

The biophysics and biochemistry of a cochlea-like organ in the ear of neotropical katydids (Insecta)

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This research is designed to unveil the biophysical principles of auditory frequency analysis in the katydid ear, and the biochemical composition of a newly discovered structure denominated the acoustic vesicle (AV). The AV is involved in frequency decomposition, wave propagation, and amplification; it functions in concert with the sensory cells, and both structure are considered analogous to the mammalian cochlea. I will test the hypothesis that the AV fluid contains ions that convert acoustic energy into electrical impulses. Characterization of the AV fluid will use Gas Chromatography/Mass Spectrometry. The biophysical properties will be approached using Laser interferometry, μ Ct-scanning, and computer modelling.