ACOUSTICS2008/2572
Haircell non-functionality and dead regions in the cochlea: an exploring study

Bastiaan Warnaar[a] and Wouter Dreschler[b]
[a]AMC - Dept. of Clinical and Experimental Audiology, Meibergdreef 9, 1105AZ Amsterdam, Netherlands
[b]AMC, Clinical and Experimental Audiology, 1105 Amsterdam, Netherlands

Dead regions (DRs) refer originally to regions in the cochlea without evoked electrical potentials due to non-functional inner hair cells and/or fibers of the auditory nerve. The focus of this study is to characterize hair cell non-functionality in the cochlea by means of psychophysical tests. A battery of tests was administered to a group of 13 subjects with a steep sloping tone threshold (>50 dB/octave) between 1 and 2 kHz and severe loss (>60 dB HL) at high frequencies. Psychophysical Tuning Curves (PTC) and Threshold Equalizing Noise (TEN) are the classical tests to diagnose dead regions. Both use as criteria the phenomenon of off-frequency listening. Based on the results of complementary tests like Notched Noise measurements (NN) and Otoacoustic Emissions (OAE), it is argued that off-frequency listening is not necessarily connected to loss of inner hair cells and/or nerve fibers. Furthermore, combination tones produced by well functioning outer hair cells at places of severe hearing loss (>60 dB HL) are found. This may be explained by the presence of a dead region, which is verified with PTC and/or TEN measurements in 3 out of 4 of the cases.