0.001	
					con vs. 120 dB SPL	p < 0.01	
					con vs. 80 dB SPL	p < 0.01	
					con vs. 100 dB SPL	n.s.	

Supplementary Table 3 Statistical information of the supplementray information

		Statistical test	**Test value**	**Degrees of freedom**	***p*-value**	**Post-hoc test with *p*-value**	**n-number**
S Fig. 4B							con n = 10 slices 80 dB SPL n = 13 slices 100 dB SPL n = 11 slices 120 dB SPL n = 15 slices
SFig. 5A-D							n = 4-5 animals /group
S Fig. 5E	δGABAA-R	1-way ANOVA	F(3, 14) = 0.22		p = 0.88		con; 80 dB SPL n = 5 animals 100 dB SPL; 120 dB SPL n = 4 animals
S Fig. 5F	α1GABAA-R	1-way ANOVA	F(3, 16) = 2.08		p = 0.14		n = 5 animals / group 2-3 repetitions