Early multisensory integration of self and source motion in the auditory system.

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Abstract:

Discriminating external from self-produced sensory inputs is a major challenge for brains. In the auditory system, sound localization must account for movements of the head and ears, a computation likely to involve multimodal integration. Principal neurons (PNs) of the dorsal cochlear nucleus (DCN) are known to be spatially selective and to receive multimodal sensory information. We studied the responses of PNs to body rotation with or without sound stimulation, as well as to sound source rotation with stationary body. We demonstrated that PNs are sensitive to head direction, and, in the presence of sound, they differentiate between body and sound source movement. Thus, the output of the DCN provides the brain with enough information to disambiguate the movement of a sound source from an acoustically identical relative movement produced by motion of the animal.

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