Supplemental Methods

mEPSC recordings

For measurements of miniature excitatory post synaptic currents (mEPSCs), CA1 pyramidal cells were patched in the presence of 1 μM tetrodotoxin to prevent spontaneous action potentials and 100 μM picrotoxin to prevent inhibitory currents. Recording were made for a minimum of 10 min.

Spine analysis

Spine analysis was performed as previously described (Larimore et al., 2009) with minor modification. CA1 pyramidal cells were patched as described above with 135 μM Alexa 594 (Invitrogen, Carlsbad, CA) present in the patch pipette in addition to normal IRS and held for >1hr prior to fixation in 4% PFA. Sections were mounted for confocal microscopy, and images were acquired with a Fluoview FV-300 laser-scanning confocal microscope (Olympus; Center Valley, PA) using an oil immersion 100× objective lens. Optical sections in the *z*-axis were acquired at 0.1 μm intervals through each dendritic branch. Dendritic spines of CA1 pyramidal neurons were visualized and counted in maximum-intensity projections of the z-stacks using ImageJ software. Spines were counted only if they were continuous with the parent dendrite; density is reported as spines/10 μM of dendrite.

Supplemental Reference

Larimore JL, Chapleau CA, Kudo S, Theibert A, Percy AK, Pozzo-Miller L (2009) Bdnf overexpression in hippocampal neurons prevents dendritic atrophy caused by Rett-associated MECP2 mutations. Neurobiol Dis 34:199-211.

Supplemental Figures

Figure S1, related to Figure 1

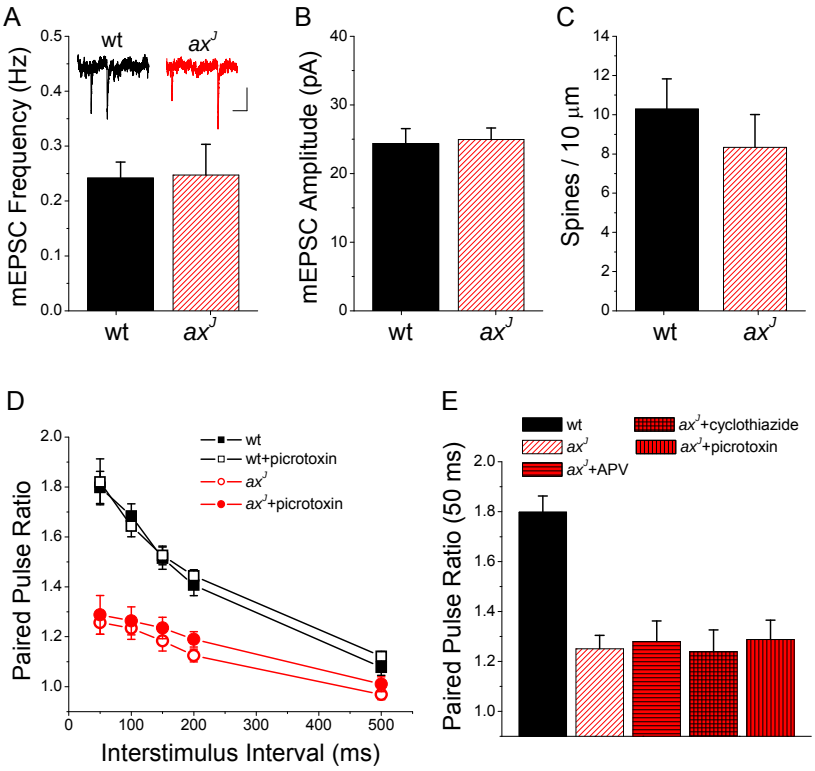

Figure S1.

There is no difference in mEPSC frequency (A) or amplitude (B) in CA1 pyramidal cells from *ax*^{J} mice (n=5) compared to wt (n=5). Insets: example traces of mEPSCs from wt and *ax*^{J}. Scale bars: 200 ms, 10 pA. C) No difference in spine number was detected between *ax*^{J} and wt mice. n= 8 dendrites from 2 mice for both *ax*^{J} and wt. D) Paired-pulse ratio is not altered by blocking GABAA receptors with picrotoxin in wt or *ax*^{J} mice, n= 5 wt, n= 9 *ax*^{J}. E) Summary of group data showing no effects of APV (n=5), cyclothiazide (n=4), or picrotoxin (n=9) on the paired pulse ratio at 50 ms at SC synapses from *ax*^{J} mice. No effect was seen in wt mice (n= 6 APV, n=4 cyclothiazide, n=5 picrotoxin, data not shown).

Figure S2, related to Figure 2

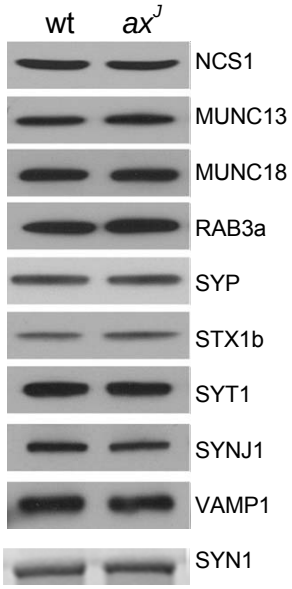

Figure S2. Presynaptic protein levels are not changed in *ax*^{J} mice.

Immunoblots of presynaptic proteins from hippocampal extracts show no difference between wt and *ax*^{J} in neuronal calcium sensor 1 (NCS1), MUNC13, MUNC18, RAB3a, synaptophysin (SYP), syntaxin 1b (STX1b), synaptotagmin 1 (SYT1), synaptojanin 1 (SYNJ1), synaptobrevin 1 (VAMP1), or synapsin 1 (SYN1).