

Supplemental Table 1. Gene expression array analysis for *Gria4* in FeJ, HeJ and backcross mice.

Supplemental Table 1. Microarray results^a

Probe set			Fold change			F-test			p-value					
Gene	Location	ID	N2-FeJ CX	HeJ-FeJ CX	N2-FeJ HB	HeJ-FeJ HB	N2-FeJ CX	HeJ-FeJ CX	N2-FeJ HB	HeJ-FeJ HB	N2-FeJ CX	HeJ-FeJ CX	N2-FeJ HB	HeJ-FeJ HB
<i>Gria4</i>	intron 13	1460097_at	1.9	1.9	1.9	2.0	0	0	0	0	0.0000	0.0000	0.0000	0.0000
<i>Gria4</i>	3' utr	1435722_at	-1.3	-1.2	-1.6	-1.5	0.0001	0.0012	0.0000	0.0000	0.0351	0.0084	0.0012	0.0001
<i>Gria4</i>	intron 2	1443285_at	-1.2	1.0	-1.0	-1.0	0.0417	0.7210	0.6993	0.6912	0.3188	0.4588	0.7507	0.3924
<i>Gria4</i>	intron 8	1440891_at	1.1	-1.2	1.1	-1.1	0.1041	0.0700	0.3964	0.2120	0.4225	0.1281	0.6638	0.1961
<i>Gria4</i>	intron 6	1458230_at	1.1	-1.0	1.0	1.1	0.3744	0.9764	0.6065	0.2264	0.5810	0.5316	0.7270	0.2041
<i>Gria4</i>	intron 8	1436772_at	1.0	-1.1	1.1	1.2	0.6692	0.0666	0.3552	0.0415	0.6769	0.1243	0.6511	0.0704
<i>Gria4</i>	last 5 exons	1421351_at	1.0	-1.1	1.1	-1.0	0.9765	0.2127	0.1473	0.8923	0.7466	0.2423	0.5485	0.4518

Probe set			Mean fluorescence intensity (sample replicate-1, -2, -3)								
Gene	Location	ID	FeJ CX-1	FeJ CX-2	FeJ CX-3	N2 CX-1	N2 CX-2	N2 CX-3	HeJ CX-1	HeJ CX-2	HeJ CX-3
<i>Gria4</i>	intron 13	1460097_at	8.00	8.13	8.01	8.89	9.12	9.02	9.18	8.90	8.94
<i>Gria4</i>	3' utr	1435722_at	9.84	9.75	9.73	9.30	9.51	9.38	9.51	9.45	9.46
<i>Gria4</i>	intron 2	1443285_at	6.82	6.66	6.76	6.34	6.64	6.54	6.87	6.93	6.57
<i>Gria4</i>	intron 8	1440891_at	8.19	8.70	8.36	8.42	8.69	8.73	8.26	8.17	8.21
<i>Gria4</i>	intron 6	1458230_at	8.12	7.93	8.06	8.13	8.07	8.16	8.14	7.97	8.02
<i>Gria4</i>	intron 8	1436772_at	8.50	9.05	8.74	8.83	8.75	8.85	8.60	8.69	8.46
<i>Gria4</i>	last 5 exons	1421351_at	7.50	7.14	7.19	7.30	7.19	7.37	7.07	7.23	7.15

Gene	Location	ID	FeJ HB-1	FeJ HB-2	FeJ HB-3	N2 HB-1	N2 HB-2	N2 HB-3	HeJ HB-1	HeJ HB-2	HeJ HB-3
<i>Gria4</i>	intron 13	1460097_at	5.25	5.26	5.32	5.41	5.30	5.40	5.33	5.27	5.29
<i>Gria4</i>	3' utr	1435722_at	10.19	9.91	10.31	9.46	9.42	9.50	9.53	9.70	9.54
<i>Gria4</i>	intron 2	1443285_at	7.06	6.78	6.76	6.78	6.74	6.96	6.55	7.04	6.87
<i>Gria4</i>	intron 8	1440891_at	8.88	8.50	8.89	8.76	8.88	8.92	8.53	8.63	8.68
<i>Gria4</i>	intron 6	1458230_at	7.98	7.85	8.03	7.94	8.00	8.05	7.84	8.28	8.06

