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DEPARTMENT: NURSING

TITLE: SPECIAL SENSES

QUESTION: ELUCIDATE THE PATHWAY INVOLVED IN TASTE

THE TASTE PATHWAY

Three nerves carry taste signals to the brain stem: the chorda tympani nerve (from the front of the tongue), the glossopharyngeal nerve (from the back of the tongue) and the vagus nerve (from the throat area to the palate)

The tongue contains small bumps called papillae, within or near which taste buds are situated. The sense of taste is mediated by taste receptor cells which are bundled in clusters called taste buds. Taste receptor cells sample oral concentrations of a large number of small molecules and report a sensation of taste to centers in the brainstem. The taste receptor cells within a bud are arranged such that their tips form a small taste pore, and through this pore extend microvilli from the taste cells. The microvilli of the taste cells bear taste receptors. Interwoven among the taste cells in a taste bud is a network of dendrites of sensory cells called “taste nerves”. When taste cells are stimulated by binding of chemicals to their receptors, they depolarize and this depolarization is transmitted to the taste nerve fibers resulting in an action potential that is ultimately transmitted to the brain. The nerve transmission rapidly adapts – after the initial stimulus, a strong discharge is seen in the taste nerve fibers but within a few seconds, that response diminishes to a steady-state level of much lower amplitude.

**Gustatory Nerve Impulses**

Once the taste cells are activated by molecules liberated from the things we ingest, they release neurotransmitters onto the dendrites of sensory neurons. These neurons are part of the facial and glossopharyngeal cranial nerves, as well as a component within the vagus nerve dedicated to the gag reflex. The facial nerve connects to taste buds in the anterior third of the tongue. The glossopharyngeal nerve connects to taste buds in the posterior two thirds of the tongue. The vagus nerve connects to taste buds in the extreme posterior of the tongue, verging on the pharynx, which are more sensitive to noxious stimuli like bitterness.

Axons from the three cranial nerves carrying taste information travel to the medulla. From there much of the information is carried to the thalamus and then routed to the primary gustatory cortex, located near the inferior margin of the post-central gyrus. It is the primary gustatory cortex that is responsible for our sensations of taste. And, although this region receives significant input from taste buds, it is likely that it also receives information about the smell and texture of food, all contributing to our overall taste experience. The nuclei in the medulla also send projections to the hypothalamus and amygdalae, which are involved in autonomic reflexes such as gagging and salivation.

Sensory information from the nose, tongue and the skin undergoes transmission from one part of a neural pathway to the other, until it reaches the part of the brain that serves as the processor of the input for the sake of perception and interpretation.