The fate of the human engram

By

Nikolai Axmacher (Universität Bonn)

Abstract:

How can we identify the neural representations of specific experiences, or "engrams", in the human brain? Can these results shed light on possible early disease processes in subjects at genetic risk of Alzheimer's dementia? Using intracranial EEG recordings in epilepsy patients as well as simultaneous EEG/fMRI recordings, we found that stimulus-specific representations are reinstantiated during memory retrieval and spontaneously reactivated during awake resting state and sleep. Furthermore, analyzing content-specific representations may be clinically relevant to identify early pathophysiology in Alzheimer's dementia. Using fMRI in genetic risk carriers for Alzheimer's disease, we observed impaired entorhinal grid cell-like representations and altered navigational strategies. Together, these studies shed light on the neural basis of intact and disturbed content-specific representations in humans.