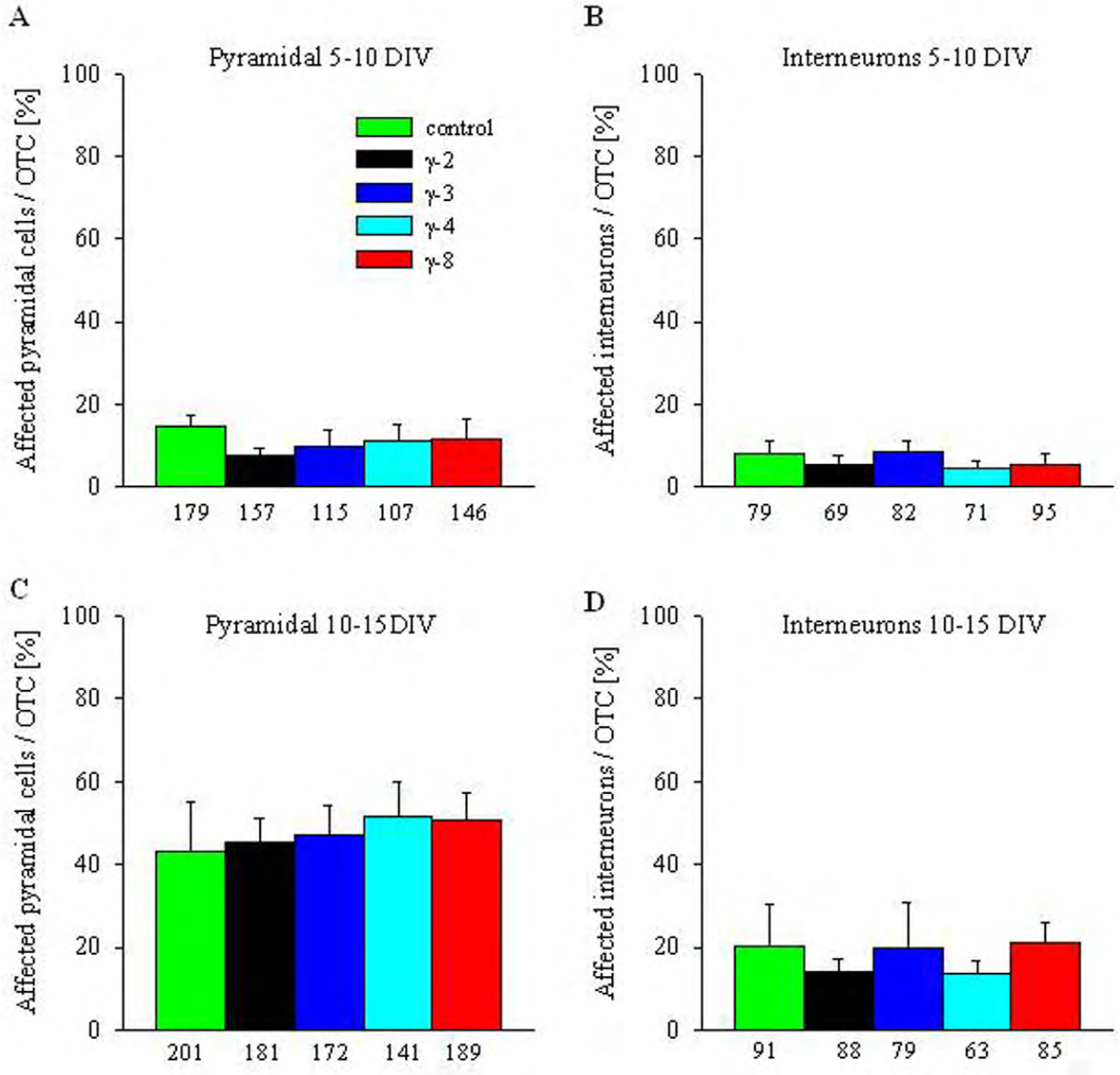

Fig. S1. NMDA does not induce excitotoxicity in TARP-overexpressing neurons. (**A**-**D**) Percentages of cells (mean ± s.e.m.) displaying dendritic injury after 15 min of 100 µM NMDA. (**A**) Pyramidal cells overexpressing EGFP alone (control) or with the indicated type I TARP at 5-10 DIV. (**B**) Interneurons overexpressing EGFP alone (control) or with the indicated type I TARP at 5-10 DIV. (**C**) Pyramidal cells overexpressing EGFP alone (control) or with the indicated type I TARP at 10-15 DIV. (**D**) Interneurons overexpressing EGFP alone (control) or with the indicated type I TARP at 10-15 DIV. Numbers of neurons analyzed are indicated below the bars.