<i>Gria4</i> intron 8	1436772_at	8.96	8.73	8.94	8.97	9.02	8.92	9.06	9.12	9.08
<i>Gria4</i> last 5 exons	1421351_at	7.41	7.13	7.38	7.36	7.37	7.65	7.10	7.38	7.39

^aN2, homozygous *Gria4*^{spwk1} from the (HeJ x FeJ)F1 x HeJ backcross,

FeJ, C3HeB/FeJ

HeJ, C3H/HeJ

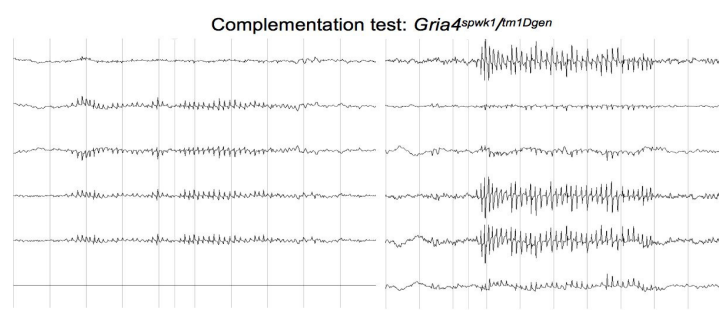
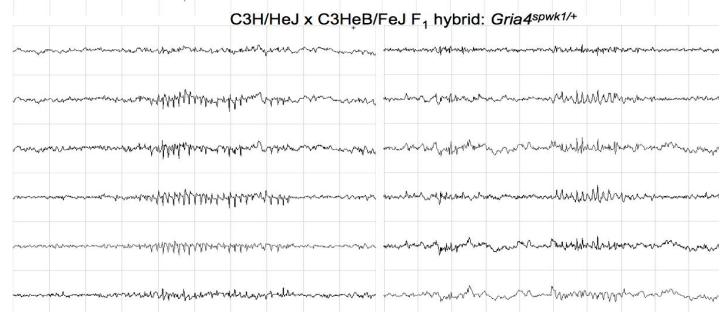
CX, cerebral cortex

HB, midbrain & hindbrain

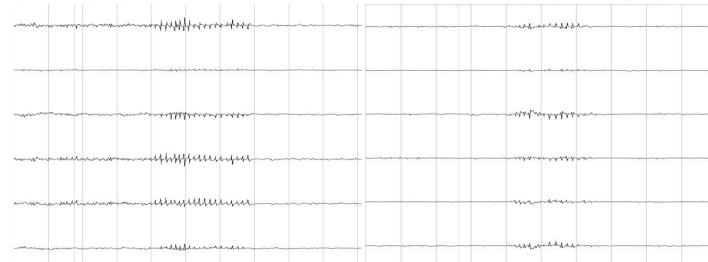
Supplemental Table 2. Effect of TTX on spontaneous EPSCs in nRT

<i>Gria4</i> ^{spkw1/spkw1} (n=4)	Frequency (Hz)	Amplitude (pA)	10-90 % Rise (ms)	Half width (ms)	90-10% Decay (ms)
Control	30.5 ± 11.5	28.5 ± 3.5	0.24 ± 0.04	0.40 ± 0.04	0.76 ± 0.11
TTX	30.4 ± 11.5	26.7 ± 3.8	0.25 ± 0.05	0.40 ± 0.05	0.75 ± 0.11
TTX % of control	97 ± 4 % N.S.	93 ± 2 % N.S.	103 ± 5 % N.S.	99 ± 6 % N.S.	99 ± 8 % N.S.

