ENDOCANNABINOIDS SIGNALING REGULATES SHARP-WAVE RIPPLES FUNCTION ACROSS LEARNING

Endocannabinoids, Sharp-wave ripples, memory

Poster presentation

The hippocampus is crucial for learning and memory. Within this structure, inhibitory interneurons play a fundamental role in shaping network activity by regulating neuronal excitability and synchronizing oscillatory patterns, such as sharp-wave ripples (SPW-Rs), which are strongly linked to memory. Endocannabinoids (eCBs), acting primarily through type-1 cannabinoid receptors, have been shown to involve memory and neuronal activity. However, their precise role in hippocampal network dynamics, particularly in relation to SPW-Rs and memory function, remains poorly understood. Therefore, to elucidate the role of eCBs in hippocampal network dynamics, we chronically implanted high-density silicon probes coupled with optic fibers in CA1 to simultaneous record extracellular recordings and endocannabinoid dynamics using the GRABeCb2.0 sensor expressed in all hippocampal neurons (n = 6 mice). This approach enabled the measurement of the temporal relationship between eCBs release and hippocampal dynamics, including SPW-Rs. Mice were exposed to a rewarded spatial alternation task across 10 days. Data showed a strong correlation between eCBs fluctuations and SPW-Rs events which were modulated across learning. These results suggest a fundamental role of eCBs in shaping memory consolidation and provide a novel framework for studying eCB-related cognitive impairments.