

# Scientists Find Memory Molecule

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In an article in *Science* magazine, SUNY Downstate researchers describe erasing memory from the brain by targeting a molecular mechanism that controls memory. Finding may be applied to chronic pain, memory loss, and other conditions.

Scientists at SUNY Downstate Medical Center have discovered a molecular mechanism that maintains memories in the brain. In an article in *Science* magazine, they demonstrate that by inhibiting the molecule they can erase long-term memories, much as you might erase a computer disc.

Furthermore, erasing the memory from the brain does not prevent the ability to re-learn the memory, much as a cleaned computer disc may be re-used. This finding may some day have applications in treating chronic pain, post-traumatic stress disorder, and memory loss, among other conditions.

The SUNY Downstate researchers reported in the August 25 issue of *Science* that an enzyme molecule called “protein kinase M zeta” preserves long-term memories through persistent strengthening of synaptic connections between neurons. This is analogous to the mechanism storing information as 0’s and 1’s in a computer’s hard disc. By inhibiting the enzyme, scientists were able to erase a memory that had been stored for one day, or even one month. This function in memory storage is specific to protein kinase M zeta, because inhibiting related molecules did not disrupt memory.

These findings may be useful for the treatment of disorders characterized by the pathological over-strengthening of synaptic connections, such as neuropathic pain, phantom limb syndrome, dystonia, and post-traumatic stress. Conversely, the identification of the core molecular mechanism for memory storage may focus effort on the development of specific therapeutic agents that enhance memory persistence and prevent memory loss. Earlier this year, SUNY Downstate scientists reported that PKMzeta was bound up in the tangles of Alzheimer's disease, thus perhaps blocking its function in memory storage.

Source: SUNY Downstate Medical Center

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