Targeted cortical manipulation of auditory perception

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Abstract

Driving perception by direct activation of neural ensembles in cortex is a necessary step for achieving a causal understanding of the perceptual code and developing central sensory rehabilitation methods. Here, using optogenetic manipulations during an auditory discrimination task in mice, we show that auditory cortex can be short-circuited by coarser pathways for simple sound identification. Yet, when the sensory decision becomes more complex, involving temporal integration of information, auditory cortex activity is required for sound discrimination and targeted activation of specific cortical ensembles changes perceptual decisions as predicted by our readout of the cortical code. Hence, auditory cortex representations contribute to sound discriminations by refining decisions from parallel routes.

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