Transduction channels in cochlear hair cells Van Netten SM Department of Neurobiophysics, University of Groningen, Groningen

Hair cells are the primary mechano-electrical transducers of the inner ear and are known for the exquisite displacement sensitivity with which they detect sound-evoked vibrations. Their characteristic organelle, the hair bundle, engages ionic channels via elastic elements that are tensioned in response to hair bundle deflection, thus creating a transduction current.

Using micromechano- and electrophysiological techniques, these transduction currents have been studied in mouse cochlear hair cells. Results show that the transduction channels in cochlear outer hair cells cause only a small nonlinearity in the elastic properties of their hair bundles, in contrast to vestibular hair cells. The measurements also indicate the involvement of active motor elements that play a crucial role in mechano-electrical transduction. Accuracy of this primary stage of processing of sound-induced information by hair cells is related to specific properties of the transduction channels and the gating mechanism. These properties will be discussed, as well as their consequences for the overall signal transduction of hair cell organs.

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