SUPPORTING INFORMATION

Table S1. Deep Sequencing Reads in Mouse Cortex (*1*)

miRNA	CK+* Cells	Gad2+** Cells	CK:Gad2
miR-128	1,533,834	91,187	16.8
miR-221	25,694	2,101	12.2
miR-222	7,259	768	9.5

*CK, Calcium/calmodulin-dependent protein kinase II, excitatory neurons
**Gad2, Glutamate decarboxylase II, inhibitory neurons

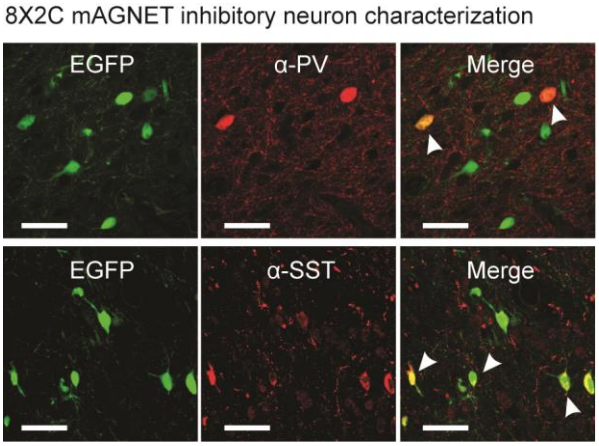

Figure S1. mAGNET cortical inhibitory neuron characterization. Representative confocal images from cortical injection sites of EGFP fluorescence from cells expressing the 8X2C mAGNET, α-PV and α-SST immunofluorescence, and colocalization. Scale bars: 40 μm.

