

Abstract Submitted
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The Role of Bidirectional Coupling in the bullfrog' saccular inner hair cells RAMI M. AMRO, ALEXANDER B. NEIMAN, Ohio University, Dept. of Physics and Astronomy — Mechanical vibrations of the hair bundle and somatic membrane potential oscillation are strongly correlated through bidirectional coupling. Hodgkin-Huxley type model was used to study the dynamical properties of the isolated (Otolithic membrane removed) bullfrog's inner ear saccular hair cells. We hypothesize the existence of the bidirectional coupling and investigating the effects of the coupling strength on the hair cell's main characteristics. The forward coupling is proportional to the magnitude of the transduction current, while backward coupling parameter is in proportion to the calcium concentration near the motor complexes' sites. Different types of these hair cells were studied. Model parameters are chosen to reflect realistic situations. This study shows that sensitivity and frequency selectivity are greatly enhanced within limited ranges of the coupling parameters' space. Also; we show that non-oscillating hair bundles undergo spontaneous activity if bidirectional coupling exists

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