

**Afferent and Efferent Innervation of the Inner Ear**

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The sensory epithelia of the inner ear are responsible for detecting sound, and for signaling the position and motion of the head. Many complex biochemical and biophysical mechanisms underlie the transduction of these energies into electrical signals by hair cells. This lecture will concentrate on how those hair cell signals are transmitted to the CNS by afferent synaptic contacts, and how efferent synaptic feedback from the brain modulates hair cell activity. The synaptic mechanisms of the inner ear differ in various ways from those found elsewhere in the nervous system. Appreciation of those unique features requires knowledge of the innervation pattern of the inner ear, as well as the synaptic ultrastructure. Signal processing across both afferent and efferent synapses will be described, as will the underlying molecular mechanisms where available. Study of hair cells is offering new insights into synaptic mechanisms, and could suggest avenues for therapeutic advances.

