Molecular and cellular mechanisms of memory allocation in neuronal networks

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Although memory allocation is a subject of active research in computer science, little is known about how the brain allocates information within neural circuits. Until recently, however, the mechanisms that determine how specific cells and synapses (and not their neighbors) within a neural circuit are recruited during learning have received little attention. Recent findings from our laboratory suggest that memory allocation is not random, but rather specific mechanisms regulate where information is stored within a neural circuit. Our laboratory used a range of single cell manipulation and recording techniques to demonstrate that CREB activity regulates neuronal excitability and consequently the allocation of fear memory to specific cells in lateral amygdala. Our studies suggest that some of the mechanisms involved in the consolidation of one memory (e.g., CREB activation) affect the allocation of the next memory.

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