Supplemental Data

Hippocampal CA3 Output Is Crucial for Ripple-Associated Reactivation and Consolidation of Memory

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Table S1. Firing properties of CA1 high-spatial information pyramidal cells during run.

	Control (N = 14, n = 94)	Mutant (N = 12, n = 91)
Mean firing rate (Hz)	1.19 +/- 0.09	1.07 +/- 0.07
Complex spike index (bursting)	24.07 +/- 1.23	22.22 +/- 1.09
Field size	36.90 +/- 1.52	39.30 +/- 1.62
Spatial information (bits/spike)	1.14 +/- 0.08	0.87 +/- 0.04*

*$P < 0.05$

In both genotypes, only pyramidal cells with robust place fields were included in the reactivation analysis. Mutant cells showed a significant decrease in spatial information, but no difference in average rate, complex spike index or field size. Data represent mean ± SEM.

N, number of mice; *n*, number of cells.

Table S2. Spatial place field overlap covaries with temporal RUN correlations in both genotypes.

	Coefficient	R^2	*P*
Control (*N*=14, *n*=530)	0.3645364	0.1328868	<0.0001
Mutant (*N*=12, *n*=572)	0.2878592	0.0828629	<0.0001

Covariance between the degree of spatial overlap and the temporal correlation of pairs of simultaneously recorded pyramidal cells was significant in both genotypes. Data represent mean ± SEM.

N, number of mice; *n*, number of cells.

Table S3. Reactivation of cell pairs was not influenced by the spatial information content of individual cells.

	Only good control cells removed (84 vs. 132)	Only poor mutant cells removed (98 vs. 78)	Both good control and poor mutant cells removed (90 vs. 124)
All ripple epochs			
Controls	0.019 ± 0.003	0.0165 ± 0.003	0.0170 ± 0.003
Mutants	0.008 ± 0.002**	0.0056 ± 0.002**	0.0086 ± 0.002*
Fast ripple epochs			
Controls	0.0167 ± 0.003	0.0146 ± 0.003	0.0150 ± 0.003
Mutants	0.0173 ± 0.003	0.0120 ± 0.004	0.0185 ± 0.003

* = $P < 0.01$

** = $P < 0.001$

To control for any bias the decrease in spatial information content may have had on the reactivation analysis, we performed three separate analyses (represented by the columns; see Experimental Procedures). Regardless of the cell pairs removed, a deficit in reactivation still occurred during ripple oscillations in the mutant animals, while no deficit was observed during fast ripple oscillations. Numbers in parentheses represent the number of Control cell pairs vs. Mutant cell pairs, respectively, that were remaining for each analysis. Data represent mean ± SEM.