Supplementary material.

Minor contribution of principal excitatory pathways to hippocampal LFPs in the anesthetized rat: a combined independent component and current source density study

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1.- Histological and electrophysiological localization of electrode sites.

2.- Further experiments on ICA-derived components for the PP evoked response.

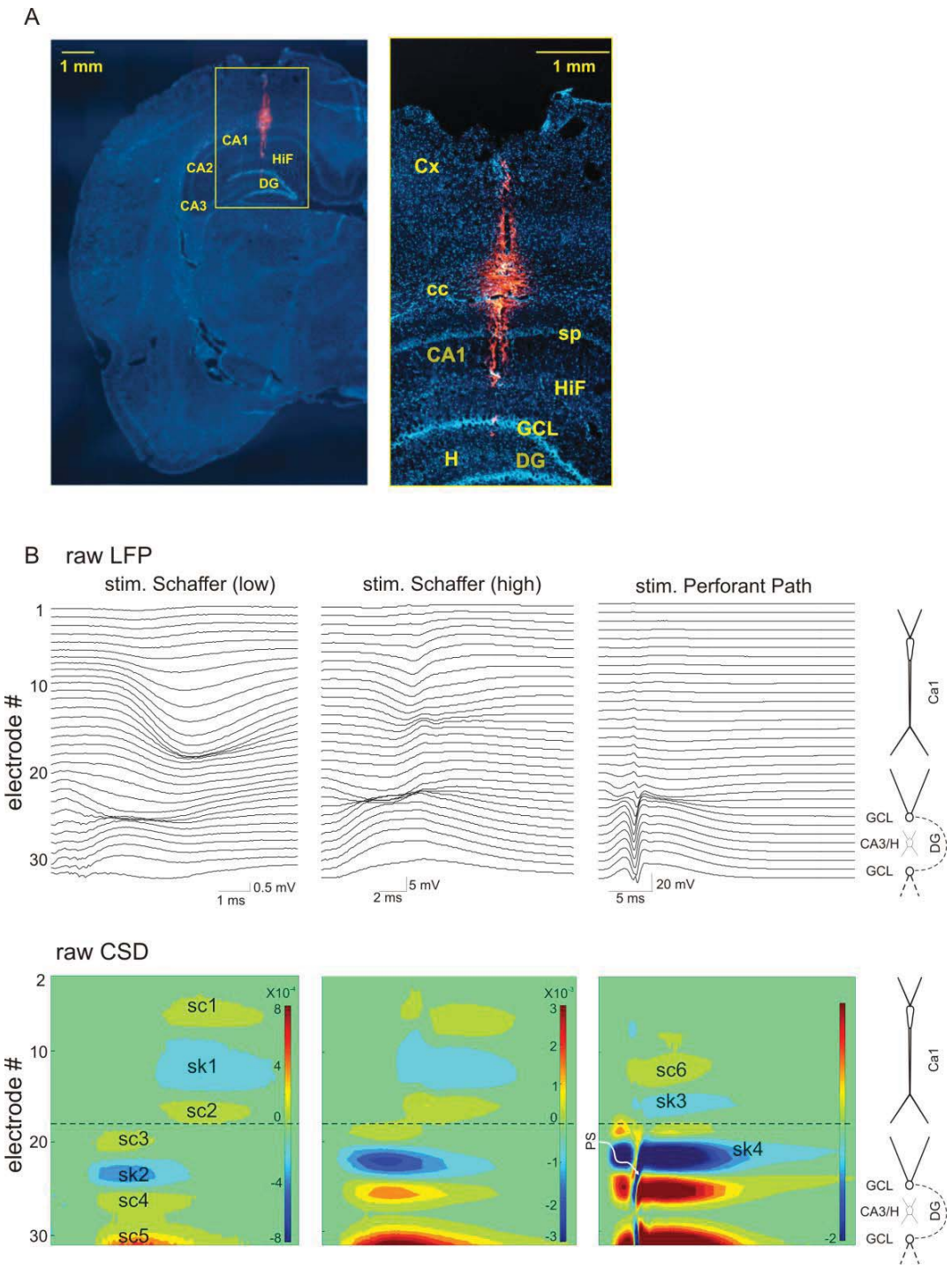

FIGURE SM1. **Histological and electrophysiological localization of electrode sites.** *A*: Linear probes were soaked in DiI to locate the silicon array under a fluorescence microscope in the brain post-mortem (see Methods in the main text). The left-hand photograph shows a coronal section of the left hemisphere in which the DiI labelling can be appreciated as a vertical tract running from the cortical surface down into the

