

Brain circuits for triggering and reversing emotional memories

Abstract: Aversive experiences are powerful triggers for memory formation and alter neural circuits to adaptively shape behavior. However, aversive memories need to be extinguished when they are no longer appropriate to facilitate adaptive functioning. My lab studies the neural circuit and cell coding mechanisms which initiate learning and memory in response to aversive events and extinguish emotional responses when they are inappropriate. I will discuss recent work examining parallel neural circuits which trigger aversive associative learning and how feedback circuits regulate neural processing in these pathways to control the strength of fear memories. In addition, I will describe our recent discovery that distinct noradrenergic networks within the brainstem locus coeruleus either enhance fear memory formation or promote fear extinction, revealing a new framework for understanding noradrenaline circuit function. Together, these findings elucidate how neural circuit organization gives rise to neural coding and adaptive behavior and suggest novel strategies for the treatment of anxiety disorders associated with aberrant fear and extinction learning.

References

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