Differential sensitivity to frequency and intensity in songbirds

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after the exposure to 4.70 ± 1.55 mm K^+. Threshold tuning curves for the inferior colliculus neurons were elevated by about 30—50 dB, when compared with the pre-exposure levels. The threshold values gradually decreased, reaching the pre-exposure level approximately after 48 hours. Similar time course was observed in the endochochlear potentials, which was decreased after the exposure. Despite the threshold elevation the excitability of neurons ot polarizing currents was not greatly affected by the exposure.

2:20

KK6. Noise-induced threshold shifts in the Mongolian gerbil. Allen Ryan (Division of Otolaryngology, School of Medicine, University of California at San Diego, La Jolla, CA 92103)

Mongolian gerbils were trained in a shuttlebox avoidance task and their auditory thresholds determined. Groups of six subjects each were exposed to a two-octave (1414—5656 Hz) band of noise for one hour at intensities of 100, 110, and 120 dB SPL. Thresholds between 0.1 and 16.0 kHz were determined 0.5, 3.0, 6.0, and 12.0 hours after exposure, and daily for 27 days. Final threshold determinations were made at least two months postexposure. A temporary threshold shift (TTS) was observed in all groups, the extent of which increased with increasing intensity of exposure. Recovery of thresholds followed an exponential course, and for extensive TTS lasted throughout the 28-day observation period. In some cases additional recovery was noted upon final threshold determination. No significant permanent threshold shift (PTS) was seen in the 100-dB exposure group, but PTS did occur in the 110- and 120-dB groups. PTS was limited to a relatively narrow band of frequencies, and exhibited a half-octave shift toward higher frequencies. In terms of both TTS and PTS, the gerbil appears to be less sensitive to noise than chinchillas exposed to the same stimulus. [Work supported by NINCDS and the Medical Research Service of the Verterans Administration.]

2:24

KK7. TTS in Squirrel monkeys. I. Low-frequency long duration noise. J. Burnham, D.W. Nielsen, C. Talley, and B. Deer (Otological Research Laboratory, Henry Ford Hospital, 2799 West Grand Boulevard, Detroit, MI 48202)

Little data has been gathered concerning TTS in primates following long-term exposures to noise. In this study, squirrel monkeys were exposed to an octave band noise centered at 500 Hz for various durations up to 48 hours. Maximum TTS occurred at 750 and 500 Hz. An overall exposure SPL of 95 dB resulted in mean threshold shifts ranging from 7 dB for a 1-h exposure to 20 dB for a 48-h exposure. Recovery of TTS from all exposures at 95 dB SPL were complete within 48 hours for every subject. Comparison with the data of Melnick and Maves [Ann. Otol. 83, 820—828 (1974)] gathered on 10 human subjects indicates that both the development and recovery of TTS in squirrel monkeys is very similar to that found in humans for long-term exposures. Presently, the development and recovery of TTS to an octave-band noise centered at 4000 Hz is also being investigated. [This research supported by a Ford Foundation and an NIH grant to Henry Ford Hospital.]

2:28

KK8. Differential sensitivity to frequency and intensity in songbirds. J.M. Sinnott, M.B. Sachs, and R.D. Hienz (Johns Hopkins School of Medicine, Baltimore, MD 21205)

Frequency- and intensity-difference limens were measured in two passerine species, the red-wing blackbird (*Agelaius Phoeniceus*) and the brown-headed cowbird (*Molothrus Ater*). Operant conditioning techniques which we described previously were employed. The techniques made use of key pecks as observing and report responses. Birds were reenforced with food for reporting changes in frequency or intensity in an ongoing train of tone bursts. Smallest Weber fractions were obtained at 4 kHz where the mean JND was 30 Hz or $\Delta f/f = 0.0075$. The mean value of $\Delta f/f$ was 0.015 at 1 kHz and 0.02 at 8 kHz. Birds were more sensitive to upward frequency shifts than to downward shifts at 1 and 2 kHz. Mean intensity JND's were 2.5 dB for a 1-kHz tone at 50 dB SL and 5.4 dB for a 20-dB-SL tone. [This work was supported by a grant from NINCDS.]

2:32

KK9. Problems of guinea pig training and how to solve them. R.A. Walloch and J.A. Fenwick (Kresge Research Laboratory, University of Oregon Health Sciences Center, Portland, OR 97201)

Twenty-two guinea pigs were trained to detect a tone with a food reward. Common behavioral problems were handled in the following manner: (1) "Freezing" or fear responses were easily obviated by allowing the animals to spend a night in the training cage. (2) Initially the lever was baited to induce pressing. (3) "False positives" were punished with a 10-sec "time out," and the "false positive" rate was reduced by increasing the number of observing responses needed to activate the tone. (4) Failures to detect the tone were also reduced by increasing the number of observing responses. (5) Despite an adequate feeding schedule, motivational levels of the quinea pigs remained a problem. [Work sponsored by the Deafness Research Foundation, Zenith Hearing Instrument Corp. and N.I.H.]

2:36

KK10. Abstract withdrawn.

2:40

KK11. Auditory thresholds in the guinea pig determined by positive reinforcement methods. C.A. Prosen, M.R. Petersen, D.B. Moody, and W.C. Stebbins (Kresge Hearing Research Institute, Departments of Otorhinolaryngology and Psychology, University of Michigan Medical School, Ann Arbor, MI 48109)

Auditory thresholds of six guinea pigs were determined employing operant conditioning techniques. Each subject was trained to nose-press a transluscent response disk (the observing response) mounted on the wall of the experimental chamber just above the floor. A tone was presented through a speaker on the chamber ceiling directly over the subject's head on a variable-interval schedule. The subject reported the tone by pressing once on a second response disk (the reporting response) mounted near the first. A small pellet of food was delivered following reporting responses made in the presence of a tone while a 15-sec time out followed false alarms. Thresholds from 125 to 45 000 Hz were determined by the method of constant stimuli. All subjects were most sensitive to test stimuli located between 4000 and 8000 Hz where the threshold ranged from -10 to 0 dB *re* 2×10^{-5} N/m^2. A brief training period and the lack of significant variability between or within subjects indicate that the guinea pig is a reliable species for further behavioral auditory research. The behavioral audiogram attained agreed well with the determined