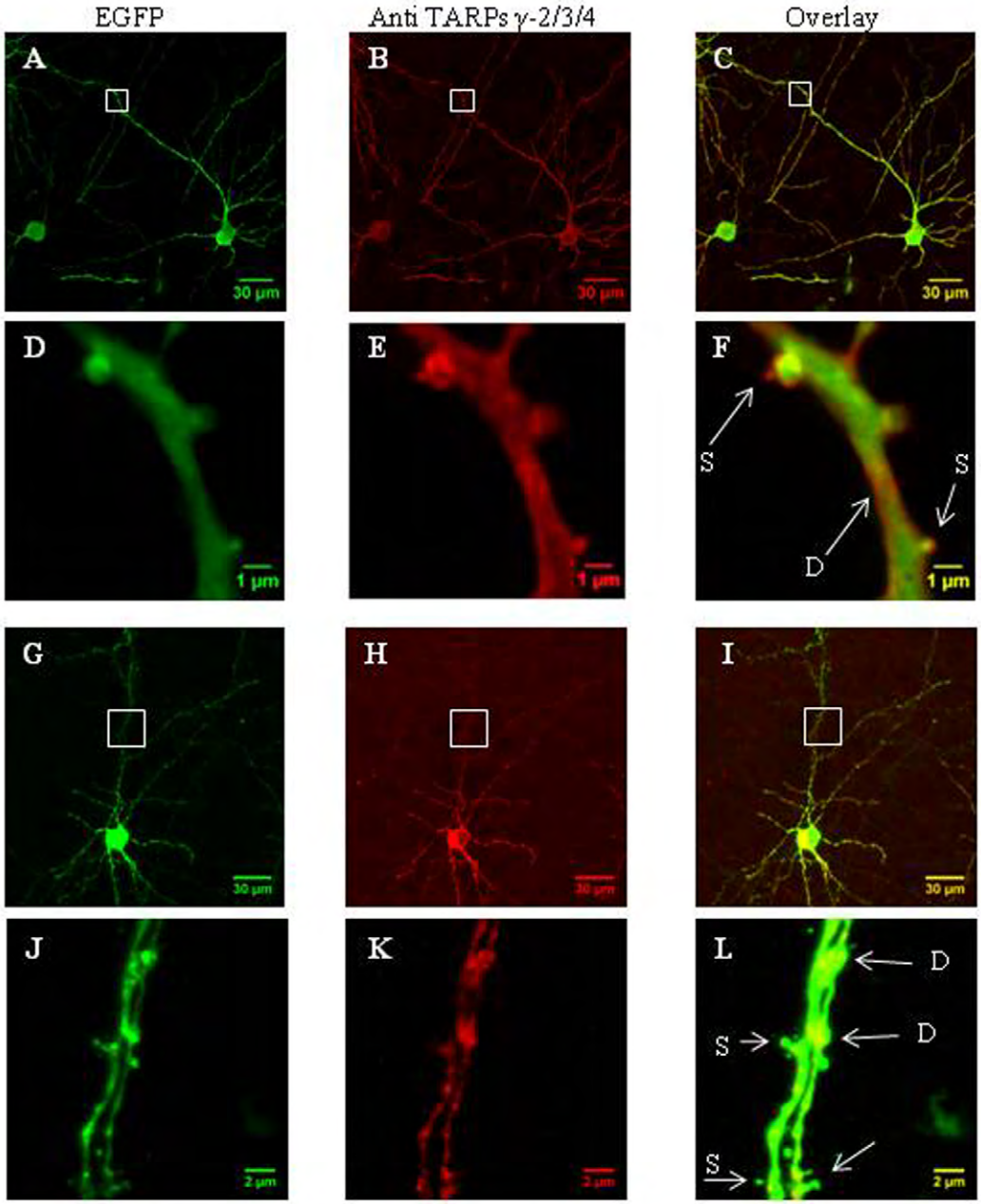

Fig. S2. Immunostaining of overexpressed γ-2 and γ-4 in OTCs. (A-L) Confocal images (taken at 63x magnification) of a representative pyramidal cell cotransfected with EGFP and γ-2, labeled by an antibody against a shared epitope in the C-terminal domain of γ-2/3/4. (**A**) EGFP fluorescence; (**B**) γ-2 detected by the anti-γ-2/3/4 antibody; (**C**) overlay of (**A**) and (**B**). (**D-F**) Enlargement of the area boxed in white in (**A-C**). As indicated with arrows in (**F**), note that γ-2 immunoreactivity appears abundant in spines (S) as well as in dendritic shafts (D), (**G-I**) A representative pyramidal cell cotransfected with EGFP and γ-4. (**G**) EGFP fluorescence; (**H**) γ-4 detected by an anti-γ-2/3/4 antibody; (**I**) overlay of (**G**) and (**H**). (**J-L**) Enlargement of the area boxed in white in (**G-I**). As indicated with arrows in (**L**), note that γ-4 is concentrated in dendritic shafts and weakly present in spines. Scale bars are given in the individual photomicrographs.

