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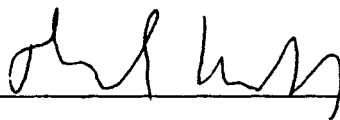
**THE FUNCTIONAL ORGANIZATION OF THE AUDITORY CORTEX
IN *MYOTIS LUCIFUGUS*, AN ECHOLOCATING BAT**

WILLIAM G. PASCHAL

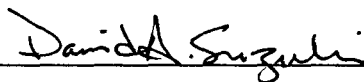
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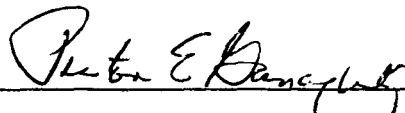


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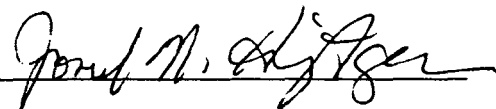


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ABSTRACT

The little brown bat, *Myotis lucifugus*, is an echolocating animal which emits frequency-modulated (FM) pulses and listens to target-reflected echoes in order to perceive auditory images. The functional organization of the auditory cortex in this FM bat was examined by recording from single neurons with microelectrodes inserted into the auditory cortex of awake bats. Neurons in the *Myotis* auditory cortex had previously been shown to be tonotopically arranged according to best frequency (Suga 1965; Wong and Shannon 1988). However, the auditory cortex represents other stimulus dimensions, and the organization of best frequency and best echo delay appears to be different among bat species. For example, delay-sensitive neurons are found throughout the *Myotis* auditory cortex (Sullivan 1982; Wong et al. 1992), and no temporal organization has been found among these neurons. A basic question is how delay-sensitive neurons that are temporally selective are organized in the tonotopically-arranged cortex. On the other hand, the auditory cortices of the mustached bat, *Pteronotus parnellii*, and the horseshoe bat, *Rhinolophus rouxi*, are composed of multiple functional

zones (Suga et al. 1983; Schuller et al. 1991). Delay-sensitive neurons representing best echo delay are located in temporally-organized zones and are separate from the tonotopically-organized zone. Therefore, the spatial distribution of best frequency, best delay, essential pulse frequency, essential echo frequency, frequency tuning, minimum threshold, response latency, and temporal tuning were investigated in the *Myotis* auditory cortex. By comparing this functional organization with that known for other bat species, common organizational principles of bat cortex might emerge and provide insights into strategies used in auditory perception of echolocating bats.

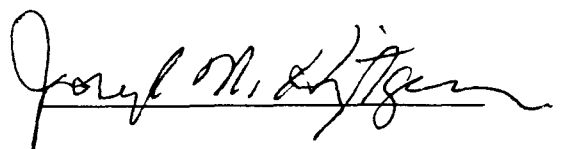
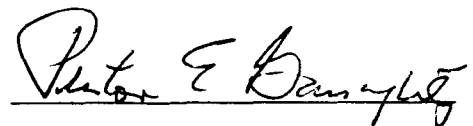
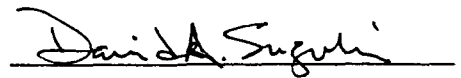
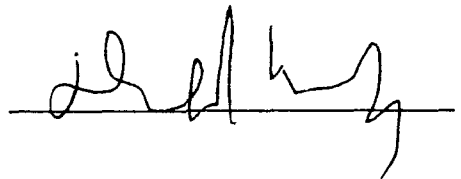


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