

**EFFECTS OF MECHANICAL STIMULATION OF AUDITORY MECHANO-SENSORY CELLS MEASURED USING ATOMIC FORCE MICROSCOPY**

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The function of the hearing organ (organ of Corti) is dependent on the mechano-sensory cells detecting very small sound-induced vibrations. It has been shown that sensory outer hair cells (OHCs) isolated from the hearing organ respond to mechanical stimulation with a change in cell length in a frequency specific manner (Brundin L, Flock A, Canlon B, *Nature*, 342, 814-6 1989). In the present study, atomic force microscopy (AFM) was used to explore changes in the mechanical properties of the cell wall of OHCs isolated from the guinea pig hearing organ. Mechanical stimulation was applied by adding a modulating drive signal to the AFM cantilever, thus producing a sinusoidal z-motion against the cell membrane while measuring its elastic properties. Frequencies ranging from 50 to 400 Hz were tested. Data are based on observations of six viable cells, which stayed well attached to the test chamber throughout the measurements. Two of the cells showed a decrease in elastic modulus with higher frequencies, while the rest showed no significant changes. The large variability in the basic mechanical properties of the cells, a common finding when using isolated OHCs, may explain the low response rate. However, it is obvious that AFM provides a powerful approach for both applying mechanical stimulation and investigating the resulting response of living mechano-sensory cells. (This work was supported by grants from the Swedish Research Council and from the Deutsche Forschungs Gemeinschaft)