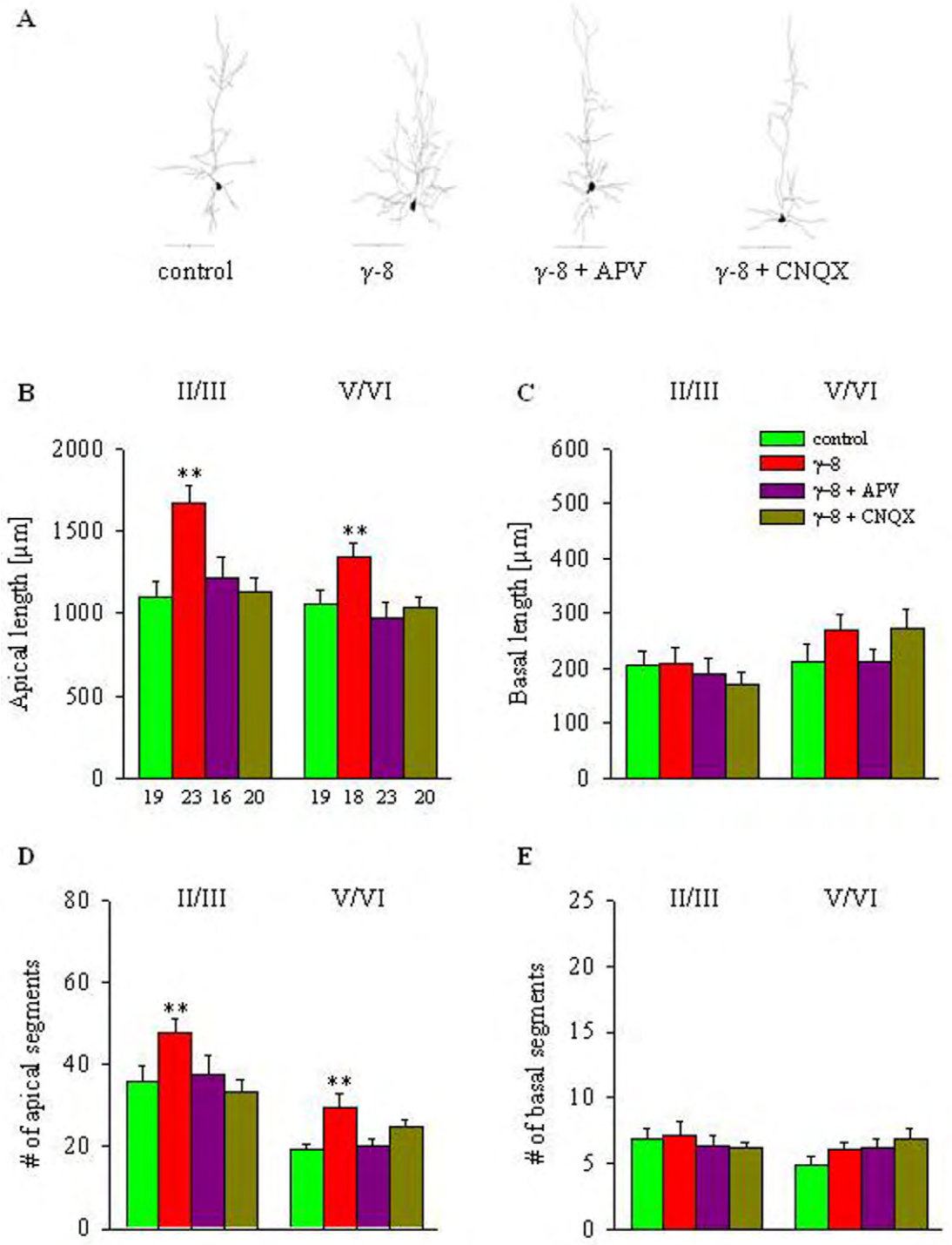

Fig. S3. Quantitative morphometric analysis of γ-8 transfectants in the presence of NMDAR and AMPAR blockers. (**A**) Representative Neurolucida reconstructions of pyramidal cells at 10 DIV transfected at 5 DIV with the γ-8 plasmid together with an EGFP plasmid or EGFP alone (= control). γ-8 transfectants received either no blocker or 50 µM APV or 10 µM CNQX. (**B**-**E**) The graphs indicate the mean ± s.e.m. of apical (**A**) and basal (**B**) dendritic length and apical (**D**) and basal (**E**) segment number of layer II/III and V/VI pyramidal cells. The overexpression of γ-8 increased dendritic length and segments in both layers (see also Fig. 4). However, blocking NMDARs in γ-8 transfectants reduced dendritic length and branching to control levels. Blocking AMPARs with CNQX also reduced dendritic length and branching to control levels. The number of cells reconstructed per group is given below the bars in (**B**); numbers are the same for **C**-**E**. Statistical significances are indicated between each treatment and the EGFP control group using Mann-Whitney U tests; **, $P<0.01$.

