MECHANISMS OF HIPPOCAMPAL HFOS

Liset Menendez de la Prida
Instituto Cajal CSIC, Madrid 28002, Spain

lmprida@cajal.csic.es

Recent evidence from fine-scale spatiotemporal recordings using multi-electrode arrays in human focal epilepsies suggests that seizures progresses through heterogeneous single-cell firing and microcircuit dynamics. Disentangling such heterogeneity is critical to better understand epileptogenesis and ictogenesis. Here, we relate neuronal responses recorded during transient high-frequency oscillations (HFOs; 150-600Hz) with the identity of participating hippocampal cells using intracellular and juxtacellular approaches. We show data on a disparate behavior of pyramidal cell activity during physiological and pathological HFOs in the rat hippocampus in vivo, depending on their neurochemical content, morphological nature and connectivity profile within the network. Activity from different cell types differentially shape HFO events recorded at the local field potentials with microelectrodes. We discuss the implication of this discovery in the context of temporal lobe epilepsy and propose that single-cell and HFO heterogeneity in epileptogenic territories should be understood in terms of the specific neuronal identity and connectivity profile within the network.