

Active cortical dendrites modulate perception

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Here, we present a study of the influence of the 'hot spot' of the apical dendritic shafts in layer 5 pyramidal neurons on perception. Two-photon calcium imaging from this region of the dendrite showed that an increase in ~20% of L5 pyramidal neurons (and a decrease in ~5%) predicted the response of mice when the stimulus passed the perceptual threshold. Furthermore, suppressing the 'hot spot' increased the perceptual threshold whereas upregulating the 'hot spot' via ChR2 decreased the perceptual threshold. This work was predicated on the hypothesis that feedback inputs are predicted to influence this region of the dendrite. Nevertheless, this study did not directly address the origin of the synaptic inputs that were presumably underlying the dendritic activation. In this talk, I discuss the likely contribution of feedback versus feedforward connections for influencing this region of the dendrite and the implications for cognition.