

Cellular localization of TWIK-1, a two-pore-domain potassium channel in the rodent inner ear

Nicolas, M. T.

Barhanin, J.

Reyes, R.

Demêmes, D.

K⁺ channels in the inner ear regulate the secretion and homeostasis of K⁺, i.e. the flux of K⁺ ions required to ensure good mechanosensory transduction. We studied the expression and cellular localization of TWIK-1 and TWIK-2, two-pore-domain K⁺ channels responsible for background K⁺ currents. Reverse transcription-polymerase chain reaction showed that TWIK-1 mRNA is present in the vestibular end organs, vestibular ganglion and cochlea. In contrast, the TWIK-2 mRNA was not detected in the inner ear. Immunocytochemical experiments using confocal microscopy showed that TWIK-1 is specifically localized in 'non-sensory' cells of the inner ear, in the dark cells of the vestibule and in the strial marginal cells of the cochlea. All of these cell types secrete and regulate the K⁺ endolymph production and homeostasis. The labeling was strictly limited to the apical membranes of these cells. TWIK-1 was also detected in the cytoplasm of the large neurons of vestibular ganglion and their fibers.