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Please note that in the event of publication, it is mandatory that authors include all relevant methodological and statistical information in the manuscript.

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- Please specify the following information for each panel reporting quantitative data, and where each item is reported (section, e.g. Results, & paragraph number).
- Each figure legend should ideally contain an exact sample size (n) for each experimental group/condition, where n is an exact number and not a range, a clear definition of how n is defined (for example x cells from x slices from x animals from x litters, collected over x days), a description of the statistical test used, the results of the tests, any descriptive statistics and clearly defined error bars if applicable.
- For any experiments using custom statistics, please indicate the test used and stats obtained for each experiment.
- Each figure legend should include a statement of how many times the experiment shown was replicated in the lab; the details of sample collection should be sufficiently clear so that the replicability of the experiment is obvious to the reader.
- For experiments reported in the text but not in the figures, please use the paragraph number instead of the figure number.

Note: Mean and standard deviation are not appropriate on small samples, and plotting independent data points is usually more informative. When technical replicates are reported, error and significance measures reflect the experimental variability and not the variability of the biological process; it is misleading not to state this clearly.

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
example	1a	one-way ANOVA	Fig. legend	9, 9, 10, 15	mice from at least 3 litters/group	Methods para 8	error bars are mean +/- SEM	Fig. legend	p = 0.044	Fig. legend	F(3, 36) = 2.97	Fig. legend
example	results, para 6	unpaired t-test	Results para 6	15	slices from 10 mice	Results para 6	error bars are mean +/- SEM	Results para 6	p = 0.0006	Results para 6	t(28) = 2.808	Results para 6
+ -	1b	Student t-test (Unpaired)	Fig. legend	25	5 brains per condition		0.16515 +/- 0.01714786		p=0.003056		t(23)=3.310	

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
+ -	1c	unpaired t-test	Fig. 1 legend	Sac = 26, Nic = 25 Sac =19, Nic = 29	Pre- and postnatal slices from 6 mice Postnatal slices from 5 mice	Fig. 1 legend	9.04 ± 0.45 10.13 ± 0.45	Supplementary source data spread sheet	p=0.00000460 p=0.00001002	Fig. 1 legend	t(49)=5.151 t(46)=4.961	Fig. 1 legend
+ -	1d	one-way ANOVA; repeated measure	Fig. 1 legend	Sac = 40 Nic = 75	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subject	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (Treatment) p=0.00329026 Interaction (Distance x treatment) (Distance) p=0.070101	Fig. 1 legend	Main effect (treatment) F(1,113)=9.019 Interaction (Distance x treatment) F(4.3,485.1) = 2.139	Fig. 1 legend
+ -	1e	one-way ANOVA; repeated measure	one-way ANOVA	Sac = 26 Nic = 24	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subjec	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (Treatment) p=0.00000085 Interaction (Distance x treatment) (Distance) p=0.000522	Fig. 1 legend	Main effect (treatment) F(1,48)=31.924 Interaction (Distance x treatment) F(4.8,214.7) = 4.882	Fig. 1 legend
+ -	1f	one-way ANOVA; repeated measure	Fig. 1 legend	Sac =25 Nic =15	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subjec	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (Treatment) p=0.00000165 Interaction (Distance x treatment) (Distance) p=0.000003	Fig. 1 legend	Main effect (treatment) F(1,38)=32.082 Interaction (Distance x treatment) F(2.9,108.6) = 11.256	Fig. 1 legend
+ -	1g	one-way ANOVA; repeated measure	Fig. 1 legend	Sac = 20 Nic = 15	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subjec	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (treatment) p=0.0000661 IInteraction (Distance x treatment) p=0.014492	Fig. 1 legend	Main effect (treatment) F(1,33) = 20.835 Interaction (Distance x treatment) F(2.6,86.4)=3.939	Fig. 1 legend
+ -	1h	one-way ANOVA; repeated measure	Fig. 1 legend	Sac = 34 Nic = 53	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subjec	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (treatment) p=0.00000210 Interaction (Distance x treatment) p=0.000779	Fig. 1 legend	Main effect (treatment) F(1,85) = 25.927 Interaction (Distance x treatment) F(4.1,350.2) =4.794	Fig. 1 legend

