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# Modeling responses of brainstem neurons to electrical stimuli

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This talk describes modeling efforts to understand brainstem neural responses to electrical cochlear stimulation. Our approach is to combine brainstem models developed for acoustic stimulation with descriptions of auditory-nerve (AN) responses to electric stimulation. Predictions for the behavior of neurons at several levels of the brainstem are compared to available physiological data. Specifically, the AN model predicts differences in discharge probability, degree of phase-locking, and adaptation of discharge rate of the AN response to stimuli, inlcuding both electrical and acoustical cases. Predicted neural responses are generated for several brainstem nuclei, including cell populations in the cochlear nucleus (CN), the superior olive (SOC) and the inferior colliculus (IC). Specific attention is given to two special topics: 1) responses to the simultaneous stimulation of multiple electrodes, and 2) the effects of amplitude modulation on the tuning of binaural neurons to interaural time delay (ITD). [Work supported by US National Institutes of Health grants DC04663, DC00100, and DC05775 (Delgutte, PI)]