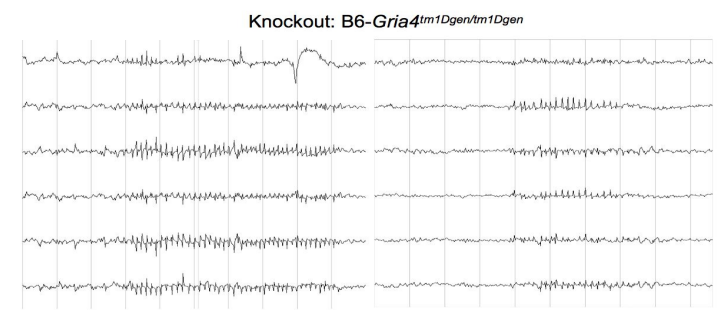
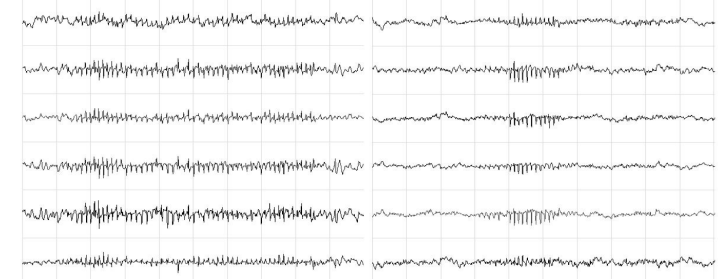
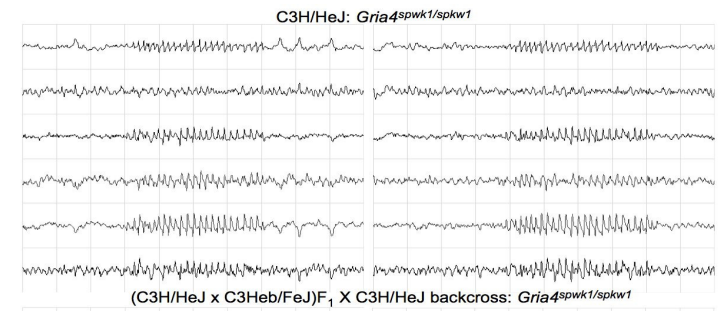
Supplemental Figure 1. Examples of EEG recordings from various genotypes displaying spike-wave discharges. Shown in each are six differential traces from the four electrodes, over the right front (RF), left front (LF), right back (RB), left back (LB) surfaces of the cerebral cortex. Two sets of traces are shown for each genotype, illustrating the range of form in each.
(also see uploaded high resolution file)



Double mutants: *Gria4*^{spkw1/spkw1}, *Gria3*^{tm1Dgen/tm1Dgen}



1 s
2 mv



Supplemental
Figure 1

Supplemental Figure 2. Genomic sequence of IAP insertion in *Gria4* locus of HeJ mice, including junctions.