+ -	1i	one-way ANOVA; repeated measure	Fig. 1 legend	Sac = 13 Nic = 19	slices from 6 mice 6-8 neurons/ animal from 2-5 sections averaged per subjec	Fig. 1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect (treatment) p=0.00020270 IInteraction (Distance x treatment) p=0.007276	Fig. 1 legend	Main effect (treatment) F(1, 30)=17.452 Interaction (Distance x treatment) F(4,120)=3.681	Fig. 1 legend
+ -	2c	one-way ANOVA		Biological repliBiological replicates Sac=5 Nic=5 Animal (Female) Nic = 13 Sac = 15	2 or 3 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 2 legend	Ash2l; 2.81 ± 0.45 Chsy3; 1.93 ± 0.17 Zfp91; 1.355 ± 0.05 Cflar; 1.292 ± 0.14 Zcchc11; 1.20 ± 0.07 Cep192; 2.56 ± 0.21 Gmeb1; 1.03 ± 0.01 Alkbh1; 1.27 ± 0.05 Unc13b; 1.17 ± 0.03 Duox1; 0.94 ± 0.07 Sucla2; 1.06 ± 0.05 Zfp597; 0.82 ± 0.05 Ctnnal1; 0.87 ± 0.05 Ntrk2; 0.84 ± 0.032 Tmem107; 0.57 ± 0.04	Supplementary source data spread sheet	p=0.01096250 for Ash2l; p=0.00051163 for Chsy3; p=0.00539670 for Zfp91; p=0.21311592 for Cflar; p=0.04718863 for Zcchc11; p=0.00058407 for Cep192; p=0.53699305 for Gmeb1; p=0.00363940 for Alkbh1; p=0.53699305 for Unc13b; p=0.30709203 for Duox1; p=0.24421686 for Scula2; p=0.18074252 for Zfp597; p=0.00582675 for Ctnnal1; p=0.00644127 for Ntrk2; p=0.00066513 for Tmem107		F(1,8)=10.848 for Ash2l; F(1,8)=31.334 for Chsy3; F(1,8)=14.28 for Zfp91; F(1,8)=1.83 for Cflar; F(1,8)=5.49 for Zcchc11; F(1,8)=30.084 for Cep192; F(1,8)=0.416 for Gmeb1; F(1,8)=16.474 for Alkbh1; F(1,8)=0.416 for Unc13b; F(1,8)=1.19 for Duox1; F(1,8)=1.58 for Scula2; F(1,8)=2.15 for Zfp597; F(1,8)=13.878 for Ctnnal1; F(1,8)=13.364 for Ntrk2; F(1,8)=28.897 for Tmem107	
+ -	2d	one-way ANOVA; Tukey's multiple comparison test		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 13 Sac = 15	2 or 3 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 2 legend	Ash2l pre&postnatal; 1.23 ± 0.07 Ash2l postnatal; 1.25 ± 0.05	Supplementary source data spread sheet	Main efffect; p=0.003411 pre & postnal Ash2l Sac vs As2l Nic p=0.030603 Postnal Ash2l Sac vs As2l Nic p=0.033186		main effect; F(3,16)=6.898	

+ -	2e	one-way ANOVA; Tukey's multiple comparison test;		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 11 Sac = 15	2 or 3 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 2 legend	Ash2l pre&postnatal; 2.82+/-0.45 Ash2l postnatal; 1.94 ± 0.16	Supplementary source data spread sheet	Main efffect; p=0.000413 pre & postnal Ash2l Sac vs As2l Nic p=0.002299 Postnal Ash2l Sac vs As2l Nic p=0.013523		main effect; F(3,16)=10.736	
+ -	3e Gapdh	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	1.005±0.08	Supplementary source data spread sheet	p=1		F(1,8)=0.00	
+ -	3e Eif4a2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	4.06 ± 0.50	Supplementary source data spread sheet	p=0.00051003		F(1,8)=31.364	
+ -	3e lzumo	one-way ANOVA		Biological replicates Sac=3 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	1.754±0.50	Supplementary source data spread sheet	p=0.37940979		F(1,6)=0.900	
+ -	3e Gpr19	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	2.69 ± 0.47	Supplementary source data spread sheet	p=0.01661552		F(1,8)=9.107	
+ -	3e Litaf	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	2.38 ± 0.58	Supplementary source data spread sheet	p=0.0461961		F(1,8)=5.554	
+ -	3e kcnq1	one-way ANOVA		Biological replicates Sac=4 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 or 4 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Fig. 3 legend	"1.44 ± 0.36	Supplementary source data spread sheet	p=0.39946656		F(1,8)=0.792	

+ -	3e Lage 3	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	4.04 ± 0.49	Supplementary source data spread sheet	p=0.00367444		F(1,8)=16.418	
+ -	3e Fbxw 4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	4.90 ± 0.91	Supplementary source data spread sheet	p=0.00287307		F(1,8)=17.9	
+ -	3e Fgf12	one-way ANO3e Rin2VA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	6.73 ± 1.36	Supplementary source data spread sheet	p=0.00750159		F(1,7)=13.804	
+ -	3e Seps ecs	one-way ANO3e Rin2VA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.318 ± 0.182	Supplementary source data spread sheet	p=0.02502024		F(1,8)=7.568	
+ -	3e Rin2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.75 ± 0.29	Supplementary source data spread sheet	p=0.00039509		F(1,8)=33.897	
+ -	3e Rabg ap1l	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.43 ± 0.37	Supplementary source data spread sheet	p=0.00981340		F(1,8)=11.344	
+ -	3e Ano2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.72 ± 0.05	Supplementary source data spread sheet	p=0.00000649		F(1,8)=107.443	
+ -	3e Apoo l	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.68 ± 0.05	Supplementary source data spread sheet	p=0.00000418		F(1,8)=120.782	

+ -	3e Lipc	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.86 ± 0.05	Supplementary source data spread sheet	p=0.00000		F(1,8)=893.328	
+ -	3e Cdk5rap	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.34 ± 0.28	Supplementary source data spread sheet	p=0.00132739		F(1,8)=23.198	
+ -	3e Ing4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.20 ± 0.35	Supplementary source data spread sheet	p=0.01328880		F(1,8)=10.019	
+ -	3e Ank3	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.65 ± 0.19	Supplementary source data spread sheet	p=0.00964250		F(1,8)=11.424	
+ -	3e Ntm	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.17 ± 0.06	Supplementary source data spread sheet	p=0.00000038		F(1,7)=330.474	
+ -	3e Zfp658	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.17 ± 0.06	Supplementary source data spread sheet	p=0.00000669		F(1,7)=141.861	
+ -	3e csda	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.95 ± 0.66	Supplementary source data spread sheet	p=0.01988645		F(1,8)=8.411	
+ -	3e Sorcs1	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.31 ± 0.64	Supplementary source data spread sheet	p=0.05346909		F(1,7)=5.378	

