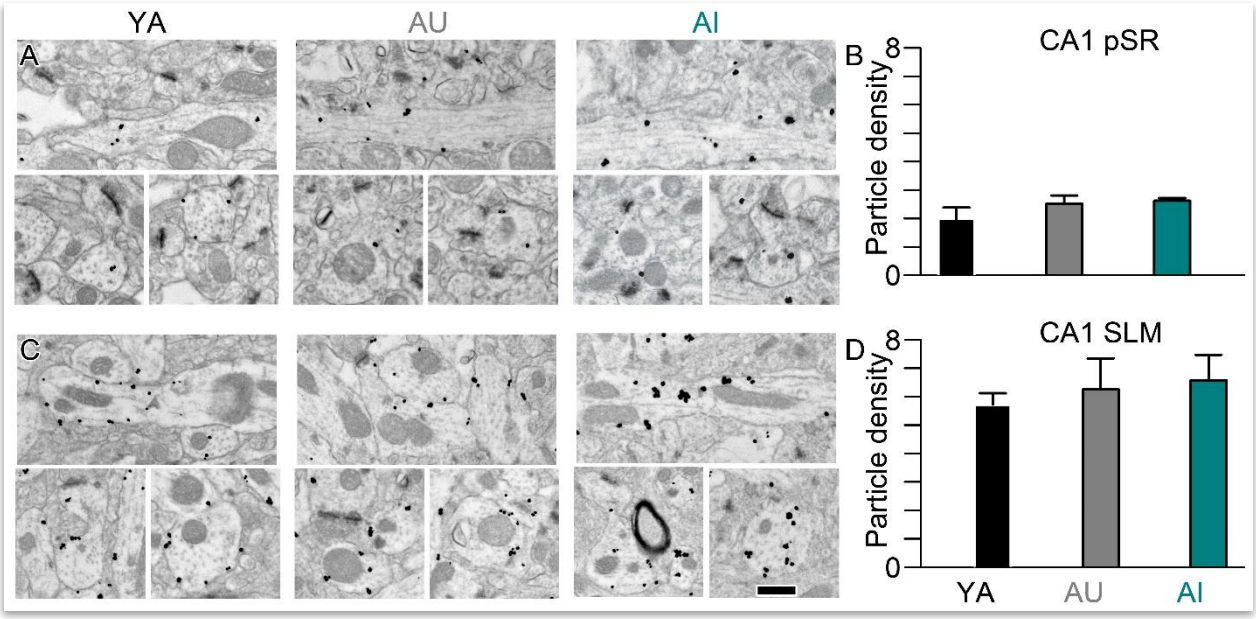

Figure S1. Distal enrichment of hyperpolarization-activated, cyclic nucleotide-gated 1 (HCN1) channels in CA1 pyramidal neurons is preserved regardless of cognitive status in aged rats. A, Pre-embedding, silver-intensified, ultrasmall immunogold electron micrographs of dendrites stained against HCN1 from proximal CA1 stratum radiatum (pSR) from young adult (YA), aged-unimpaired (AU), and aged-impaired (AI) rats. **B,** HCN1 expression (expressed as particle density per unit surface area) for dendrites in CA1 pSR for YA (black), AU (grey), and AI rats (aqua). **C,** Immunogold electron micrographs of dendrites stained against HCN1 from the most distal dendritic region of CA1, stratum lacunosum-moleculare (SLM) from YA, AU, and AI rats. Scale bar = 500 nm for both pSR and SLM. **D,** HCN1 expression (expressed as particle density per unit surface area) for dendrites in CA1 SLM for YA (black), AU (grey), and AI rats (aqua). There were no group differences, HCN1 expression was enriched in the distal dendrites of SLM as compared to the more proximal dendrites in pSR (main effect of Region; MANCOVA, $F_{(1,595)} = 218.72$, $p < 0.01$).

