Supporting Information

Yassa et al. 10.1073/pnas.1002113107

SI Materials and Methods

We conducted a battery of neuropsychological examinations in the older adult sample that included the Mini-Mental State Examination (1) to assess cognitive status at the time of testing; digit-span backward and forward; letter/number sequencing to assess working memory; Wechsler Adult Intelligence Scale (part III, Vocabulary and Matrix Reasoning) to assess IQ; RAVLT (2), which assesses verbal learning, immediate and delayed recall, and recognition; Trail Making Tests A and B (3), which measure attention, visual searching, and mental processing speed; as well as verbal and category fluency measures (2).

1. Folstein MF, Folstein SE, McHugh PR (1975) "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 12:189–198.
2. Lezak MD (1995) *Neuropsychological assessment* (Oxford Univ Press, London).
3. Reitan RM (1955) The relation of the trail making test to organic brain damage. *J Consult Psychol* 19:393–394.
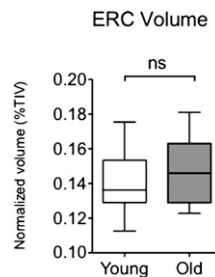
Fig. S1. Comparison of total entorhinal volumes (combined left and right) in young and older adults shows no significant difference among groups. Volumes were normalized by total intracranial volume (TIV) per participant.
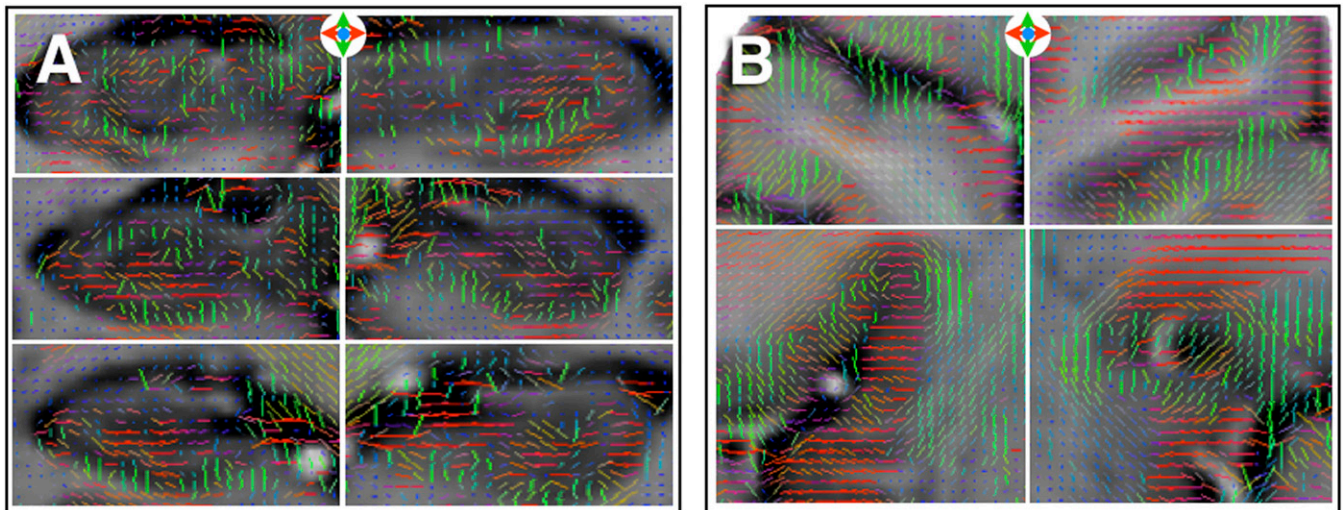
Fig. S2. Gray matter anisotropy with high-resolution msDTI. (*A*) Hippocampal gray matter anisotropy. Note the change in tensor orientation from green (superior–inferior) to red (left–right) consistent with the changing orientation of the pyramidal cells in the cortical sheet. (*B*) Frontoparietal cortical gray matter anisotropy. Note once again the change in tensor orientation with the changing direction of the cortical folds. These examples illustrate the power of msDTI and the ability to extract anisotropy information from gray matter.

Fig. S3. Anatomical slices illustrating the approximate locations where measurements of the perforant and alvear pathways were conducted. (*A*) Typical anatomical slices for PP measurements and anterior hippocampal location of the three slices in the sagittal plane (red lines) with sample slices (PP 1–3). (*B*) Typical anatomical slices for the alveus (AV) measurements and the posterior hippocampal location of the three slices in the sagittal plane (red lines) with sample slices (AV 1–3). All sample slices are based on a single young participant.

Fig. S4. Comparison of PP measurements with and without using the fine-tuning procedure and correlation between the two sets of measurements. (*A*) PP signal curves for a subset of participants (*n* = 9 in each age group). (*B*) The same curves as *A*, but based on fine-tuned measurements. The same rater conducted both sets of measurements. (*C*) Correlation between the two sets of measurements, which also places a lower bound on intrarater reliability.