LOCUS	EU529742.		5567 BP							
BASE COUNT	1523	A	1217	C	1256	G	1569	T	2	OTHER
ORIGIN	-									
1	TTTATTATAT	GAATTTAAC	TTATAAAAAG	TCTCTCTCAC	ACACATATTC	ATATATATAT				
61	ATGAAGGATG	TAAACAAAA	TGAAAGTTTG	TGTGGGAAGC	CGCCCCACA	TTTCGCCGTC				
121	CAAGATGGCG	CTGACATCCT	GTGTTCTAAG	TTGGTAAACA	AATAATCTGC	GCATGAGCCA				
181	AGGGTATTTA	CGACCACTTG	TACTCTGTTT	TTCCCGTGAA	CGTCAGCTCG	GCCATGGGCT				
241	GCAGCCAATC	AGGGAGTGAT	GCGCCCTAGG	CAATGGTTGT	TCTCTTTAAA	ATAGAAGGGG				
301	TTTCGTTTTT	CTCTCTCTCT	TGCTTCTTGC	TCTCTCTTGC	TTCCCTCTCT	TGCTTCTTGC				
361	TCTCTCTTGC	TTCTTGCTCT	CTCTTGCTTC	CCTCTCTTGC	TTCTTGCTCT	CTCTTGCTTC				
421	TTGCTCTCTT	TTCTTGAAGA	TGTAAGAATA	AAGCTTTGTC	GCAGAAGATT	CTGGTCTGTG				
481	GTGTTCTTCC	TGGCCGGTCG	TGAGAACGCG	TCGAATAACA	ATTGGTGCCG	AATTCGGGGA				
541	CGAGAAAATC	CGGGACGAGA	AAAAACTCCG	GACTGGCGCA	GGAGGGATAC	CTCATTCCAG				
601	AACCAGAACT	GCGAATCAAG	GTTATAAGGT	TCCCGTAACA	CAGACTGTTG	AGAAGGATTC				
661	AACTGCCGAA	TTCAGAACTC	ATCAGCTGGG	GAACGACGGT	GATAAAGGTT	CCCGTAAAGC				
721	GGAGAAGGAT	GAAGGATFCA	ACTGTATGAA	TTTCAGAACTT	TTTCAGCTGGG	GAACGAGGTA				
781	AGTCTGATCT	TGAACCTTCT	AAGGAAATTC	AAGACAGTCT	ATCAGAAGTA	AAGTGGAAAA				
841	TGGCTTTTAA	AGTTATGTTT	GGCCTTAAAT	TTTTTCTAGT	GTTTAGAAGCC	CTTTTGTTC				
901	TTTTTACATG	TTATATAGTG	CTTAAGATAG	GGCTGAAAA	TCTAGAGGAA	ATTCAGGACA				
961	GTCTATCAGA	AGTAAAGCGG	GGAGAGAGAG	TAGGAGCAAG	GAGAAACGGT	AAGTATACAG				
1021	GCCTTTCCAA	GGGTC'TTGAA	CCCGAGGAAA	AGTTAAGGTC	AGGTAGGAAT	ACCTGGGGAG				
1081	AGATTAGAAG	GAAGAAAAAG	AAAAAAGAAA	AGAAAAAGA	TCGATTAGCG	GAGGTCTCTA				
1141	GGAGAAGGAG	CCTGTGCTCT	GAAGAAACAG	ACTGGGAGAA	AAAAGCGGCT	CATTATGAAA				
1201	GAAAAGGATA	CCAGCCGCCA	AGTAAAGTGC	TAACTAGTCA	TTCAAGAAAA	AAGCCAAAAG				
1261	CGCTGGCCGA	AGGCCAGTTT	GCTAATTGGC	CTCAGGGCAA	TCCGCTACCA	GGTGCACTCC				
1321	CGCCCTATGC	GGAGTCCCCG	CCCTGCGTAG	TGCGTCAGCC	CGTAGTGCGT	CAGCAATGCG				
1381	CAGAGAGGCA	GTGCGCAGAG	AGGCAGTGCG	CAGACTCATT	CATTCCCCGA	GAGGAACAAA				
1441	GGAAAATAGA	ACAGGCATTT	CCAGTCTTTA	AAGGAGCCGA	GGGTGGGCGT	GTCCACGCTC				
1501	CGTATAGAATA	CGTACAGATT	AAGGAAATTTG	CCGAGTCGGT	TCCGTAATAC	GGAACCAATG				
1561	CTAATTTTAC	CTTGGCCGAG	TTAGACAGGC	TGCGTGGCGT	GGCACTGACT	CCTGCCGACT				
1621	GGCAAAATGAT	TGCAAAAAGTC	GCTCTCCCTA	GTATGGCCAA	ATATGTGGAA	TGGCGAGCTC				
1681	TGTGGCAGGA	GGCGGCACAG	GCGCAGGCC	GAGCAAACGC	TGCTGCTTTA	ACTCCAGAGC				
1741	AGAGAGATTG	GACTTTTGAC	TTGTTAACGG	GTCAGAGAGC	TTATTTCTGCT	GAACCTGATA				
1801	AGAGGTATCA	ATGGAAGATC	TTACCACAGG	GAATGTCCAA	TAGTCCTATA	ATGTGCCAGC				
