

The Impact of Sleep Deprivation on Memory Storage

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Millions of people regularly obtain insufficient sleep. Therefore, understanding the cellular and molecular pathways affected by sleep deprivation is of great social and clinical importance. Sleep facilitates the formation of hippocampus-dependent memories and brief periods of sleep deprivation are detrimental to memory consolidation. Additionally, sleep is regulated by many of the same molecular processes that contribute to memory storage. The Abel lab uses a combination of molecular, genetic, and viral approaches to elucidate the mechanisms underlying the impact of sleep deprivation long-term memory consolidation. We have found sleep deprivation induces a cascade of changes in cAMP signaling, protein synthesis and changes in the actin cytoskeleton and dendritic spines. These molecular and cellular effects of sleep deprivation led to deficits in memory storage and synaptic plasticity. By manipulating these molecular pathways, we have been able to reverse the memory deficits caused by sleep deprivation.