Single neuron and population coding of natural sounds in auditory cortex

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Abstract:

The auditory system drives behavior using information extracted from sounds. Early in the auditory hierarchy, circuits are highly specialized for detecting basic sound features. However, already at the level of the auditory cortex the functional organization of the circuits and the underlying coding principles become different. Here, we review some recent progress in our understanding of single neuron and population coding in primary auditory cortex, focusing on natural sounds. We discuss possible mechanisms explaining why single neuron responses to simple sounds cannot predict responses to natural stimuli. We describe recent work suggesting that structural features like local subnetworks rather than smoothly mapped tonotopy are essential components of population coding. Finally, we suggest a synthesis of how single neurons and subnetworks may be involved in coding natural sounds.

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