

## **Entrained Activity as an Imprint of Stimulus Interval in the Visual Circuit**

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Temporal information such as interval timing in the multi-second range is represented in brain areas such as prefrontal cortices that are associated with attention and decision-making. It is unclear whether interval timing is also represented in primary sensory circuits. We recorded both local field potentials (LFP) and spiking activities of multiple neurons in primary visual cortex (V1) after periodic stimulation in lightly anaesthetized mice. The LFP event intervals in V1 were entrained to the stimulation interval for about 100 s. Pairwise correlation patterns during the entrainment period resembled those during periodic stimulation. However, population recordings demonstrated similar encoding capabilities. Activity in the Superior Colliculus (SC) also demonstrated interval-entrained phenomenon. Physiological relevance of entrained activities includes tail flips and limb movements in the absence of stimuli. Surprisingly, periodic optogenetic stimulation of neurons in V1 induced similar interval entrainment. These experiments demonstrate that interval entrainment is a generic network effect.