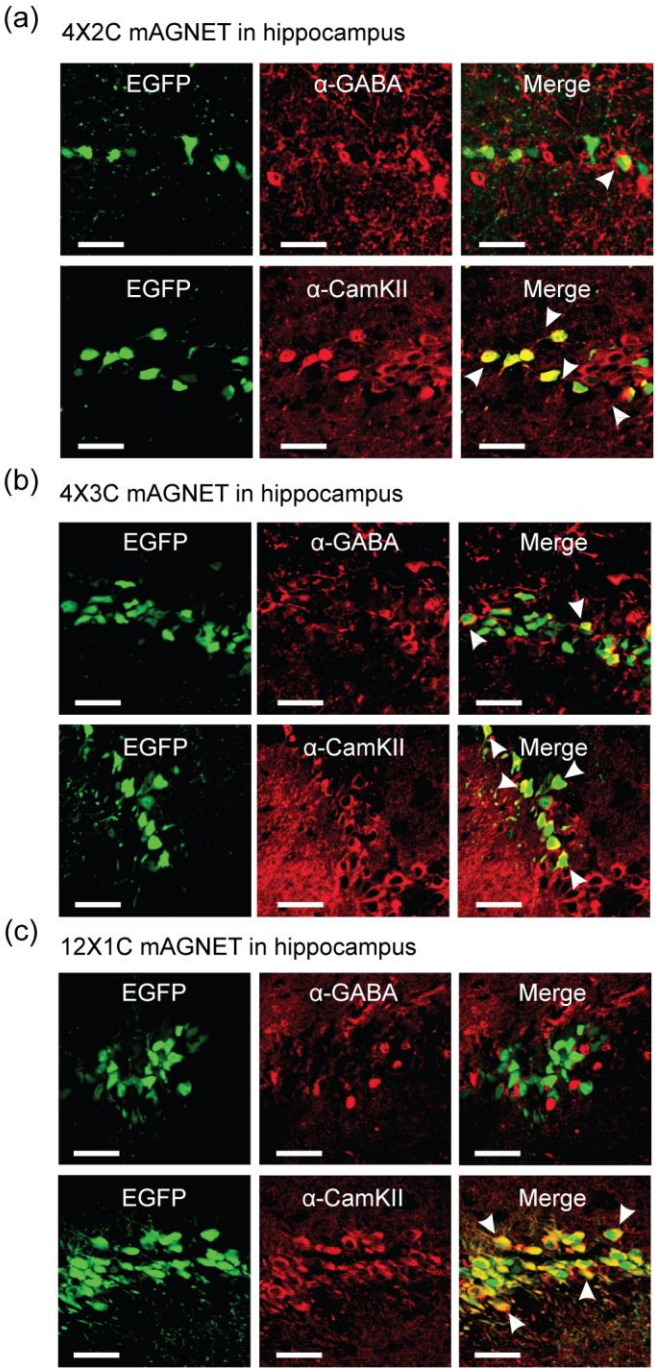

Figure S2. (a-c) Representative confocal images from hippocampal injection site of EGFP fluorescence from cells expressing the 4X2C (a), 4X3C (b), or 12X1C (c) mAGNET, α-GABA and α-CAMKII immunofluorescence, and colocalization. Scale bars: 40 μm. Arrowheads indicate examples of EGFP colocalization with immunofluorescence.

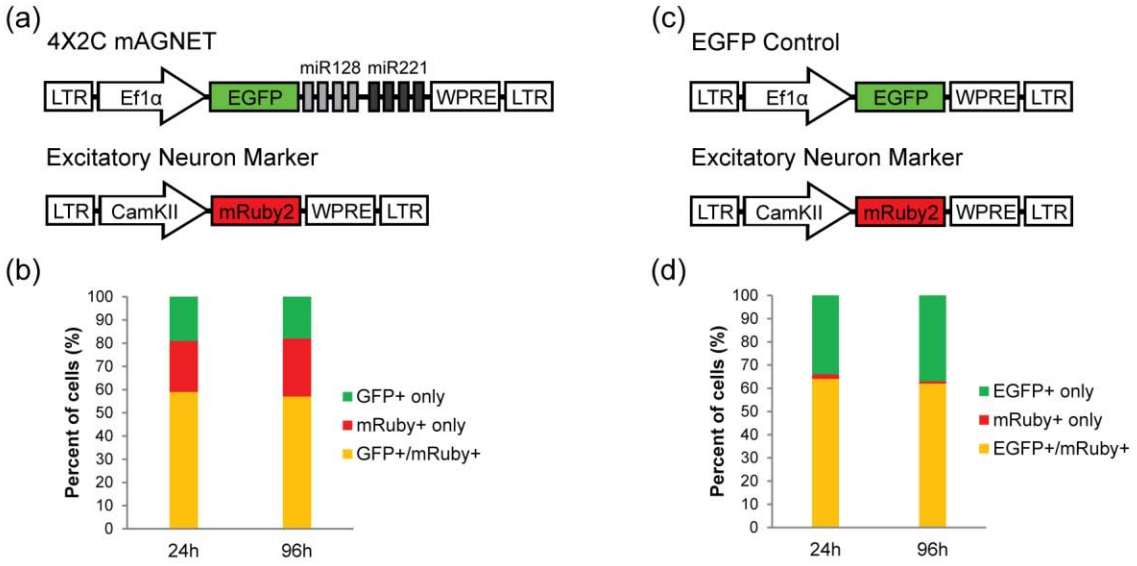

Figure S3. Cortical neuron expression profiles in cultured neurons *in vitro*. (a&c) Pairs of constructs co-transfected into mouse cortical neuron cultures. (b) Percentage of cultured neurons co- transfected as indicated in (a) expressing EGFP alone (EGFP+), mRuby2 alone (mRuby2+) and both EGFP and mRuby2 (EGFP+/mRuby2+) observed at 24 hours and 96 hours post-transfection (n = 130 cells examined at 24h, and n=108 cells at 96h). (d) Percentage of cultured neurons with the three indicated expression profiles co-transfected with control vectors indicated in (c), at 24 hours and 96 hours post-transfection (n = 102 cells at 24h, 157 cells at 96h).

