

**Title: How are sensory stimuli integrated in episodic memories?**

**Synopsis:**

Goal-directed behavior (GDB) starts with the attention-guided selection of sensory signals, followed by the storage of a mental representation of context in memory, to be retrieved by other brain areas for further cognitive functions. Episodic memories, whose sensory details are often overwhelming, depend on the hippocampus (HIPP). However, HIPP responses to sensory stimuli are neither clear, nor simple. The storage of sensory information in memory would start with the encoding of elementary sensory memories, subsequently stored in coherently retrievable form by a circuit fulfilling the following criteria: 1-respond to sensory stimuli, 2-be involved in memory processes, 3-be connected to the HIPP. A few studies specifically implicate the secondary occipital area (Oc2M) in signaling, and persistently storing, the spatial source of auditory stimuli. Our preliminary data indicates that Oc2M neurons oscillate with the HIPP theta rhythm (5-10 Hz), and respond to HIPP memory retrieval events, suggesting its involvement in both sensory processing and memory. We have recently identified synapses connecting primary sensory areas, Oc2M, and HIPP, Oc2M neural responses to contextual stimulation, and associative memory deficits when Oc2M is silenced. We must now confirm these data and study the result of Oc2M-HIPP synapses in behavior.

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