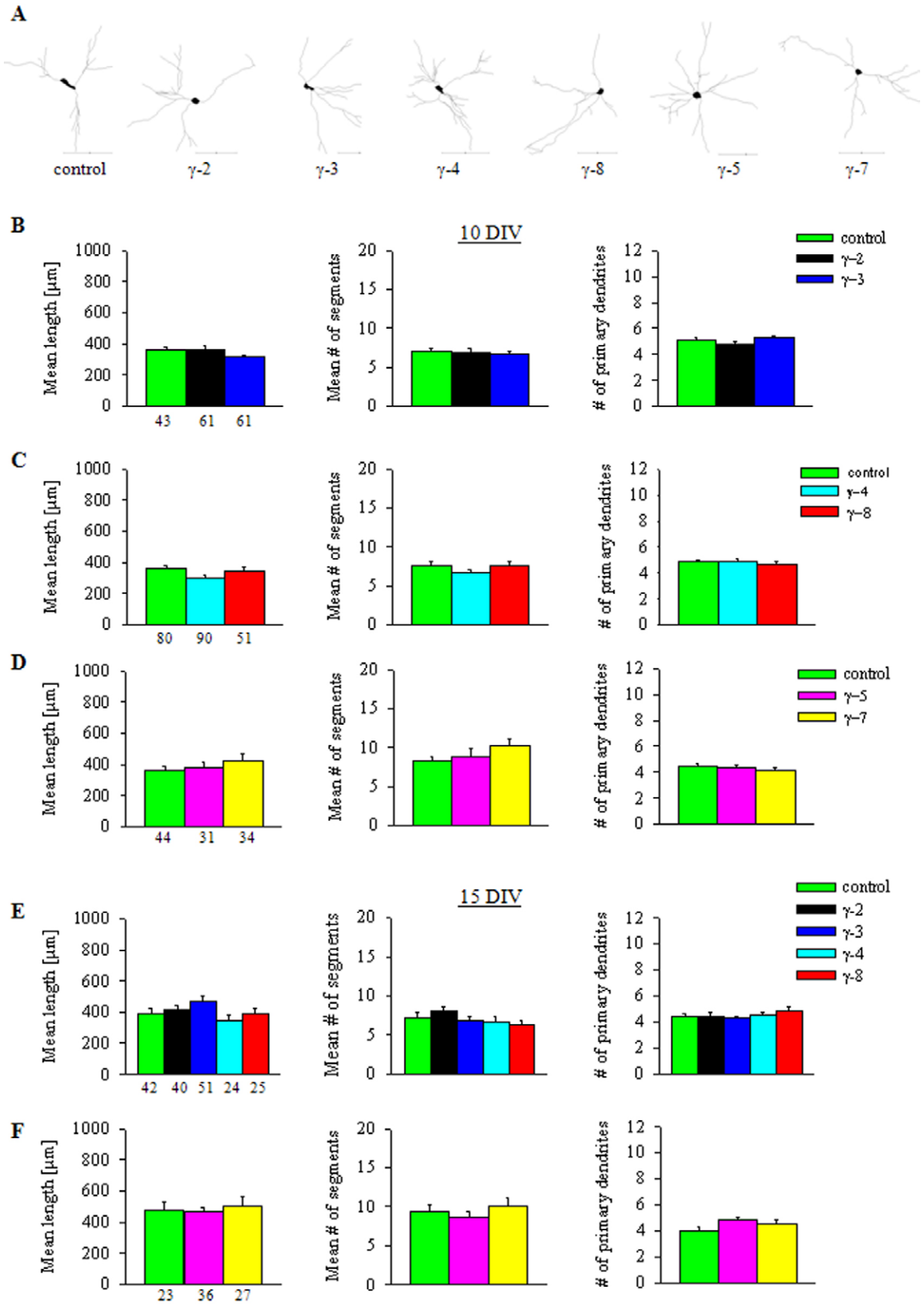

Fig. S4. Quantitative morphometric analysis of interneurons expressing type I and II TARPs. (**A**) Representative Neurolucida reconstructions of interneurons from 10 DIV coexpressing either EGFP only (control), or TARP γ-2, γ-3, γ-4, γ-8, γ-5, or γ-7. (**B-F**) the graphs indicate the mean ± s.e.m. of dendritic length (left column), segment number (middle column), and number of primary dendrites (right column) of interneurons overexpressing type I and II TARPs. The analyses were done at two developmental time windows: 5-10 DIV (labeled 10 DIV) and 10-15 DIV (labeled 15 DIV). None of the TARPs elicited dendritic growth in interneuronal transfectants. The number of cells reconstructed per group is given below the bars in the left column.

