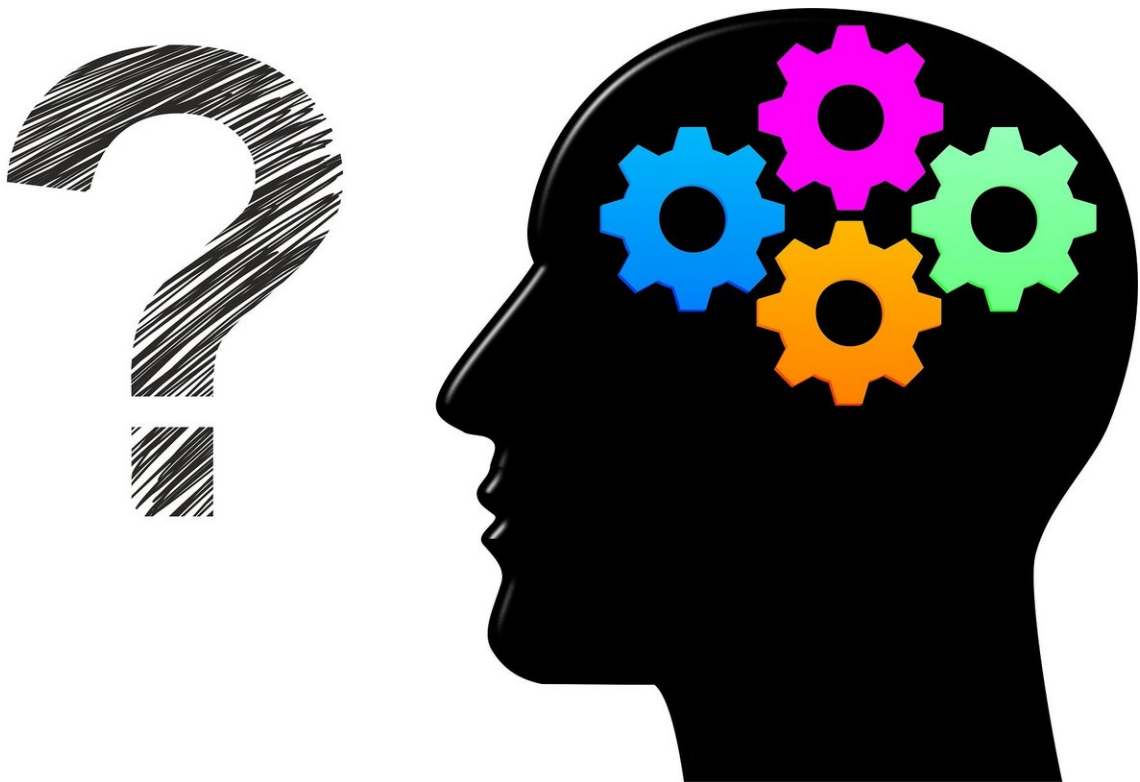


Researchers find key to keep working memory working

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Working memory, the ability to hold a thought in mind even through distraction, is the foundation of abstract reasoning and a defining characteristic of the human brain. It is also impaired in disorders such as schizophrenia and Alzheimer's disease.

Now Yale researchers have found a key molecule that helps neurons maintain information in working memory, which could lead to potential treatments for neurocognitive disorders, they report March 19 in the journal *Neuron*.

"Working memory arises from [neuronal circuits](#) in the [prefrontal cortex](#)," said senior author Min Wang, senior research scientist in neuroscience. "We have been learning that these circuits have special molecular maintenance requirements."

Neurons in the prefrontal cortex excite each other to keep information "in mind." These circuits act as a sort of mental sketch pad, allowing us to remember that caramelized onions are cooking in the frying pan while we search the next room for a pair of scissors.

The new study shows that these prefrontal cortical circuits depend upon the [neurotransmitter acetylcholine](#) stimulating muscarinic M1 receptors aligned on the surface of neurons of the prefrontal cortex. Blocking muscarinic M1 receptors reduced the firing of neurons involved in working [memory](#), while activating the M1 receptors helped restore neuronal firing. Because acetylcholine actions at M1 [receptors](#) are reduced in schizophrenia and Alzheimer's disease, the M1 receptor may serve as a potential therapeutic target, the authors suggest.

Wang notes that a drug currently under development for the treatment of schizophrenia stimulates this M1 receptor and has shown promise in early clinical trials.

Provided by Yale University

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