1861	TTTATATACA	AGAAGCTCTT	TTGCCAGTGA	GGGAACAAAT	CCCCCTTTTA	ATTTTGTCTC				
1921	TTTACATGGA	TGACATCCTC	CTGTGCCATA	AAGACCTTAC	CATGCTACAA	AAGGCATATC				
1981	CTTTTCTACT	TAAAAC'TTTA	AGTCAGTGGG	GTCTACAGAT	AGCCACAGAA	AAGGTCCAAA				
2041	TTTCTGATAC	AGGACAATTC	TTGGGCTCTG	TGGTGTCCCC	AGATAAGATT	GTCCCCCAAA				
2101	AGGTAGAGAT	AAGAAGAGAT	CACCTCCATA	CCTTAAATGA	TTTTCAAAA	CTGTTGGGAG				
2161	ATATTTAATTG	GCTCAGACCC	TTTTTAAAGA	TTCTTCTTGC	TGAGTTAAGG	CCTTTGTTTA				
2221	GTATTTTAGA	AGGAGATCCT	CATATCTCCT	CCCCTAGGAC	TCTTACTCTA	GCTGCTAACC				
2281	AGGCCTTACA	AAAGGTAGAA	AAGGCCTTAC	AGAATGCACA	ATTACAACGT	ATTGAGGATT				
2341	CGCAGCCCTT	CAGTTTGTGT	TGCTTTAAGA	CAGCACAAAT	GCCAACGTGA	GTTTTGTGGC				
2401	AGAATGGGCC	ATTGTTGTGG	ATCCATCCAA	ACGTATCCCC	AGCTAAAATA	ATAGATTGGT				
2461	ATCCTGATGC	AATTGCACAG	CTTGCCCTTA	AAGGCCATAA	AGCAGCAATC	ACCCACTTTG				
2521	GGCAAAGTCC	ATATCTTTTA	ATTGTACCTT	ATACCGCTGC	ACAGGTTCAA	ACCTTGGCAG				
2581	CCGCATCTAA	TGATTGGGCA	GTTTTAGTTA	CCTCCTTTTC	AGGAAAAATA	GATAACCATT				
2641	ATCCAAAGCA	TCCAATCTTA	CAGTTTGCCC	AAAATCAATC	TGTTGTGTTT	CCACAAATAA				
2701	CAGTAAGAAA	CCCCTTAAA	AATGGGATTG	TGGTATATAC	TGATGGATCA	AAAACCTGGCA				
2761	TAGGTGCCTA	TGTGGCTAAT	GGTAAAGTGG	TATCCAAACA	GTATAATGAA	AATTCACCTC				
2821	AAGTGGTAGA	ATGTTTAGTG	GTCTTAGAAG	TTTTTAAAAC	CTTTTAAAA	CCCTTAATA				
2881	TTGTGTGAGA	TTCTGTGTTT	GTGGTAAATG	CAGTAAATCT	TTTAGAAGTG	GCTGGAGTGA				
2941	TTAAGCCCTC	CAGTAGAGTT	GCCAATATTT	TTTCAGCAGAT	ACAATTAGTT	TTGTTATCTA				
3001	GAAGATCTCC	TGTTTATATT	ACTCATGTTA	GAGCCCATTC	AGGCCTACCT	GGCCCCATGG				
3061	CTCTGGGAAA	TGATTTGGCA	GATAAGGCCA	CTAAAGTGGT	GGCTGCTGCC	CTATCATCCC				
3121	CGTATAGAGC	TGCAAGAAAT	TTTCATAACA	ATTTTTCATGT	GACGGCTGAA	ACATTACGCA				
3181	GTGTTTTCTC	CTTGACAAGA	AAAGAAGCCC	GTGACATTGT	TACTCAATGT	CAAAGCTGCT				
3241	GTGAGTTCTT	GCCAGTTCCCT	CATGTGGGAA	TTAACCCACG	CGGTATTCTA	CCTCTACAGG				
3301	TCGGCAAAAT	GGATGTTACA	CATGTTTCTT	CCTTTGGAAA	ACTTCAATAT	CTCCATGTGT				
3361	CCATTGACAC	ATGTTCTGGC	ATCATGTTTG	CTTCTCCGTT	AAC'TGGAGAA	AAAGCCTCAC				
3421	ATGTGATTCA	ACATTGTCTT	GAGGCATGGA	GTGCTTGGGG	GAAACCCAGA	CTCCTTAAGA				
3481	CTGATAATGG	ACCAGCTTAT	ACGTCCCAAA	AATTTTCAGCA	GTTCTGCCGT	CAGATGGACG				
3541	TAACCCACCT	GACTGGACTT	CCATACAACC	CTCAAGGACA	GGGTATTGTT	GAGCGTGGCG				
3601	ATCGCACCTT	CAAAGCCTAT	CTTATAAAAAC	AGAAGAGGGG	AAC'TTTTGAG	GAGACTGTAC				
3661	CCCGAGCACC	AAGAGTGTCT	GTGCTTTTGG	CAC'TCTTTAC	ACTCAATTTT	TTAAATATTG				
3721	ATGCTCATGG	CCATACTGCG	GCTGAACGTC	ATTGTTTCAGA	GCCAGATAGG	CCCAATGAGA				