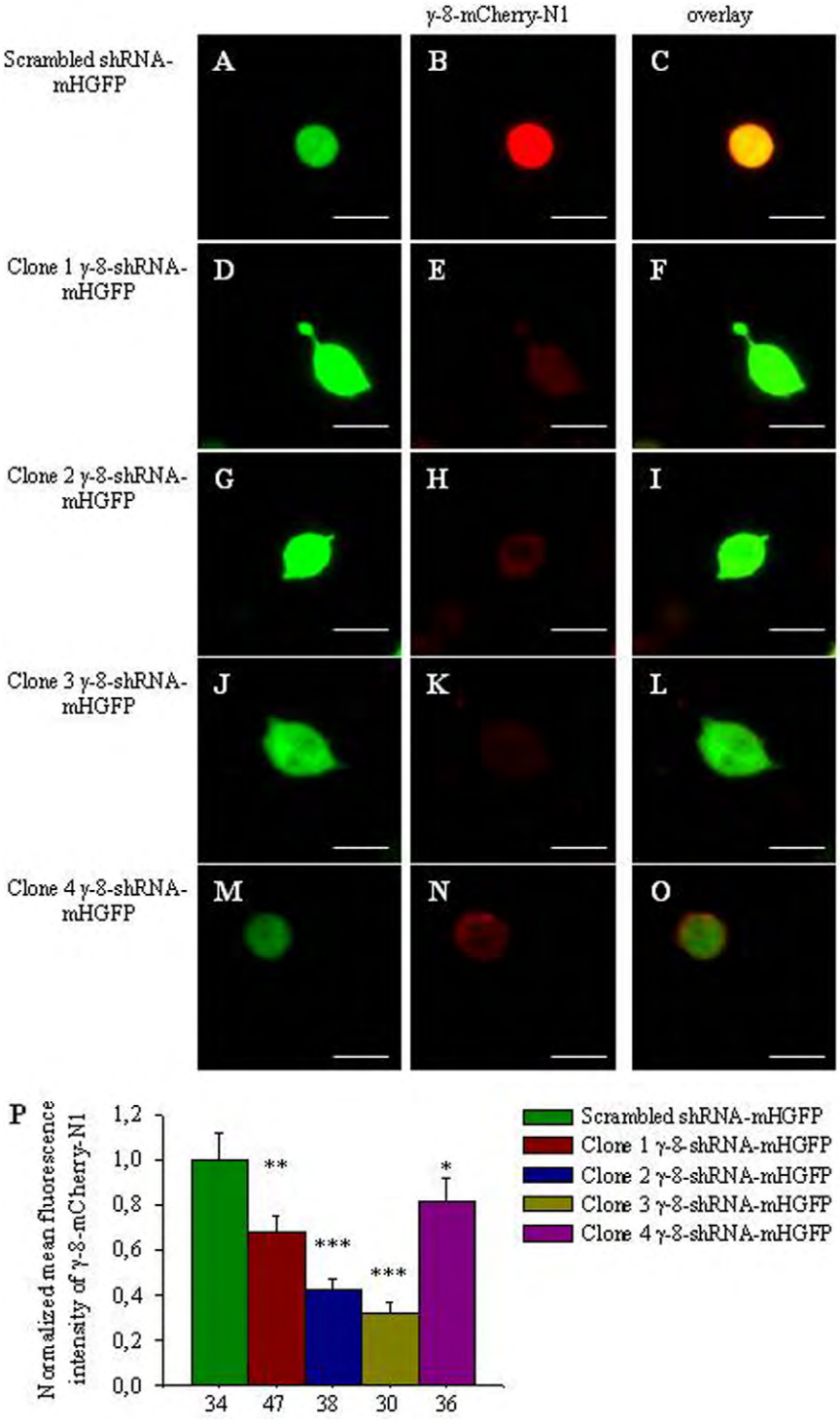

Fig. S5. Quantification of the knock-down efficiency of the γ-8 protein in HEK cells. (A-O) Confocal images (taken at 10x magnification) of a representative HEK cell cotransfected with either scrambled shRNA-mHGFP or selected γ-8 shRNA clones together with γ-8-mCherry-N1. (**A**) A HEK cell transfected with scrambled shRNA-mHGFP and γ-8 shRNA (**B**). The overlay in (**C**). (**D**) A HEK cell transfected with clone 1 γ-8-shRNA-mHGFP and γ-8 shRNA (**E**). The overlay in (**F**). (**G**) A HEK cell transfected with clone 2 γ-8-shRNA-mHGFP and γ-8 shRNA (**H**). The overlay in (**I**). (**J**) A HEK cell transfected with clone 3 γ-8-shRNA-mHGFP and γ-8 shRNA (**K**). The overlay in (**L**). (**M**) A HEK cell transfected with clone 4 γ-8-shRNA-mHGFP and γ-8 shRNA (**N**). The overlay in (**O**). Scale bar = 15 µm. (**P**) The graph indicates mean ± s.e.m. of normalized fluorescence intensity of γ-8-mCherry-N1 expression in HEK cells when coexpressed with either one of the four γ-8 shRNA-mHGFP constructs or the scrambled control shRNA-mHGFP. To avoid overestimating the knock-down efficiency for γ-8-mCherry-N, only cells were analyzed which displayed γ-8 shRNA-mHGFP green fluorescence and the red fluorescence of γ-8-mCherry-N1. The construct with the scrambled sequence did not affect the expression of γ-8-mCherry-N; therefore, it was used for normalization. All tested constructs showed a significant reduction in γ-8-mCherry-N expression. However, clone 3 was most efficient; therefore, we employed this construct for the study of dendritic growth, dendritic complexity, and calcium imaging experiments. The number of cells analyzed is indicated below the bars.

