

Researchers find that memory storage molecule preserves complex memories

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The brain acts as a computer to both store information and process that information. In a computer, separate devices perform these roles; while a hard disk stores information, the central processing unit (CPU) does the processing. But the brain is thought to perform both these functions in the same cells – neurons – leading researchers to ask if distinct molecules within the brain cells serve these different functions.

In a discovery that may one day lead to the ability to erase debilitating painful memories and addictions from the brain, researchers at SUNY Downstate Medical Center have found that a molecule known to preserve memories – PKMzeta – specifically stores complex, high-quality memories that provide detailed information about an animal's location, fears, and actions, but does not control the ability to process or express this information. This finding suggests that PKMzeta erasure that is designed to target specific debilitating memories could be effective against the offending memory while sparing the computational function of brain.

The findings are detailed in the December edition of *PLoS Biology* in a paper titled, "PKMzeta Maintains Spatial, Instrumental, and Classically Conditioned Long-Term Memories." The paper is authored by Andre A. Fenton, PhD, associate professor of physiology and pharmacology, Todd C. Sacktor, MD, professor of physiology and pharmacology and of neurology, and Peter Serrano, PhD, research assistant professor of physiology and pharmacology, at SUNY Downstate, as well as by colleagues at other institutions in Michigan, New York, Wisconsin, and

the Czech Republic.

Dr. Fenton said, "The work published in PLoS reveals that PKMzeta is a general storage mechanism for different types of memory content but, fortunately, that PKMzeta stores only high-quality memories, the kind that provide detailed information rather than general abilities."

"If further work confirms this view we can expect to one day see therapies based on PKMzeta memory erasure," Dr. Fenton suggests. "Negative memory erasing not only could help people forget painful experiences, but might be useful in treating depression, general anxiety, phobias, post-traumatic stress, and addictions," he adds.

Dr. Sacktor said the research "shows that PKMzeta is fundamental for storing many different forms of memory, which previously has been viewed as potentially mediated by distinct mechanisms."

The PloS Biology paper may be accessed via this link:
[biology.plosjournals.org/perls ... journal.pbio.0060318](https://biology.plosjournals.org/perls...journal.pbio.0060318)

Source: SUNY Downstate Medical Center

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