HYPOTHESIS: Opening of the inner ear during stapes surgery or cochlear implantation may result in trauma to inner ear structures and possible hearing loss. The dual aim of the present study was to evaluate the effectiveness of locally applied Triamcinolon* to protect the inner ear against surgically induced trauma and to exclude possible ototoxic effects. METHODS: In an animal model (guinea pig), a corticosteroid (Triamcinolon) was topically applied to the inner ear, either by extracochlear application and diffusion through the round window membrane or by direct intracochlear application via a cochleostomy. Physiological effects of the steroid were investigated by monitoring the hearing of steroid treated animals in comparison to control animals treated with Ringer solution instead of Triamcinolon. Thresholds as well as input/output functions (I/O function) of compound action potentials (CAPs) in response to auditory stimuli were determined before the cochleostomy and at specific intervals up to 4 weeks after application of Triamcinolon. RESULTS: Extracochlear application of Triamcinolon induced only minor shifts of mean CAP thresholds but significantly increased mean maximal amplitudes of I/O function 14 d after application. No detrimental effects on cochlear function were noted; thus, indicating absence of ototoxicity for extracochlear application in the concentrations used. After the surgical trauma of cochleostomy, CAP...
thresholds increased by 12.5 dB directly after surgery and by 15.8 dB at day 3. Amplitudes of CAPs diminished. Intracochlear application of Triamcinolon resulted in significantly enhanced recovery of CAP thresholds and amplitudes of I/O function from initial loss over a period of 4 weeks.

CONCLUSIONS: From these results, we conclude that extracochlear topical application of Triamcinolon has no ototoxic effect in the concentrations that were used and that intracochlear application supports an increased recovery of cochlear functions after surgical trauma. Furthermore, the results indicate a protective effect of corticosteroids, partially preventing progressive loss of hearing after cochleostomy over a period of 4 weeks. Intracochlear application of Triamcinolon may be useful to prevent hearing loss after surgical intervention on the inner ear; however, clinical safety and efficacy remain to be proven in clinical studies.