3-D Reconstructions of the Neural Network and Atypical Mitochondria in Taste Buds of the Mouse

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Our laboratory studies the neurobiology of taste. A taste bud comprises 50-150 spindle-shaped cells. Atypical mitochondria release the neurotransmitter ATP and are unique to taste cells that signal bitter, sweet and umami stimuli. Another taste cell type detects sour and salty tastes and forms conventional synapses with neurons. This study sought to clarify the predominant model of taste coding found in mammalian taste buds by examining the structural relationship between atypical mitochondria and the neural network. We hypothesize that taste cells tuned to a given stimulus form functional contacts with specific neurons. This hypothesis was tested by studying computer generated three-dimensional (3-D) models of the neural network and atypical mitochondria. The results of these experiments support our hypothesis and will be useful for future studies regarding coding of gustatory information in health and disease.

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