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Scanning Electrochemical Microscopic Imaging of Taste Cells

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SCANNING ELECTROCHEMICAL MICROSCOPIC IMAGING OF TASTE CELLS

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The goal of this project is to detect the stimulated release of serotonin and to image the topography of taste cells using Scanning Electrochemical Microscopy (SECM). The sense of taste is important for animals because it allows animals to recognize food, derive pleasure from food, and to detect food that may be unsafe to eat. The multiple taste signaling pathways respond to five different kinds of taste molecules: sour, sweet, umami, salty and bitter. Taste buds are organized groups of 50-100 cells responsible for the transduction of the taste signal. Within the taste bud, there are at least three different cell types: Type I (Glial-like) Cells, Type II (Receptor) Cells and Type III (Pre-synaptic) Cells. While there is evidence that some taste transduction also occurs in Type I and Type III cells, currently the best understood signal transduction pathways occur in Type II cells. Type III cells contain serotonin and can depolarize in response to various stimuli. We can detect the release of electro-active neurotransmitters like serotonin, using electrochemistry. This type of electrochemical detection of released neurotransmitters has been used successfully with model neurons. The role of the Type III Cells in the in the taste signal transduction pathway can be elucidated using this new electrochemical tool. Taste bud extraction and isolation have been successfully completed at Illinois Wesleyan University and now the focus is to detect neurotransmitter release from isolated taste buds.