

## **Webinar**

### **To sleep, or not to sleep: How environmental context determines the role of sleep in memory formation**

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Sleep is a highly conserved behaviour across evolution that serves an important role in various physiological functions. However, a basic mechanistic understanding of its function remains elusive. This is further complicated by the observations that animals can function properly even without sleep for extended periods. *Drosophila*, a genetically potent sleep model, needs sleep to form long-term memories, similar to mammals. However, conditions such as starvation require flies to remain active to forage for food, and therefore the ability to form memory without sleep may confer an evolutionary advantage. My work showed that starved flies can form long-term reward memories without sleep but require sleep for memory consolidation if food is available. Flies rely on a feeding/hunger-dependent adaptive switch that drives the recruitment of distinct neuronal circuits to form either sleep-dependent memory or sleep-independent memory. The neuronal circuit required for sleep-dependent memory in fed flies also drives sleep post-training, thereby linking sleep and memory. This adaptive circuit-based mechanism allows flies to retain essential information in varying environmental conditions. Altogether, this work demonstrated that the role of sleep in memory formation is not universal but is adaptive and is regulated by physiologically relevant environmental factors.

***Monday, May 10<sup>th</sup> 2021***

***4:00 PM***