

Format: Abstract

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Neural substrates of sensory-guided locomotor decisions in the rat superior colliculus.

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Abstract

Deciding in which direction to move is a ubiquitous feature of animal behavior, but the neural substrates of locomotor choices are not well understood. The superior colliculus (SC) is a midbrain structure known to be important for controlling the direction of gaze, particularly when guided by visual or auditory cues, but which may play a more general role in behavior involving spatial orienting. To test this idea, we recorded and manipulated activity in the SC of freely moving rats performing an odor-guided spatial choice task. In this context, not only did a substantial majority of SC neurons encode choice direction during goal-directed locomotion, but many also predicted the upcoming choice and maintained selectivity for it after movement completion. Unilateral inactivation of SC activity profoundly altered spatial choices. These results indicate that the SC processes information necessary for spatial locomotion, suggesting a broad role for this structure in sensory-guided orienting and navigation.

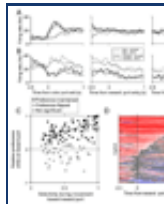
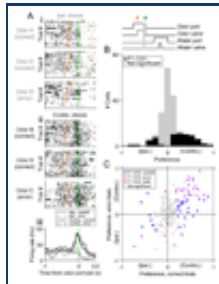
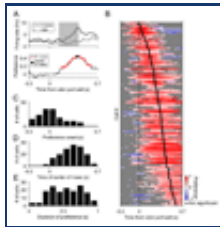
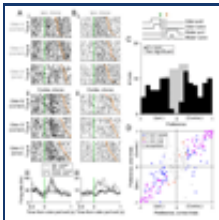
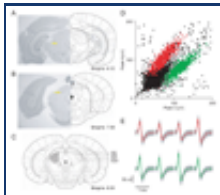
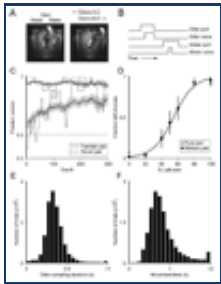
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