+ -	3e Lars2	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.96 ± 0.20	Supplementary source data spread sheet	p=0.00195662		F(1,7)=23.081	
+ -	3e Ank1	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.71 ± 0.19	Supplementary source data spread sheet	p=0.00023397		F(1,7)=47.436	
+ -	3e Acacb	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 174, 5	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	4.55 ± 0.35	Supplementary source data spread sheet	p=0.00000930		F(1,7)=128.527	
+ -	3e Mgda2	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	5.98 ± 1.71	Supplementary source data spread sheet	p=0.01333907		F(1,7)=10.811	
+ -	3e Chl1	one-way ANOVA		Biological replicates Sac=5 Nic=4 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.97 ± 0.17	Supplementary source data spread sheet	p=0.00348039		F(1,7)=18.662	
+ -	3e Auts2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.24 ± 0.37	Supplementary source data spread sheet	p=0.00986976		F(1,8)=11.318	
+ -	3e Mbnl1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.94 ± 0.17	Supplementary source data spread sheet	p=0.00063647		F(1,8)=29.295	
+ -	3e Cpeb1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	3.84 ± 0.23	Supplementary source data spread sheet	p=0.00000232		F(1,8)=141.042	

+ -	3e Zfp71-rs1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	3.41 ± 0.08	Supplementary source data spread sheet	p=0.0000001		F(1,8)=830.025	
+ -	3e Chd9	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	4.66 ± 0.16	Supplementary source data spread sheet	p=0.00000004		F(1,8)=396.42	
+ -	3e Syt4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	Fig. 3 legend	3.35 ± 0.04	Supplementary source data spread sheet	p=0.00001422		F(1,8)=87.029	
+ -	3e Sp110	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.02 ± 0.38	Supplementary source data spread sheet	p=0.02460310		F(1,8)=7.628	
+ -	3e Sorbs2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	2.22± 0.13	Supplementary source data spread sheet	p=0.00002176		F(1,8)=77.526	
+ -	3e Slc35a2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.83 ± 0.14	Supplementary source data spread sheet	p=0.00027950		F(1,8)=37.6	
+ -	3e Mef2c	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 15 Sac = 17	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Fig. 3 legend	1.98 ± 0.17	Supplementary source data spread sheet	p=0.01088096		F(1,8)=10.881	

+ -	4a	one-way ANOVA; LSD's multiple comparison test		Saline = 4 Nicotine = 4 MEC = 4 MEC, Nic = 4	4 dishes with each treatment condition	Fig. 4 legend	Control; 1.85 ± 0.11 α-BTX ; 1.45 ± 0.16 MLA; 1.71 ± 0.19 Atropine; 1.69 ± 0.18	Supplementary source data spread sheet	Main effect: p=0.000001 Saline vs Nic; p=0.009350; α-BTX vs α-BTX.Nic; p=0.003186 MLA vs MLA/Nic; p=0.000001 Atropine vs Atropine/Nic; p=0.000030		F(13,42)=12.540	
+ -	4b	one-way ANOVA; LSD's multiple comparison test		4	4 dishes with each treatment condition	Fig. 4 legend	Control; 1.26 ± 0.05 α-BTX; 1.19 ± 0.16 MLA; 1.24 ± 0.01 Atropine; 1.13 ± 0.08	Supplementary source data spread sheet	Main effect: p=0.000551 Saline vs Nic; p=0.023076 α-BTX vs α-BTX.Nic; p=0.010348 MLA vs MLA/Nic; p=0.05 Atropine vs Atropine/Nic; p=0.023488		F(13,42)=3.749	
+ -	5b	one-way ANOVA; LSD's multiple comparison test		Scr sac = 20 Scr nic = 13 Ash2l sac = 26 Ash2l nic = 11 Mef2c sac = 17 Mef2c nic = 11	Total counted cell number in 3 repeated experiments, 2-3 neurons were selected from coverslips	Fig. 5 legend	Scr sac; 4.36 ± 0.32 Sscr nic; 8.25 ± 1.01 Ash2l sac; 2.45 ± 0.23 Ash2l nic; 2.12 ± 0.21 Mef2c sac; 2.72 ± 0.26 Mef2c nic; 2.28 ± 0.28	Supplementary source data spread sheet	Main effect: p=0.0000001 Scr Sac vs Scr Nic = 0.000001		Main effect: F(5,108)=28.45	
+ -	5d	two-way ANOVA; repeated measure; Tukey's multiple comparison test	Fig. 5 legend	Scr, Sac = 32 Scr, Nic = 57 Ash2l, Sac = 22 Ash2l, Nic = 67	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Fig. 5 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (gene) p=0.0000001 (treatment) p=0.215552 (gene x treatment) p=0.00006893 Follow-up; Scr sac vs Scr nic =0.000581 Ash2l sac vs Ash2l nic =0.229149	Fig. 5 legend	Main effect; (gene) F(1,174)=30.006 (treatment) F(1,174)=1.545 (gene x treatment) F(1,174)=16.633	Fig. 5 legend

