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Abstract

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Grant Number:	5R01DC003180-03
PI Name:	WANG, XIAOQIN
PI Email:	xwang@bme.jhu.edu
PI Title:	ASSISTANT PROFESSOR
Project Title:	NEURAL BASIS OF COMMUNICATION SOUND PERCEPTION

Abstract: The long-term goal of our research is to understand the neural basis for the perception of species-specific vocalizations in the auditory cortex and the fundamental cortical mechanisms that subserve neural representations of these biologically important communication sounds. Currently such mechanisms are poorly understood and there are no adequate models available to address these issues. In the present proposal, we will approach these problems using a vocal primate model, the common marmoset (Callithrix jacchus jacchus), which provides several important advantages, namely, a rich vocal repertoire, a primary auditory cortex that lies on the lateral surface of the cerebral cortex, thereby making it accessible for electrophysiological recordings and anatomical tracer placements (the primary auditory cortex of most primates is tucked into the depths of the lateral fissure) and an extremely high reproductive rate while in captivity. The specific aims of this application are to investigate the nature of the cortical representation of species-specific vocalizations in the primary and secondary auditory cortex, to analyze how cortex treats natural and unnatural sounds, and to determine the acoustic elements in marmoset vocalizations that not only characterize the sounds but also effectively evoke cortical responses. These studies are a natural extension of the P.I.'s previous work. The investigations will emphasize the systematic and quantitative characterization of marmoset vocalizations, and standard extracellular single-unit recording and analytic techniques with a focus on populations of neurons whose responses may reflect the detection of vocalization features. Findings of the present study will contribute to our basic understanding of the cortical representation of complex acoustic stimuli, and will have implications for the neural b~is of human speech perception, clinical management of speech- and hearing related disorders, and for designing better hearing aids and prosthetic devices for the deaf and hearing- impaired.

Thesaurus Terms:
animal communication behavior, auditory cortex, hearing, neural information processing, sound perception
auditory pathway, evoked potential, sex difference, sound frequency, species difference
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