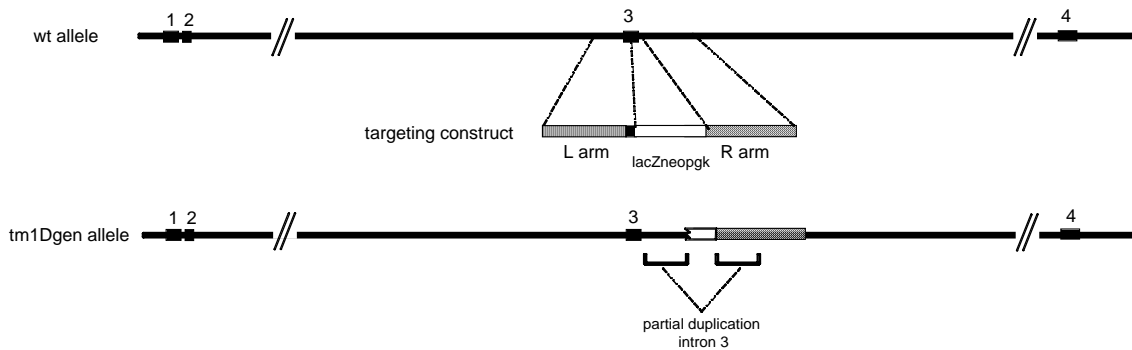
3781	TGGTTAAATG	GAAAAATGTC	CTTGATAATA	AATGGTATGG	CCCGGATCCT	ATCTTGATAA
3841	GATCCAGGGG	AGCTATCTGT	GTTTTCCAC	AGAATGAAGA	CAACCCATTT	TGGGTACCAG
3901	AAAGACTCAC	CCGAAAAATC	CAGACTGACC	AAGGGAATAC	TAATGTCCCT	CGTCTTGGTG
3961	ATGTCCAGGG	CGTCAATAAT	AAAGAGAGAG	CAGCGTTGGG	GGATAATGTC	GACATTTCCA
4021	CTCCCAATGA	CGGTGATGTA	TAATGCTCAA	GTATTCTCCT	GCTTTTTTAC	CACTAACTAG
4081	GAAGTGGGTT	TGGCCTTAAT	TCAGACAGCC	TTGGCTCTGT	CTGGACAGGT	CCAGATGACT
4141	GACAACATTA	ACACTTTGTC	AGCCTCAGTG	ACTACAGTCA	TAGATGAACA	GGCCTCAGCT
4201	AATGTCAAGA	TACAGAGAGG	TCTCATGCTG	GTTAATCAAC	TCATAGATCT	TGTCCAGAAA
4261	CAACTGGATG	TATTATGACA	AATAACTCAG	CAGGGATGTG	AACAAAAGTT	TCCGGGATTG
4321	TGTGTTATTT	CCATTCAGTA	TGTTAAATTT	ACTAGGACAG	CTAATTTGTC	AAAAAGTCTT
4381	TTTCAGTATA	TGTTACAGAA	TTGGATGGCT	GAA'TTGAAT	AGATCCTTCG	AGAATTGAGA
4441	CTTCAGGTCA	ACTCCACGCG	CTTGGACCTG	TCGCTGACCA	AAAGATTACC	CAATTGGATC
4501	TCCTCAGCAT	TTTCTTTCTT	TAAAAAATG	GGTGGGATTA	ATATTATTTG	GAGATACACT
4561	TTGCTGTGGA	TTAGTGTGTC	TTCTTTGATT	GGTCTGTAAG	CTTAAGGCC	AACTAAGAG
4621	AGACAAGGTG	GTATTGCCC	AGGCGCTGTC	AGGACTAGAA	CATGGAGCTT	CCCCTGATAT
4681	ATCTATGCTT	AGGCAATAGG	TCGCTGGCCA	CTCAGCTCTT	ATATCTCAG	AGGCTAGACT
4741	CATTGCACGA	GATAGAGTGA	GTGTGCTTCA	GCAGCCGAG	AGAGTTGCAA	GGCTAAGCAC
4801	TGCAGTAGAA	GGGCTCTGCG	GCACATATGA	GCCTATTCTA	GGGAGACATG	TCATCTTTCA
4861	TGAAGGTTCA	GTGTCCTAGT	TCCCTTCCCC	CAGGCAAAAC	GACACGGGAG	CAGGTCAGGG
4921	TTGCTCTGGG	TAAAAGCCTG	TAAGCCTAAG	AGCTAATCCT	GTACATGGCT	CCTTTACCTA
4981	CACACTGGGG	ATTTGACCTC	TATCTCCACT	CTCAATAATA	TGGGTGGCCT	ATTTGCTCTT
5041	ATTAAGAA	AAAGGGGGAA	CTGTGGGAAG	CCGCCCCAC	ATTCGCCGTC	ACAAGATGGC
5101	GCTGACATCC	TGTGTTCTAA	GTTGGTAAAC	AAATAATCTG	CGCATGAGCC	AAGGGTATTT
5161	ACGACCACTT	GTA CTCTGTT	TTTCCCCTGA	ACGTCAGCTC	GGCCATGGGC	TGCAGCCAAT
5221	CAGGGAGTGA	TGCGCCCTAG	GCAATGGTTG	TTCTCTTTAA	AATAGAAGGG	GTTTCGTTTT
5281	TCTCTCTCTC	TTGCTTCTTG	CTCTCTCTTG	CTTCCCTCTC	TTGCTTCTTG	CTCTCTCTTG
5341	CTTCTTGCTC	TCTCTTGCTT	CCCTCTCTTG	CTTCTTGCTC	TCTCTTGCTT	CTTCTTGCTT
5401	TTTCCTGAAG	ATGTAAGAAT	AAAGCTTTGT	CGCANAAAT	TCTGGTCTGT	GGTGTCTCTC
5461	CTGGCCGGTC	GTGAGAACGC	GTCGAATAAC	AAGTTTGCAG	TGAGGTACTA	TACATTTTTT
5521	TCCATTTTGT	CCCCCTTTTA	CATAAACCAT	GTCACCCACA	CTTATAC	

