

Brain study shows coupled ripples in brain areas as part of memory recall

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A team of researchers from the National Institutes of Health and Duke University has found that parts of the brain experience coupled rippled high-frequency oscillations as part of the process of recalling a memory. In their paper published in the journal *Science*, the group describes experiments they conducted with epilepsy patients and what they found. Jennifer Gelinas with Columbia University Irving Medical Center has published a Perspective [piece](#) regarding work by the team in the same journal issue.

Gelinas notes medical scientists have learned a lot about the way memories are saved in the [brain](#)—but the same cannot be said about memory retrieval, which is far more complicated. In this new effort, the researchers sought to learn more by studying [epilepsy patients](#) who were already scheduled to undergo electrophysiological mapping in preparation for surgery to reduce seizures. Electrophysiological mapping involves applying electrodes directly to the surface of the brain and measuring electrical activity.

Each of the volunteers was shown a sequence of words, and then created associations between pairs to help them remember them later. They were then shown one of the words and were asked to recall its paired mate. Fourteen volunteers performed the same test, and the researchers were able to compare brain electrical activity between them. They report that they found "coupled ripples" between two [brain regions](#), the medial temporal lobe and the temporal association cortex, as the volunteers were in the process of successfully recalling a paired word. In practice, the coupled ripples appeared as nearly synchronized lines on a graph forming the same hills and valleys at the same time.

The researchers suggest their findings indicate that the coupled oscillations they witnessed might be a necessary part of memory recall. They also note their observations are the first to show a connection between coupling of oscillations in the brain and human behavior. Gelinas suggests that the ripples observed by the researchers may well serve as a biomarker for memory retrieval and that further work in this area could help to better understand how [memory](#) recall works.

More information: Alex P. Vaz et al. Coupled ripple oscillations between the medial temporal lobe and neocortex retrieve human memory, *Science* (2019). [DOI: 10.1126/science.aau8956](https://doi.org/10.1126/science.aau8956)

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