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Question: Elucidate the pathway involved in taste

#### TASTE PATHWAYS

The sensory nerve fibers from the taste buds on the anterior two-thirds of the tongue travel in the chorda tympani branch of the facial nerve, and those from the posterior third of the tongue reach the brain stem via the glossopharyngeal nerve.

The fibers from areas other than the tongue (pharynx) reach the brain stem via the vagus nerve. On each side, the myelinated but relatively slowly conducting taste fibers in these three nerves unite in the gustatory portion of the **nucleus of the solitary tract (NTS)** in the medulla oblongata.

From there, axons of second-order neurons ascend in the ipsilateral medial lemniscus and, in primates, pass directly to the ventral posteromedial nucleus of the thalamus. From the thalamus, the axons of the third-order neurons pass to neurons in the anterior insula and the frontal operculum in the ipsilateral cerebral cortex. This region is rostral to the face area of the postcentral gyrus, which is probably the area that mediates conscious perception of taste and taste discrimination. Receptors for taste sensation are the type III cells of taste buds. Each taste bud is innervated by about 50 sensory nerve fibers and each nerve fiber supplies at least five taste buds through its terminals.

#### **FIRST ORDER NEURON**

First order neurons of taste pathway are in the nuclei of three different cranial nerves, situated in medulla oblongata. Dendrites of the neurons are distributed to the taste buds. After arising from taste buds, the fibers reach the cranial nerve nuclei by running along the following nerves

1. **Chorda tympani fibers** of facial nerve, which run from anterior two third of tongue

2. **Glossopharyngeal nerve fibers**, which run from posterior one third of the tongue
3. **Vagal fibers**, which run from taste buds in other regions.

Axons from first order neurons in the nuclei of these nerves run together in medulla oblongata and terminate in the nucleus of **tractus solitarius**.

#### **SECOND ORDER NEURON**

Second order neurons are in the nucleus of tractus solitarius. Axons of second order neurons run through **medial lemniscus** and terminate in **posteroventral nucleus** of thalamus.

#### **THIRD ORDER NEURON**

Third order neurons are in the posteroventral nucleus of thalamus. Axons from third order neurons project into **parietal lobe** of the cerebral cortex.

#### **TASTE CENTER**

Center for taste sensation is in opercular insular cortex, i.e. in the lower part of postcentral gyrus, which receives cutaneous sensations from face. Thus, the taste fibers do not have an independent cortical projection.