+ -	5e	two-way ANOVA; repeated measure; Tukey's multiple comparison test	Fig. 5 legend	Scr, Sac = 26 Scr, Nic = 31 Ash2l, Sac = 27 Ash2l, Nic = 30	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Fig. 5 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (gene) p=0.0000001 (treatment) p=0.0000001 ((gene x treatment) p=0.0000001 Follow-up; Scr sac vs Scr nic =0.0000001 Mef2c sac vs Mef2c nic =0.122684	Fig. 5 legend	Main effect; (gene) F(1,110)=154.897 (treatment) F(1,110)=43.650 (gene x treatment) F(1,110)=95.076	Fig. 5 legend
+ -	5f	one-way ANOVA; repeated measure; Tukey's multiple comparison test	Fig. 5 legend	OE, con = 28 OE, Ash2l = 22 OE, Mef2c Ash2l = 24	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Fig. 5 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect: p=0.0000001 OE con vs OE Ash2l =0.0000001 OE con vs OE Mef2c =0.0000001	Fig. 5 legend	Main effect; F(2,71)=100.450	Fig. 5 legend
+ -	5g	one-way ANOVA; LSD's multiple comparison test		Scr sac = 21 Scr nic = 36 Ash2l sac = 34 Ash2l nic = 37 Mef2c sac = 23 Mef2c nic = 38	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Fig. 5 legend	Scr sac; 5.76 ± 1.03 Scr nic; 12.26 ± 0.98 Ash2l sac; 4.12 ± 1.64 Ash2l nic; 5.02 ± 0.78 Mef2c sac; 8.33 ± 1.28 Mef2c nic; 8.20 ± 1.36		Main effect: p=0.0000001 Scr sac vs Scr nic =0.0000001 Scr sac vs Mef2c sac =0.042553 Scr sac vs Mef2c nic =0.023182 Scr nic vs Mef2c sac =0.000158 Scr nic vs Mef2c nic =0.000295	Fig. 5 legend	Main effect: F(5,183)=10.748	Fig. 5 legend
+ -	5h	one-way ANOVA LSD's multiple comparison test		OE control = 34 OE Ash2l = 45 OE Mef2c =26	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Fig. 5 legend	OE control; 3.96 ± 1.23 OE Ash2l; 8.12 ± 1.78 OE Mef2c; 7.13 ± 1.28	Supplementary source data spread sheet	Main effect: p=0.00000006 OE con vs OE Ash2l =0.000033 OE con vs OE Mef2c =0.019220	Fig. 5 legend	Main effect: F(2,102)=19.692	Fig. 5 legend

+ -	6a	one-way ANOVA LSD's multiple comparison test		Scr, Sac = 19 Scr, Nic = 24 Ash2l, Sac = 10 Ash2l, Nic = 60 Mef2c, Sac = 13 Mef2c, Nic = 15	Aiming 10 -15 survived for in utero electroporation surgery per each condition (survival rate 40%), All survive pups (Female and Male) are used for behavior and neural structure analyssi	Fig. 6 legend	Scr sac; 3.82 ± 1.06 Scr nic; 9.73 ± 1.56 Ash2l sac; 3.76 ± 1.26 Ash2l nic; 5.99 ± 1.06 Mef2c sac; 3.31 ± 0.79 Mef2c nic; 4.01 ± 0.66	Supplementary source data spread sheet	Main effect: p=0.02090053 Scr sac vs Scr nic =0.015343 Scr nic vs Ash2l nic =0.009136	Fig. 6 legend	Main effect: F(5,135)=2.759	Fig. 6 legend
+ -	6b	one-way ANOVA LSD's multiple comparison test		OEcon = 31 OEAsh2l = 22 OEMef2c = 32	Aiming 10 -15 survived for in utero electroporation surgery per each condition (survival rate 40%), All survive pups (Female and Male) are used for behavior and neural structure analyssi	Fig. 6 legend	OE control; 4.06 ± 0.62 OE Ash2l; 11.61 ± 1.97 OE Mef2c; 8.05 ± 1.14	Supplementary source data spread sheet	Main effect: p=0.00031264 OE con vs OE Ash2l; p=0.000076 OE con vs OE Mef2c p=0.017160	Fig. 6 legend	Main effect; F(2,82) = 8.858	Fig. 6 legend
+ -	Supplementary Fig. 1a	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 28 Nic = 54	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.010321 Interaction (Distance x treatment) p=0.000223	Supplementary Fig.1 legend	Main effect; (treatment) F(1,80)=6.901 IInteraction (Distance x treatment) F(12.740,301.475)=5.170	Supplementary Fig.1 legend
+ -	Supplementary Fig. 1b	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 36 Nic = 31	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.0000001 Interaction (Distance x treatment) p=0.0000001	Supplementary Fig.1 legend	Main effect; (treatment) F(1,30)=16.525 IInteraction (Distance x treatment) F(4.683738.911)=6.471	Supplementary Fig.1 legend
+ -	Supp Supplementary Fig. 1c	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 20 Nic = 12	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.000319 Interaction (Distance x treatment) p=0.000488	Supplementary Fig.1 legend	Main effect; (treatment) F(1,65)=32.586 Interaction (Distance x treatment) F(3.384,101.512)=6.016	Supplementary Fig.1 legend
+ -	Supp Supplementary Fig. 1d	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 9 Nic = 13	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.027854 Interaction (Distance x treatment) p=0.000488	Supplementary Fig.1 legend	Main effect; (treatment) F(1,20)=5.625 Interaction (Distance x treatment) F(2.413,48.253)=1.176	Supplementary Fig.1 legend