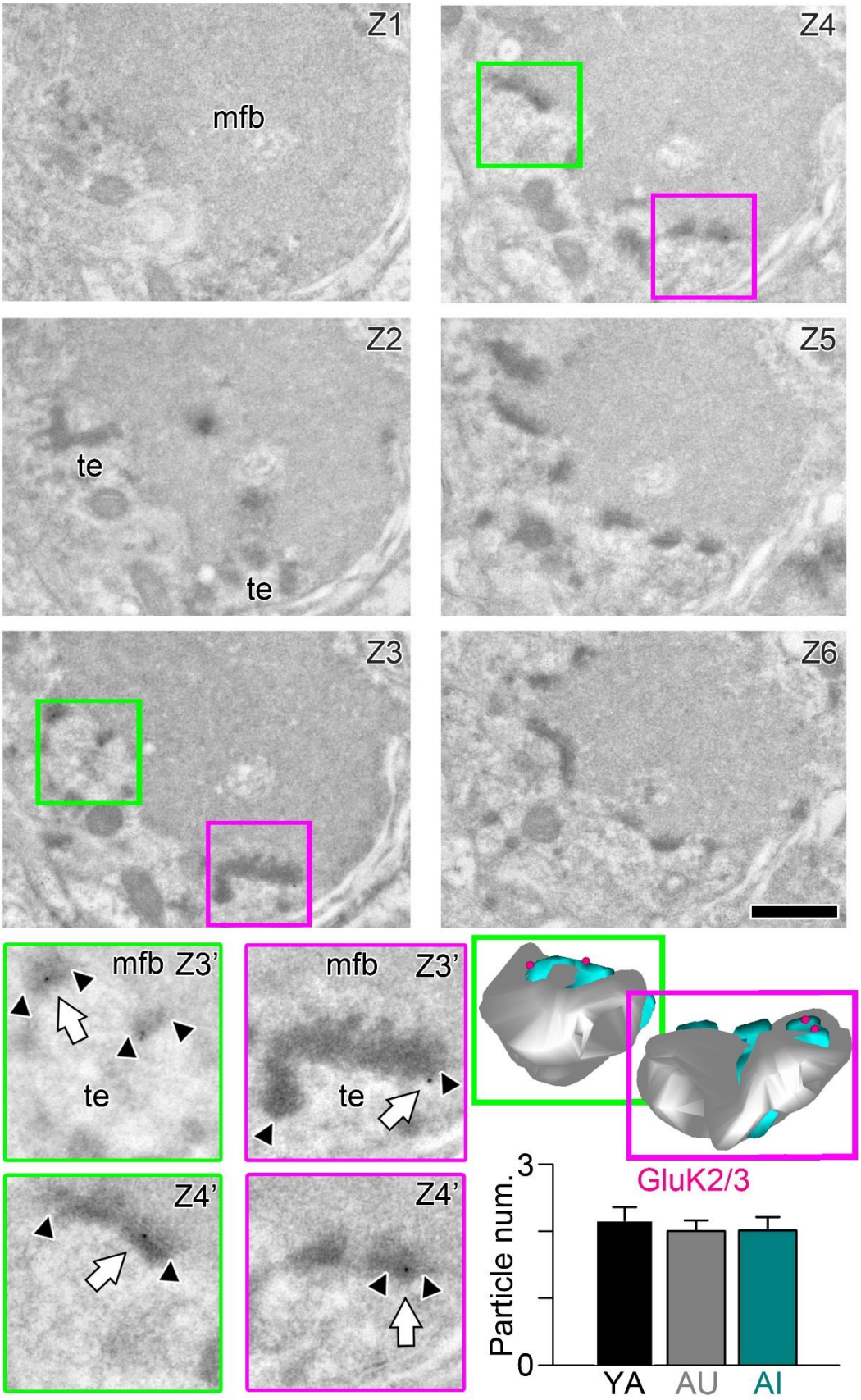
Z1
mfb
Z4
Z2
te
te
Z5
Z3
Z6
mfb Z3'
te
mfb Z3'
te
Z4'
Z4'
GluK2/3
Particle num.
3
0
YA
AU
AI

Figure S2 (above). Synaptic expression of kainite receptors among thorny excrescence-mossy fiber synapses does not vary with age or cognitive ability. Z1-Z6 are serial electron micrographs through a thorny excrescence-mossy fiber synaptic complex immunostained against GluK2/3 using post-embedding immunogold electron microscopy. Green and pink boxes outline the higher magnification images in the lower left. 3-dimensional reconstructions from serial electron micrograph of the two thorny excrescences are to the right (grey = thorny excrescence head; aqua = postsynaptic density; pink spheres = immunogold particles for GluK2/3). Scale bar = 250nm for Z1-Z6; and 500 nm for the higher magnification micrographs and 3-dimensional reconstructions. White arrows indicate individual immunogold particles projected on the the postsynaptic densities. Particle number (per synapse) for young adult (YA), aged-unimpaired (AU), and aged-impaired (AI) rats are shown at the bottom right.

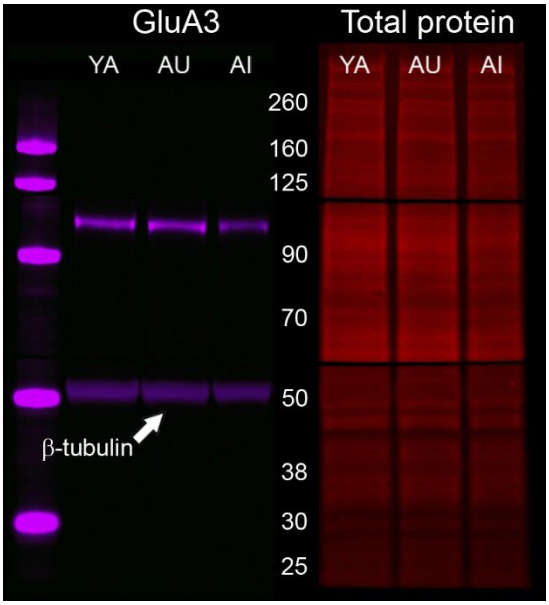

Figure S3. Quantitative western blotting using near-infrared (IR) imaging, normalized to total protein stain. An example of a western blot experiment probing for the AMPA-type receptor subunit GluA3 (left), with total protein staining shown in the three lanes on the far right for microdissected CA1 homogenates from young adult (YA), aged-unimpaired (AU), and aged-impaired (AI) rats. β-tubulin was included in each run, but quantification was performed on values normalized to total protein stain. Numbers correspond to the approximate molecular weight in kiloDaltons.