mAGNET Vector miRNA Cassette Sequences

The 4X2C mAGNET contains the recognition cassettes for miR128 (AAAGAGACCGGTTCACTGTGA) and miR221 (GAAACCCAGCAGACAATGTAGCT), with each cassette containing four identical repeats of the respective recognition sequence. The DNA sequence inserted after the GFP is:
actagtgcggccttAAAGAGACCGGTTCACTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAG
AGACCGGTTCACTGTGAtcggaAAAGAGACCGGTTCACTGTGAgcggccttGAAACCCAGCAGACA
ATGTAGCTcagtaGAAACCCAGCAGACAATGTAGCTgaatgGAAACCCAGCAGACAATGTAGCTtc
ggaGAAACCCAGCAGACAATGTAGCTgcggccgc.

The 4X3C mAGNET contains three recognition cassettes for miR128 (AAAGAGACCGGTTCACTGTGA), miR221 (GAAACCCAGCAGACAATGTAGCT), and miR222 (ACCCAGTAGCCAGATGTAGCT), with each cassette containing four identical repeats of the respective recognition sequence. The DNA sequence inserted after the GFP is:
actagtgcggccttAAAGAGACCGGTTCACTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAG
AGACCGGTTCACTGTGAtcggaAAAGAGACCGGTTCACTGTGAgcggccttGAAACCCAGCAGACA
ATGTAGCTcagtaGAAACCCAGCAGACAATGTAGCTgaatgGAAACCCAGCAGACAATGTAGCTtc
ggaGAAACCCAGCAGACAATGTAGCTgcggccttACCCAGTAGCCAGATGTAGCTcagtaACCCAGT
AGCCAGATGTAGCTgaatgACCCAGTAGCCAGATGTAGCTtcggaACCCAGTAGCCAGATGTAGC
Tgcggccgc.

The 8X2C mAGNET contains recognition cassettes for miR128 (AAAGAGACCGGTTCACTGTGA) and miR221 (GAAACCCAGCAGACAATGTAGCT), with each cassette containing eight identical repeats of the respective recognition sequence. The DNA sequence inserted after the GFP is:
actagtgcggccttAAAGAGACCGGTTCACTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAG
AGACCGGTTCACTGTGAtcggaAAAGAGACCGGTTCACTGTGAgcggccttAAAGAGACCGGTTCA
CTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAGAGACCGGTTCACTGTGAtcggaAAAG
AGACCGGTTCACTGTGAgcggccttGAAACCCAGCAGACAATGTAGCTcagtaGAAACCCAGCAGA
CAATGTAGCTgaatgGAAACCCAGCAGACAATGTAGCTtcggaGAAACCCAGCAGACAATGTAGC
TgcggccttGAAACCCAGCAGACAATGTAGCTcagtaGAAACCCAGCAGACAATGTAGCTgaatgGAA
ACCCAGCAGACAATGTAGCTtcggaGAAACCCAGCAGACAATGTAGCTgcggccgc

The 12X1C mAGNET contains recognition cassettes for miR128 (AAAGAGACCGGTTCACTGTGA) only with the one cassette containing twelve identical repeats of the recognition sequence. The DNA sequence inserted after the GFP is:
actagtgcggccttAAAGAGACCGGTTCACTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAG
AGACCGGTTCACTGTGAtcggaAAAGAGACCGGTTCACTGTGAgcggccttAAAGAGACCGGTTCA
CTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAGAGACCGGTTCACTGTGAtcggaAAAG
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CTGTGAgaatgAAAGAGACCGGTTCACTGTGAtcggaAAAGAGACCGGTTCACTGTGAggccttAAA
GAGACCGGTTCACTGTGAcagtaAAAGAGACCGGTTCACTGTGAgaatgAAAGAGACCGGTTCAC
TGTGAtcggaAAAGAGACCGGTTCACTGTGAgcggccgc

Supporting Information References

1. He, M., Liu, Y., Wang, X., Zhang, M. Q., Hannon, G. J., and Huang, Z. J. (2012) Cell-type-based analysis of microRNA profiles in the mouse brain, *Neuron 73*, 35-48.