Nucleus Gustatory

The act of perceiving taste is called gustation. The ability to taste strongly links to our ability to smell, olfaction. The brain has a dedicated area chiefly responsible for perceiving and distinguishing different tastes called the gustatory cortex. Its location in the anterior insula in the temporal lobe and frontal opercular region is the terminal connection serving taste perception. The system differentiates the subtleties of salty, sweet, sour, bitter, and umami (Japanese for savory, monosodium glutamate), the essence of flavor in our food. First-order neurons originate as peripheral taste chemoreceptors found in papillae on the upper surface of the tongue, soft palate, pharynx, and upper aspect of the esophagus. Chemoreceptor stimulation, specific for individual tastes, triggers cellular depolarization, ultimately synapsing with primary sensory axons that run in the chorda tympani of the facial nerve CN VII, the lingual branch of the glossopharyngeal nerve CN IX and the vagus nerve CN X. The central axon of these primary sensory neurons projects from their specific cranial nerve ganglia to the solitary tract in the medulla. Axons from the rostral gustatory solitary nucleus project to the ventral posterior medial nucleus of the thalamus VPM and ultimately terminate, both crossed and uncrossed, at the neocortex, the gustatory cortex (the anterior insula of the temporal lobe and frontal opercular region). The gustatory nucleus is a group of neuron cell bodies that serve as an intermediate to relay gustation from the chemoreceptors in the mouth to the gustatory cortex. These neuron cell bodies are in the posterolateral portion of the brainstem known as the nucleus of the solitary tract. Specifically, the neurons found here are the second-order neurons in the pathway for gustation. The gustatory nucleus receives their input from first-order neurons: the afferent cranial nerve fibers from the facial (VII), glossopharyngeal (IX), and vagus (X) nerves. These fibers carry gustation from the anterior twothirds of the tongue, posterior one-third of the tongue, and the epiglottis, respectively. JL Clarke and B Stilling first described the gustatory nuclei in the mid-19th century. Their early discoveries and contributions paved the way for what is known about the gustatory nucleus today. Due to its complexity, dysfunctions of taste can have clinical significance in fields including but not limited to neurosurgery, neurology, and otolaryngology. Therefore, knowledge of the function and structure of this neuroanatomical finding is essential in several practices of medicine¹⁾.

1)

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