Normal granule cell excitability in Tc1 mice.

Pooled stimulus-response curves showing the mean ± SEM amplitude of antidromically-evoked compound action potential recorded in the granule cell (GC) layer of dentate gyrus (DG) vs. the strength of stimulation applied to mossy fibers in area CA3. Data are pooled from slices prepared from 7 wild-type (WT) and 6 Tc1 mice. Inset traces show example responses at 50, 150 and 300µA stimulation. Scale bar: 1ms, 5mV. P=0.70, F(1,11)=0.15, two-way mixed ANOVA.
Normal synaptic function in the Schaffer collateral pathway in Tc1 mice.

(a) Pooled CA3-CA1 stimulus-response curves for recordings made in hippocampal slices from wild-type (WT) and Tc1 mice (mean ± SEM). Inset traces show overlaid example responses to 20, 40 and 80V stimulation for the two genotypes. (b) Pooled CA3-CA1 paired-pulse facilitation curves for paired stimuli delivered over inter-stimulus intervals from 25-400ms. Traces show example responses at each inter-stimulus interval. (c) Pooled data from CA3-CA1 LTP experiments in wild-type and Tc1 mice. Arrow denotes delivery of the conditioning stimulus (200ms, 100Hz repeated 3x at 1.5s intervals). Traces show example responses at times a and b. Scale bars: 5ms, 0.25mV.
Supplementary Figure 3

Normal hippocampal volumes and dentate granule cell and CA3 pyramidal cell densities in Tc1 mice.

(a) Hippocampus:brain volume ratios in wild-type (WT) and Tc1 mice. For each box-plot, the center line illustrates the median and box limits indicate the 25th and 75th percentiles (determined using R software). Whiskers extend to the minimum and maximum values. Individual data points are plotted as open circles. n=4, 5, 4, 4 mice per sample respectively. (b) Dentate gyrus (DG) granule cell densities (per mm$^3$) in wild-type (n=3) and Tc1 (n=3) mice. (c) Area CA3 pyramidal cell densities (per mm$^3$) in wild-type (n=3) and Tc1 (n=3) mice.
Supplementary Figure 4

Three-dimensional reconstructions of CA3 dendritic segments, thorny excrescences and postsynaptic densities in wild-type and Tc1 mice.

Dendritic segments and associated presynaptic giant boutons from (a) wild-type and (f) Tc1 mice. Boutons are shown separately in (b) for the wild-type example. Typical examples of thorny excrescences with their postsynaptic densities (PSD) shown in red from (c-d) wild-type and (g) Tc1 mice. 10 representative PSDs from (e) wild-type and (h) Tc1 mice, showing reduced PSD volume in Tc1 animals.
Supplementary Figure 5

Schematic comparison of thorny excrescences in wild-type and Tc1 mice.

(a) Wild-type mice. (b) Tc1 mice. Prominent features in the Tc1 mice are: (1) retraction of thorns on thorny excrescences (yellow); (2) decrease in the volume of mossy fibre giant boutons (blue); (3) rearrangements of postsynaptic densities (PSD; red); (4) retraction of mitochondria from thorny excrescences (green). Note that dendritic spines in CA1 and dentate gyrus do not contain mitochondria.