+ -	Supp Supplementary Fig. 1e	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 18 Nic = 30	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.000565 Interaction (Distance x treatment) p=0.000015	Supplementary Fig.1 legend	Main effect; (treatment) F(1,46)=13.729 Interaction (Distance x treatment) F(3.824,175882) =2.785	Supplementary Fig.1 legend
+ -	Supp Supplementary Fig. 1f	one-way ANOVA repeated measure	Supplementary Fig.1 legend	Sac = 10 Nic = 15	slices from 5 mice 4-6 neurons/ animal from 2-4 sections averaged per subject	Supplementary Fig.1 legend	Data expressed as mean +/- SEM	Supplementary source data spread sheet	Main effect; (treatment) p=0.003299 Interaction (Distance x treatment) p=0.000643	Supplementary Fig.1 legend	Main effect; (treatment) F(1,23)=10.746 Interaction (Distance x treatment) F(3.291,75.697) =2.290	Supplementary Fig.1 legend
+ -	Supplementary Fig. 2b	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 11 Sac = 15	2 or 3 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Supplementary Fig.2 legend	Ash2l; 1.23 ± 0.07 Chsy3; 1.35 ± 0.09 Zfp91 1.01 ± 0.012 Cflar; 1.30 ± 0.14 Zcchc11; 1.26 ± 0.04 Cep192; 1.17 ± 0.06 Alkbh1 1.27 ± 0.05 Gmeb1 1.00 ± 0.026 Unc13b 1.17 ± 0.028 Duox1 0.94 ± 0.07 Scula2; 1.10 ± 0.02 Zfhp597 0.82 ± 0.05 Ctnnal1 0.87 ± 0.050 Ntrk2 0.85 ± 0.03 Tmem107; 0.7 ± 0.09	Supplementary source data spread sheet	p=0.02365035 for Ash2l; p=0.03127061 for Chsy3; p=0.44681333 for zfp91; p=0.53987164 for Cflar; p=0.00087271 for Zcchc11; p=0.05240060 for Cep192; p=0.29780695 for Alkbh1; p=0.42080639 for Gmeb1; p=0.56511006 for Unc13b; p=0.85625319 for Duox1; p=0.01787528 for Scula2; p=0.21198878 for Zfp597; p=0.30899997 for Ctnnal1; p=0.44341660 for Ntrk; p=0.02625917 for Tmem107;		F(1,8)=7.77 for Ash2l; F(1,8)=6.797 for Chsy3; F(1,8)=0.64 for Zfp91; F(1,8)=0.41 for Cflar; F(1,8)=26.538 for Zcchc11; F(1,8)=5.18 for Cep192; F(1,8)=1.24 for Alkbh1; F(1,8)=0.72 for Gmeb1; F(1,8)=0.36 for Unc13b; F(1,8)=0.035 for Unc13b; F(1,8)=8.82 for Scula2; F(1,8)=1.84 for Zfp597; F(1,8)=1.18 for Ctnnal1; F(1,8)=0.65 for Ntrk; F(1,8)=7.397 for Tmem107;	
+ -	Supplementary Fig. 3c Eif4a2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.67 ± 0.18	Supplementary source data spread sheet	p=0.01054575		F(1,8)=11.02	

+ -	Supplementary Fig. 3c Izumo1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.21 ± 0.96	Supplementary source data spread sheet	p=0.03961426		F(1,8)=6.028	
+ -	Supplementary Fig. 3c Gpr19	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	"1.80 ± 0.84	Supplementary source data spread sheet	p=0.26974334		F(1,8)=1.406	
+ -	Supplementary Fig. 3c Litaf	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.85 ± 0.63	Supplementary source data spread sheet	p=0.00162698		F(1,8)=21.7	
+ -	Supplementary Fig. 3c Kcnq1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.62 ± 0.15	Supplementary source data spread sheet	p=0.00406270		F(1,8)=15.839	
+ -	Supplementary Fig. 3c Lage3	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.51 ± 0.59	Supplementary source data spread sheet	p=0.00236227		F(1,8)=19.147	
+ -	Supplementary Fig. 3c Fbxw4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.92 ± 0.45	Supplementary source data spread sheet	p=0.00305973		F(1,8)=17.512	
+ -	Supplementary Fig. 3c Fgf12	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	6.76 ± 1.37	Supplementary source data spread sheet	p=0.00356573		F(1,8)=16.594	
+ -	Supplementary Fig. 3c Sepsecs	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.01 ± 0.16	Supplementary source data spread sheet	p=0.00002212		F(1,8)=77.18	

+ -	Supplementary Fig. 3c Rin2	one-way ANOVAone-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.30 ± 0.15	Supplementary source data spread sheet	p=0.01341607		F(1,8)=9.979	
+ -	Supplementary Fig. 3c Rabgap1l	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.65 ± 0.19	Supplementary source data spread sheet	p=0.00004215		F(1,8)=64.634	
+ -	Supplementary Fig. 3c Ano2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.44 ± 0.21	Supplementary source data spread sheet	p=0.00001803		F(1,8)=81.61	
+ -	Supplementary Fig. 3c Apool	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.70 ± 0.17	Supplementary source data spread sheet	p=0.00306323		F(1,8)=17.505	
+ -	Supplementary Fig. 3c Lipc	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.44 ± 0.10	Supplementary source data spread sheet	p=0.00000862		F(1,8)=99.602	
+ -	Supplementary Fig. 3c Cdk5rap	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	4.06 ± 0.45	Supplementary source data spread sheet	p=0.00014572		F(1,8)=45.502	
+ -	Supplementary Fig. 3c Ing4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.68 ± 0.10	Supplementary source data spread sheet	p=0.00000001		F(1,8)=565.869	
+ -	Supplementary Fig. 3c Ank3	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.97 ± 0.11	Supplementary source data spread sheet	p=0.00000452		F(1,8)=118.256	

