Poster 137

ELECTRICAL STIMULATION OF THE AUDITORY NERVE [illegible] STIMULATION USING VERY HIGH STIMULUS RATES

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Speech processing strategies based on high rate electrical stimulation have been associated with recent improvements of speech perception among cochlear implant users. In the present study we investigated the effects of chronic monopolar stimulation using very high rates (14493 pulses\s). Under general anaesthesia (ketamine (20 mg/kg) and xylazine (3.8 mg/kg) i.p.) six normal hearing cats were implanted bilaterally with a three channel platinum (Pt) scala tympani electrode array, while a return Pt-electrode was placed outside the bulla. Chronic electrical stimulation using charge-balanced biphasic current pulses was delivered unilaterally via a transcutaneous leadwire connected to a backpack-stimulator for up to 2000 h. The animals hearing status was periodically monitored using acoustically evoked compound action potentials (CAP's) and brainstem responses (ABR's). In addition the electrically evoked ABR (EABR) was also recorded to ensure that the chronic stimulus was above threshold. Stimulus current and electrode voltage waveforms were monitored twice daily and access resistance (R_a) and electrode impedance (Z_e) calculated. ABR and CAP thresholds were elevated immediately following implantation, but generally showed evidence of partial recovery (0-40 dB). Further deterioration of thresholds on the stimulated side (10-30 dB) was subsequently observed, while control-thresholds remained more stable. R_a (1.3-1.8 kΩ) and Z_e (2.2-3.8 kΩ) typically increased in the first few weeks of electrical stimulation up to R_a:5.6 kΩ and Z_e:8.1 kΩ, before decreasing slightly to a constant plateau. These initial results indicate changes in the electrode-tissue interface and tissue growth within the cochlea. They also indicate that chronic stimulation at these high rates may decrease residual hearing.

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