hippocampus. The amplified on the right more clearly shows the depth of the dye staining in the Hilus of the DG in this section. Successive sections were explored to find the deepest point that the dye reached, which was considered as the tip of the array. *CA1-3*: Cornus Ammonis 1-3; *cc*: corpus callosum; *ctx*: cortex; *DG*: Dentate gyrus; *GCL*: Granule cell layer; *H*: hilus; *HiF*: hippocampal fissure. *B*: The spatial map of customary evoked responses guided the placement of the silicon array. The upper and lower panels correspond to the raw LFPs and their corresponding CSD maps, respectively. The recordings span from the CA1 st. oriens to the lower GCL in the DG (see schematic neurons on the right). The left and middle panels show the response to a subthreshold (*left*) and just-threshold (*middle*) stimulus in the ipsilateral CA3, and the panels on the right show the response to a PP volley. A customary Schaffer negative fEPSP is recorded through the apical dendritic tree in the CA1 field, while a complex local response is recorded through the electrodes placed across the CA3/DG. The CSD map below shows the main active Schaffer sink (*sk1*) surrounded by passive sources in the CA1 st. pyramidale (*sc1*) and lacunosum-moleculare (*sc2*). Stronger stimulus intensity (*middle panel*) elicited a complex field map in the CA1 st. radiatum containing the fEPSP and the slow and fast spike (active) somatodendritic contributions (see Herreras 1990 for details: note the different vertical scales for the raw LFP and CSDs). The local response in CA3 typically had a very large amplitude, and produced complex field and CSD maps that varied somewhat between experiments depending on the precise location of the stimulating electrode. In general, backfiring of PP fibres produced a local response containing the same components as for the PP stimulation (*sk2* and *sc2-5*). The same array of electrodes recorded a standard PP-evoked field when this pathway was stimulated (*right*). Note the negativity corresponding to the fEPSP in the molecular layer of the upper blade of the DG (toward electrodes #20-22) and the positive field interrupted by the granule cell population spike throughout the Hilus. The corresponding CSD map below shows the main PP sink (*sk4*) in the molecular layer of the upper blade (the molecular layer in the lower blade right below the tip of the array). An additional weaker active sink and its passive source can be appreciated in the CA1 st. lac.-mol. (*sk3/sc6*) corresponding to the direct entorhinal fibres in this subfield. Note a population spike sink (PS and white curved arrow) breaking out from the passive source in the GCL and back-propagating into the respective molecular layers.

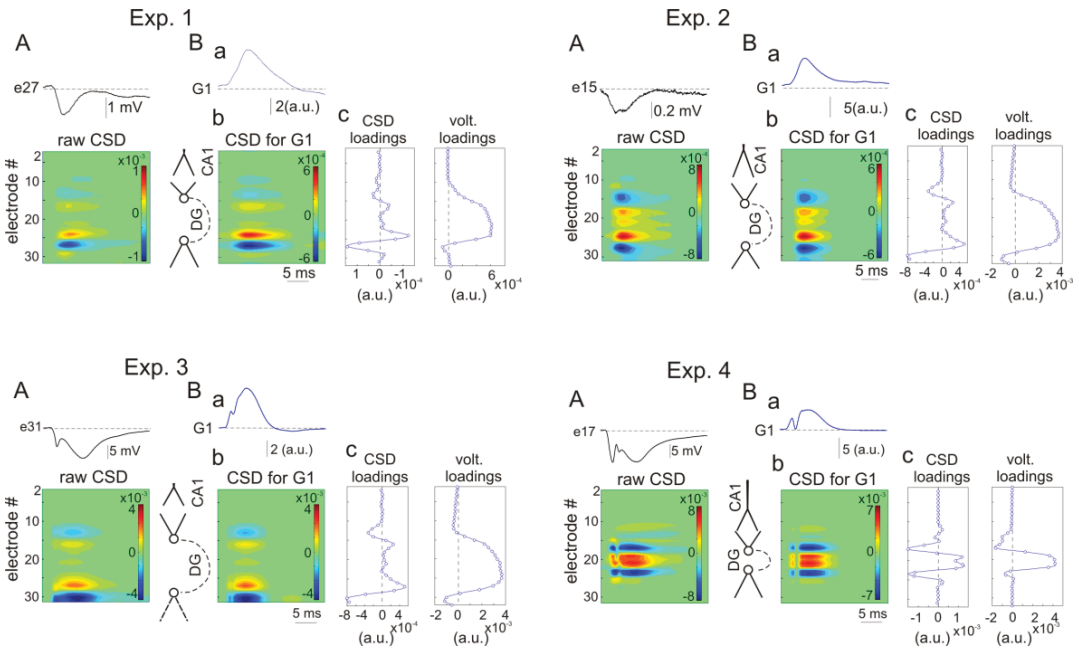

FIGURE SM2. **Further experiments on ICA-derived components for the PP evoked response**. The four experiments (*Exp 1-4*) are analogous to those illustrated in Fig. 4 of the main text and they depict the results obtained in four different animals for the ICA derived components of the DG evoked response to PP volleys. The order of the panels is similar to that in Fig. 4 of the main text. Due to the notable curvature of the DG cell layers there is a slightly different coverage of the electrode array in each experiment (see schematic neurons), precluding the spatial homogenization between experiments. In addition, different antero-posterior coordinates caused the array to record from open (near CA3, *Exps 1-3*) or closed areas (near the GCL apex, *Exp 4*) of the DG. In all the experiments: *A*: Sample recording in the st. moleculare (*upper*) and the CSD (*lower*) for the raw LFP. *B*: Time activation obtained for the main LFP generator (*a*: G1) and the CSD of the reconstructed LFP for this generator. *C*: spatial CSD and voltage loadings for the main generator. Note the near perfect match of the CSDs for the raw and reconstructed LFPs. Also note the similitude between the spatial profiles of the CSD and the voltage loadings for the main generator. The main generator accounted for at least 98 % of the total variance in all experiments. The separation between the GCL layers is smaller in Exp. #4, producing a more compact spatial profile that nevertheless presents the same features.