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Supplemental Figure 3. Structure of the *Gria4*^{tm1Dgen} allele. a) Graphic depiction of the first four exons of the wild-type (wt) allele of *Gria4*, and below it a depiction of the targeting construct made by Deltagen, intended to replace exon 3 with a truncated exon 3-lacZ-neopgk cassette. At the bottom is a genomic map of the eventual targeted allele, showing that the left (L) arm of the construct inserted 3' to exon 3 and did not effect the replacement of exon 3, resulting in a mostly deleted lacZ-neopgk cassette and a partial duplication of intron 3 just downstream of exon 3, as determined by long-PCR (data not shown) and genomic DNA sequencing. Presumably at least some of the right (R) arm of the targeting construct underwent homologous recombination with endogenous intron 3.

b) Genomic sequence of deletion junction of lacZ-neo targeting cassette in the *Gria4* locus of *Gria4*^{tm1Dgen}.

A.



B.

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LOCUS      EU529743.      278
BASE COUNT  92 A      47 C      51 G      88 T      0 OTHER
1  AAAAGGCTGT  TTAGCTCTCA  ACTACTAAAT  GTATAGAGTA  CACCAGCTTG  TAAAACCTGGA
   61  CATGATTAAC  TCAAATGGAG  TAATTTGGTG  GGTATAAGTA  TCATATTGCT  GGAGGAAGCA
  121  GTAATTTTAT  TGTTAGCCAT  AATTTATCTT  CAGCAGTATT  TAAATTAAAT  TTTTGCTTTC
  181  CATTC TAGTG  ATGATGAGGC  TACTGCTGAC  TCTCAACATT  CTACTCCTCC  AAAAAAGAAG
  241  AGAAAGGTAG  AAGACCCCAA  GGACTTTCCT  TCAGAATT

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Supplemental Figure 4. GluR3 protein levels are not affected by *Gria4* genotype. Representative (of two trials each) western blot analysis of GluR3 expression in cerebellar preps from B6, *Gria4*^{tm1Dgen}, and *Gria4*^{spwk1} intra-C3H backcross adult mice. Below, the calbindin level is shown as the loading control for this blot. Overall GluR3 protein levels appear not to be affected by mutant genotypes at the *Gria4* locus.

