Video: Genetic engineering allows MIT researchers to implant false memories

Can you install a false memory in the brain? Researchers at MIT's Picower Institute for Learning and Memory have shown it's possible in lab animals. First they locate where in the brain the memory is formed; then they use optogenetics to manipulate the memory neurons. One day such techniques could be used to help people with debilitating traumatic memories.

"We demonstrate that behavior based on high-level cognition, such as the expression of a specific memory, can be generated in a mammal by highly specific physical activation of a specific small subpopulation of brain cells, in this case by light," says Susumu Tonegawa, the Picower Professor of Biology and Neuroscience at MIT and lead author of the study reported online in the journal *Nature*. "This is the rigorously designed 21st-century test of Canadian neurosurgeon Wilder Penfield's early-1900s accidental observation suggesting that mind is based on matter."

In that famous surgery, Penfield treated epilepsy patients by scooping out parts of the brain where seizures originated. To ensure that he destroyed only the problematic neurons, Penfield stimulated the brain with tiny jolts of electricity while patients, who were under local anesthesia, reported what they were experiencing. Remarkably, some vividly recalled entire complex events when Penfield stimulated just a few neurons in the hippocampus, a region now considered essential to the formation and recall of episodic memories.

Scientists have continued to explore that phenomenon but, until now, it has never been proven that the direct reactivation of the hippocampus was sufficient to cause memory recall.

Watch the full, original video: The cross-section of memory

Read full, original article: Researchers show that memories reside in specific brain cells