+ -	Supplementary Fig. 3c Ntm	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.67 ± 0.07	Supplementary source data spread sheet	p=0.00017324		F(1,8)=43.276	
+ -	Supplementary Fig. 3c Zfp658	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.66 ± 0.05	Supplementary source data spread sheet	p=0.00000002		F(1,8)=487.52	
+ -	Supplementary Fig. 3c csda	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.21 ± 0.62	Supplementary source data spread sheet	p=0.01810693		F(1,8)=8.77	
+ -	Supplementary Fig. 3c Sorcs1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.41 ± 0.37	Supplementary source data spread sheet	p=0.00019884		F(1,8)=41.57	
+ -	Supplementary Fig. 3c Lars2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.31 ± 0.18	Supplementary source data spread sheet	p=0.00000168		F(1,8)=153.564	
+ -	Supplementary Fig. 3c Ank1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.04 ± 0.28	Supplementary source data spread sheet	p=0.00009898		F(1,8)=50.843	
+ -	Supplementary Fig. 3c Acacb	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.40 ± 0.15	Supplementary source data spread sheet	p=0.00000029		F(1,8)=242.093	
+ -	Supplementary Fig. 3c Mgda2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	9.07 ± 0.54	Supplementary source data spread sheet	p=0.00000040		F(1,8)=223.283	

+ -	Supplementary Fig. 3c Chl1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.90 ± 0.25	Supplementary source data spread sheet	p=0.00000592		F(1,8)=110.084	
+ -	Supplementary Fig. 3c Auts2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.81 ± 0.09	Supplementary source data spread sheet	p=0.00119824		F(1,8)=23.981	
+ -	Supplementary Fig. 3c Mbnl1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	0.9546 ± 0.035	Supplementary source data spread sheet	p=0.50674655		F(1,8)=0.483	
+ -	Supplementary Fig. 3c Cpeb1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.22 ± 0.038	Supplementary source data spread sheet	p=0.01096747		F(1,8)=10.846	
+ -	Supplementary Fig. 3c Zfp71-rs1	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.82 ± 0.23	Supplementary source data spread sheet	p=0.00461852		F(1,8)=15.121	
+ -	Supplementary Fig. 3c Chd9	one-way ANOVA			2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.04 ± 0.11	Supplementary source data spread sheet	p=0.04089817		F(1,8)=5.928	
+ -	Supplementary Fig. 3c Syt4	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	3.51 ± 0.44	Supplementary source data spread sheet	p=0.00119008		F(1,8)=24.034	
+ -	Supplementary Fig. 3c Sp110	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.31 ± 0.48	Supplementary source data spread sheet	p=0.02322340		F(1,8)=7.836	

+ -	Supplementary Fig. 3c Sorbs2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.07 ± 0.08	Supplementary source data spread sheet	p=0.00009607		F(1,8)=51.276	
+ -	Supplementary Fig. 3c Slc35a2	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.83 ± 0.16	Supplementary source data spread sheet	p=0.00106755		F(1,8)=24.889	
+ -	Supplementary Fig. 3c Mef2c	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	1.76 ± 0.11	Supplementary source data spread sheet	p=0.00223843		F(1,8)=19.501	
+ -	Supplementary Fig. 4a	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 11 Sac = 15	2 or 3 animals (Female) were pooled one biological replicate, animals randomly assigned to groups	Supplementary Fig.4 legend	1.67 ± 0.15	Supplementary source data spread sheet	p=0.00232999		F(1,8)=19.237	
+ -	Supp Supplementary Fig. 4b	one-way ANOVA		Biological replicates Sac=5 Nic=5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.4 legend	2.11 ± 0.10	Supplementary source data spread sheet	p=0.00000445		F(1,8)=118.802	
+ -	Supplementary Fig. 4c	one-way ANOVA Tukey's multiple comparison test		Frontal; Sac = 5 Nic = 5 Parietal; Sac = 5 Nic = 5 Occipital; Sac = 5 Nic = 5 Animal (Female) Nic = 12 Sac = 14	2 to 4 animals (Female) were pooled one biological replicate, animal randomly assigned to groups	Supplementary Fig.5 legend	Frontal nic; 2.98 ± 0.17 Parietal nic; 2.75 ± 0.58 Occipital nic; 2.37 ± 0.46	Supplementary source data spread sheet	main effect; p=0.000021 Frontal sac vs Frontal nic; p=0.001277 Parietal sac vs Parietal nic; p=0.005846 Occipital sac vs Occipital nic; p=0.011952		main effect; F(5,24)=10.403	

Representative figures

1. Are any representative images shown (including Western blots and immunohistochemistry/staining) in the paper?

   If so, what figure(s)?

