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School of 中醫藥學院
Chinese Medicine

Dissecting neural circuits for spatial hearing: systems-identification approaches

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Facilitator	:	Prof. Bian Zhao Xiang

Abstract

Animals take advantage of the physical separation of their two ears to navigate complex acoustic environments. By encoding micro-second differences in the timing of sounds at the two ears, brainstem neural circuits in the superior olivary complex establish a sensory code for sound-source localization. Moreover, these same inter-aural temporal comparisons allow sounds of interest to “pop out” from background noise: a form of sensory de-noising. Until recently, difficulties obtaining sufficient neural data at the single-neuron level in this area of the brainstem have hampered progress in understanding the neural circuit mechanisms underlying spatial hearing. We have established successful techniques to overcome these difficulties, and used novel engineering-inspired systems-identification analyses to characterize the transfer functions of single neurons in spatial hearing circuits. Our data reveal surprising results, which imply systematic asymmetric innervation patterns from the two cochleas play an important role in mammalian binaural processing.

~ All are welcome ~