Table S1. List of PCR primers and γ-8 shRNA sequences. (**A**) A list of TARP primers (upper and lower strand) and the length of PCR product in base pair (bp). S and L are short and long isoforms of γ-6. (**B**) Sequences of custom-synthesized oligo shRNAs which target the rat γ-8 mRNA sequence at different starting positions, and a scrambled sequence.

(A) List of TARP primers

cDNA	Upper strand primer	Lower strand primer	Product length
γ-1	5'-GGCCGTGCTGAGTCCACACC-3'	5'-GGGCATCCGAGGCAGGGAGA-3'	532 bp
γ-2	5'- GGCCGTGAGGGCCTCGAGTA-3'	5'-GATGCGGGTGATGGCGGAGG-3'	382 bp
γ-3	5'-CATTGCGGTGGGCACGGACT-3'	5'-CACGGCGACCACACCCACAA-3'	517 bp
γ-4	5'-CTGGAGCCTTCGCCGCCTTC-3'	5'-GGTCGCCCGTGTTGCTGGAA-3'	456 bp
γ-5	5'-TGGGAGGAAGGCCCTGACCC-3'	5'-CAGCCGTGGCCGGTAGAAGC-3'	652 bp
γ-6	5'-TCGTGGGTGCCACTCTGGCT-3'	5'-TGCCGGAACACCTCCAGGCT-3'	304 bp (S), 442 bp (L)
γ-7	5'-GCGCCCTGACCCTGCTGAG-3'	5'-GGACATGACTCCGGCCCCCT-3'	569 bp
γ-8	5'-GGGGGCAGTGGCTCCTCAGA-3'	5'-CAGGCCTGCTGCCACGAACA-3'	309 bp

(B) Sequences of custom-synthesized oligo shRNAs

Clone	sequence	Starting position
γ-8 shRNA clone 1	AAC CTC ACA GCA GGT GAT GAT	166
γ-8 shRNA clone 2	CTG CGT GAA GAT CAA CCA CTT	297
γ-8 shRNA clone 3	CTG CCT CTC GCG TCT ACA AAT	437
γ-8 shRNA clone 4	TTC GTA TGG CTG GTC CTT CTA	597
Scrambled	GGA ATC TCA TTC GAT GCA TAC	