

Title: Biophysical specializations in the vestibular inner ear may serve rapid stabilization of vision and balance during head motions

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Abstract: Information from the vestibular inner ear about head motions drives remarkably fast reflexes necessary to preserve gaze and balance as we move about the world. Within the inner ear of mammals, specialized mechanosensory cells (type I hair cells) are embedded in calyceal synaptic terminals of the vestibular afferent nerve fibers. In addition to the cup-shaped terminals, the hair cells are electrically leaky because they have an unusual voltage-gated potassium channel that is fully open at resting potential. These properties work together to produce very fast non-quantal transmission across the first synapse in vestibular reflex pathways. These unique hair cell-calyx complexes are also found in reptiles and birds, leading us to speculate that they evolved in stem reptiles in response to the challenges of locomotion on land.

Biography: Ruth Anne was introduced to the beauty of the inner ear as an undergraduate and Master's student at McGill University in Montreal, where she studied sound-evoked responses in auditory neurons of lizards. For her doctoral work at Caltech, she studied mechano-electrical transduction by vibration-sensitive hair cells. Her postdoctoral training in auditory physiology was done at the Massachusetts Eye and Ear Infirmary (MEEI). She has held faculty positions at the University of Rochester, Baylor College of Medicine, and Harvard Medical School/MEEI, and is now at the University of Chicago in the Department of Neurobiology.