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## **Control of somatosensory integration by thalamo-cortical feed-forward inhibition**

Timing is one of the basic attributes of a stimulus conveyed by sensory systems and is fundamental for accurate sensory discrimination. Accordingly, during the initial steps of sensory processing faithful transmission of the temporal properties of a stimulus is observed in several brain areas and for different sensory modalities. The spiking of neurons in the somato-sensory “barrel cortex”, for example, is precisely time-locked to stimuli applied to the whiskers and spiking probability depends on the velocity of the deflection. Very little is known, however, about the cellular mechanisms underlying temporal discrimination of tactile information entering the cortex.

To address the cellular basis for this temporal precision we have determined the mechanisms that control the temporal window of integration (IW) of principal neurons to thalamic inputs. We show that the IW of layer 4 neurons has a strikingly broad dynamic range and is regulated by an efficient thalamo-cortical feed-forward inhibitory circuit. Hence, disynaptic inhibition not only controls spatial but also temporal resolution of tactile information.