

Alterations in hippocampal structural connections differentiate responders of electroconvulsive therapy

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A new study in people with major depression reports that electroconvulsive therapy (ECT) induces changes in the fibers

connecting the hippocampus to brain regions involved in mood and emotion. Only patients who responded to the treatment showed these changes, and those who had the greatest changes in hippocampal pathways also showed the largest improvements in mood.

The study, conducted by researchers at University of California, Los Angeles, was published in *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

The findings reveal that ECT causes subtle changes in the structural integrity of the fiber paths, which can affect how well information is transferred between [brain regions](#). "The nature of these changes suggests plasticity in the brain's structural connections contribute to successful therapeutic response," said senior author Katherine Narr, Ph.D.

"ECT is highly effective for treating [patients](#) with [severe depression](#) who have not benefited from standard antidepressant treatments. However, researchers are still trying to understand how and why ECT works to improve depressive symptoms," said Dr. Narr.

So Dr. Narr and colleagues conducted brain scans of the hippocampus—the brain region most affected by depression—in people with the disorder before and after ECT, and assessed the participants' changes in mood. Because the changes in structural integrity of the hippocampal pathways were only observed in patients who responded to ECT, the findings suggest that ECT produces its therapeutic effects in the brain by improving this structural integrity.

"These data add to the growing evidence that response to ECT is associated with changes in [brain](#) structure, in this case anatomical measures of white matter, in individuals undergoing this treatment for [major depression](#)," said Cameron Carter, MD, Editor of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*.

Hippocampal structural connectivity before ECT was not related to [treatment](#) response, meaning that the measures can't be used to predict how a patient will respond to ECT. Despite that, the connection between the structural changes induced by ECT and therapeutic response suggests that changes of hippocampal structural connectivity could be used during the development of new treatments to test how well they might work.

More information: Antoni Kubicki et al. Variations in Hippocampal White Matter Diffusivity Differentiate Response to Electroconvulsive Therapy in Major Depression, *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging* (2018). [DOI: 10.1016/j.bpsc.2018.11.003](#)

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