

Top-down cortical circuit for sensory perception and memory consolidation.

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Top-down control of sensory processing by higher cortical areas is essential for sensory perception. Despite its importance, little is known about the mechanisms executing this control. Recently, we identified a reverberating cortical circuit that underlies somatosensory perception in the mouse hindpaw. We revealed that 1) physiologically, the circuit consists of sensory input from the primary somatosensory cortex (S1) to secondary motor cortex (M2) that is converted into a feedback projection that returns from M2 to S1, that 2) anatomically, the circuit comprises a long-range recurrent intracortical connection between S1 and M2. Axons from M2 to S1 target both deep and superficial cortical layers in a bidirectional projection pattern that is characteristic of top-down projections. In this talk, I will introduce physiological roles of the top-down pathway in brain functions including perception and memory consolidation of tactile information.