Figure 1 c
Figure 4 a, b, c, d
Figure 5 a, c

2. For each representative image, is there a clear statement of how many times this experiment was successfully repeated and a discussion of any limitations in repeatability? If so, where is this reported (section, paragraph #)?	Figure 1 c: confirmation of already observed result (Discussion paragraph 2) Figure 4 a, b, c, d: experiment repeated 2 times with 4 replicates. Both experiments showed a similar pattern (Figure 4 legend). Supplementary figure 3 and 7

Statistics and general methods

1. Is there a justification of the sample size? If so, how was it justified? Where (section, paragraph #)? Even if no sample size calculation was performed, authors should report why the sample size is adequate to measure their effect size.	No statistical methods were used to predetermine sample sizes, but our sample sizes are similar to those reported in previous works. Microarray and deep sequencing experiments were done on sample sizes based on successful experiments in the literature. All confirmation experiments were performed on multiple pools of brains to reduce biological variability with adequate power. Cell culture and slice experiments were performed as per previously published studies. In utero electroporation was performed on as many litters as possible to obtain viable pups, and was replicated to assure stability of the findings. Each method section states this.
2. Are statistical tests justified as appropriate for every figure? Where (section, paragraph #)?	yes Figure legends
a. If there is a section summarizing the statistical methods in the methods, is the statistical test for each experiment clearly defined?	Although there is a section on Statistical Analysis in the Online Methods, there are too many statistical tests to be described in a single section, so the statistics are presented in the figure legends.
b. Do the data meet the assumptions of the specific statistical test you chose (e.g. normality for a parametric test)? Where is this described (section, paragraph #)?	Yes This is described in the Online Methods: Statistical Analysis and Computational Analysis, page 34.
c. Is there any estimate of variance within each group of data? Is the variance similar between groups that are being statistically compared? Where is this described (section, paragraph #)?	Levene's test were conducted for homogeneity variance (now described in Methods: Statistical Analyses).
d. Are tests specified as one- or two-sided?	yes
e. Are there adjustments for multiple comparisons?	Yes. Bonferroni Corrections/Tukey's/LSD'S Hoc corrections for multiple comparisons.
3. Are criteria for excluding data points reported? Was this criterion established prior to data collection? Where is this described (section, paragraph #)?	No data points were excluded for these studies

4. Define the method of randomization used to assign subjects (or samples) to the experimental groups and to collect and process data. If no randomization was used, state so. Where does this appear (section, paragraph #)?	N/A (all studies were performed on wild type C57BL6J mice or cultures from wild type mice.
5. Is a statement of the extent to which investigator knew the group allocation during the experiment and in assessing outcome included? If no blinding was done, state so. Where (section, paragraph #)?	For all morphological studies, after collection of brain samples, written information was masked with tape. We asked lab colleagues to assign random numbers to each sample tube. The blind was uncovered after experiments were completed. This is stated in the Online Methods on pages 27 and 28. Identity of In utero electroporated animals was revealed after behavioral study by examining sliced brain with fluorescence micros scope. This is stated in the Online Methods on pages 35 and 36
6. For experiments in live vertebrates, is a statement of compliance with ethical guidelines/regulations included? Where (section, paragraph #)?	Yes - all animal experiments were carried out in accordance with an approved IACUC protocol. This is stated in the Online Methods: Animal section.
7. Is the species of the animals used reported? Where (section, paragraph #)?	Yes Online methods: Animal section
8. Is the strain of the animals (including background strains of KO/ transgenic animals used) reported? Where (section, paragraph #)?	Yes In Online Methods, Animal section
9. Is the sex of the animals/subjects used reported? Where (section, paragraph #)?	Brains and neurons for cultures were obtained from litters and sex was not determined. Data come from pooled males and females. This is reported in the Online Methods, Animal section
10. Is the age of the animals/subjects reported? Where (section, paragraph #)?	Yes Results. paragraph 1 and paragraph 3
11. For animals housed in a vivarium, is the light/dark cycle reported? Where (section, paragraph #)?	Yes Online Methods, Animal section
12. For animals housed in a vivarium, is the housing group (i.e. number of animals per cage) reported? Where (section, paragraph #)?	Yes Online Methods, Animal section
13. For behavioral experiments, is the time of day reported (e.g. light or dark cycle)? Where (section, paragraph #)?	Yes. 12 h light/dark cycle; Online method on page 24
14. Is the previous history of the animals/subjects (e.g. prior drug administration, surgery, behavioral testing) reported? Where (section, paragraph #)?	Yes. In utero electroporation surgery on E14day and nicotine and saccharin adiministered. Online Methods, developmental nicotine exposure on page 24

a. If multiple behavioral tests were conducted in the same group of animals, is this reported?

Where (section, paragraph #)?

N/A

15. If any animals/subjects were excluded from analysis, is this reported?

Where (section, paragraph #)?

No animals were excluded from analysis; No reported

a. How were the criteria for exclusion defined?

Where is this described (section, paragraph #)?

N/A

b. Specify reasons for any discrepancy between the number of animals at the beginning and end of the study.

Where is this described (section, paragraph #)?

N/A

Reagents

1. Have antibodies been validated for use in the system under study (assay and species)?

Yes, Ash2l and Mef2c antibodies are validated with shRNA and over expressed constructs of Ash2l and Mef2c.

Wdr5 and RbBP antibodies validation data were not reported in the manuscript. The citations listed below are validation of the antibodies used in both Western.

Anti-Wdr5 antibody (abcam, ab56919)
Ullius A et al. Nucleic Acids Res N/A:N/A (2014).
Mungamuri SK et al. Cell Rep 5:302-13 (2013).

Anti-RbBP5 (abcam, ab52084)
Benedikt A et al. Leukemia 25:135-44 (2011).

Anti-beta tubulin (abcam, ab6046)
Liu L et al. Cell Microbiol 17:595-605 (2015).

