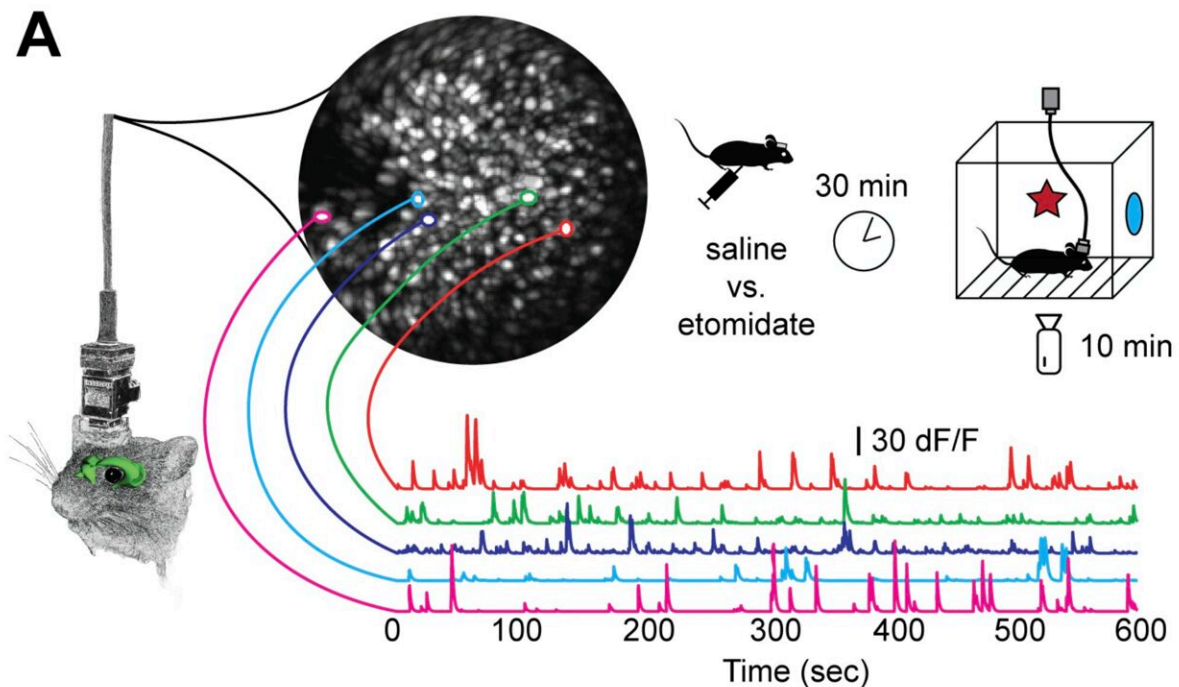


Key memory receptors are located on interneurons, finds study

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Hippocampal dorsal CA1 pyramidal neuron activity was captured using a head-mounted miniaturized endoscope. Contours of five cells are overlaid on the maximum projected image from a 10-minute recording; their associated fluorescence traces are shown below. Credit: Zhu et al

A key receptor regulating memory formation has been localized to interneurons, according to a study with implications for drug

development.

Robert Pearce and colleagues probed the localization of γ -aminobutyric acid type A receptors that incorporate $\alpha 5$ subunits ($\alpha 5$ -GABAARs). $\alpha 5$ -GABAARs are concentrated within the hippocampus, a [brain structure](#) that is essential for the formation of episodic memories. Their research is published in the journal *PNAS Nexus*.

The general anesthetic etomidate blocks learning by targeting $\alpha 5$ -GABAARs, as do many drugs designed to enhance cognition, intended for use in people with Alzheimer's disease, Down syndrome, autism, depression, and schizophrenia.

Researchers have assumed that these drugs act through $\alpha 5$ -GABAARs on pyramidal neurons, but by monitoring the formation and stability of spatial memories directly within the hippocampus of mice, the authors found that selectively knocking $\alpha 5$ -GABAARs out of interneurons rendered etomidate ineffective in blocking [memory formation](#) and impaired spatial memory overall.

By contrast, knocking $\alpha 5$ -GABAARs out of [pyramidal neurons](#) did not alter memory, and did not prevent etomidate from blocking spatial memories. The authors conclude that interneuronal $\alpha 5$ -GABAARs serve a physiological role in promoting spatial learning, and serve as essential targets for etomidate modulation of contextual memory.

More information: Mengwen Zhu et al, Control of contextual memory through interneuronal $\alpha 5$ -GABA receptors, *PNAS Nexus* (2023). [DOI: 10.1093/pnasnexus/pgad065](https://doi.org/10.1093/pnasnexus/pgad065)

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