Anti-Gapdh antibidy (sigma, G8795-200UL)
Zheng, L., et al., Cell, 114, 255-266 (2003)

a. Is antibody catalog number given?

Where does this appear (section, paragraph #)?

Yes

Online Methods, p24, p29

b. Where were the validation data reported (citation, supplementary information, Antibodypedia)?

Where does this appear (section, paragraph #)?

Citations

2. If cell lines were used to reflect the properties of a particular tissue or disease state, is their source identified?

Where (section, paragraph #)?

N/A

a. Were they recently authenticated?

Where is this information reported (section, paragraph #)?

N/A

Data deposition

Data deposition in a public repository is mandatory for:

a. Protein, DNA and RNA sequences
b. Macromolecular structures
c. Crystallographic data for small molecules
d. Microarray data

Deposition is strongly recommended for many other datasets for which structured public repositories exist; more details on our data policy are available here. We encourage the provision of other source data in supplementary information or in unstructured repositories such as Figshare and Dryad.

We encourage publication of Data Descriptors (see Scientific Data) to maximize data reuse.

1. Are accession codes for deposit dates provided? Where (section, paragraph #)?	Microarray data are in the process of being deposited to GEO and ChIP sequencing data are being submitted to NCBI. We do not yet have accession numbers, but will add these should the manuscript be accepted.

Computer code/software

Any custom algorithm/software that is central to the methods must be supplied by the authors in a usable and readable form for readers at the time of publication. However, referees may ask for this information at any time during the review process.

1. Identify all custom software or scripts that were required to conduct the study and where in the procedures each was used.	N/A
2. If computer code was used to generate results that are central to the paper's conclusions, include a statement in the Methods section under "**Code availability**" to indicate whether and how the code can be accessed. Include version information as necessary and any restrictions on availability.	N/A

Human subjects

1. Which IRB approved the protocol? Where is this stated (section, paragraph #)?	N/A
2. Is demographic information on all subjects provided? Where (section, paragraph #)?	N/A
3. Is the number of human subjects, their age and sex clearly defined? Where (section, paragraph #)?	N/A
4. Are the inclusion and exclusion criteria (if any) clearly specified? Where (section, paragraph #)?	N/A

5. How well were the groups matched?

   Where is this information described (section, paragraph #)?

   N/A

6. Is a statement included confirming that informed consent was obtained from all subjects?

   Where (section, paragraph #)?

   N/A

7. For publication of patient photos, is a statement included confirming that consent to publish was obtained?

   Where (section, paragraph #)?

   N/A

fMRI studies

For papers reporting functional imaging (fMRI) results please ensure that these minimal reporting guidelines are met and that all this information is clearly provided in the methods:

1. Were any subjects scanned but then rejected for the analysis after the data was collected?

   N/A

   a. If yes, is the number rejected and reasons for rejection described?

      Where (section, paragraph #)?

      N/A

2. Is the number of blocks, trials or experimental units per session and/or subjects specified?

   Where (section, paragraph #)?

   N/A

3. Is the length of each trial and interval between trials specified?

   N/A

4. Is a blocked, event-related, or mixed design being used? If applicable, please specify the block length or how the event-related or mixed design was optimized.

   N/A

5. Is the task design clearly described?

   Where (section, paragraph #)?

   N/A

6. How was behavioral performance measured?

   N/A

7. Is an ANOVA or factorial design being used?

   N/A

8. For data acquisition, is a whole brain scan used?

   If not, state area of acquisition.

   N/A

   a. How was this region determined?

      N/A

9. Is the field strength (in Tesla) of the MRI system stated?	N/A
a. Is the pulse sequence type (gradient/spin echo, EPI/spiral) stated?	N/A
b. Are the field-of-view, matrix size, slice thickness, and TE/TR/ flip angle clearly stated?	N/A
10. Are the software and specific parameters (model/functions, smoothing kernel size if applicable, etc.) used for data processing and pre-processing clearly stated?	N/A
11. Is the coordinate space for the anatomical/functional imaging data clearly defined as subject/native space or standardized stereotaxic space, e.g., original Talairach, MNI305, ICBM152, etc? Where (section, paragraph #)?	N/A
12. If there was data normalization/standardization to a specific space template, are the type of transformation (linear vs. nonlinear) used and image types being transformed clearly described? Where (section, paragraph #)?	N/A
13. How were anatomical locations determined, e.g., via an automated labeling algorithm (AAL), standardized coordinate database (Talairach daemon), probabilistic atlases, etc.?	N/A
14. Were any additional regressors (behavioral covariates, motion etc) used?	N/A
15. Is the contrast construction clearly defined?	N/A
16. Is a mixed/random effects or fixed inference used?	N/A
a. If fixed effects inference used, is this justified?	N/A
17. Were repeated measures used (multiple measurements per subject)?	N/A
a. If so, are the method to account for within subject correlation and the assumptions made about variance clearly stated?	N/A
18. If the threshold used for inference and visualization in figures varies, is this clearly stated?	N/A
19. Are statistical inferences corrected for multiple comparisons?	N/A
a. If not, is this labeled as uncorrected?	N/A

20. Are the results based on an ROI (region of interest) analysis? N/A

    a. If so, is the rationale clearly described? N/A

    b. How were the ROI's defined (functional vs anatomical localization)? N/A

21. Is there correction for multiple comparisons within each voxel? N/A

22. For cluster-wise significance, is the cluster-defining threshold and the corrected significance level defined? N/A

Additional comments

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