Tactile Stimulation of the Tongue Elicits the Activation of TrkC Neurons in the Trigeminal Ganglion

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It is evident that the tongue perceives tactile sensation, but little is known about the neurons that mediate this. Since tropomyosin receptor kinase C (TrkC) neurons are mechanoreceptors on the skin, it is hypothesized that TrkC neurons are also mechanoreceptors on the tongue. Using TrkC mechanoreceptors of the skin as a model, I have found that TrkC neurons in the tongue and trigeminal ganglion have an anatomy that suggests a role in mechanosensation. Building off these findings, this experiment seeks to investigate the function of TrkC neurons on the tongue. A behavioral experiment was conducted in which mice were exposed to touch stimulation on the tongue via licking. The number of TrkC neurons expressing c-fos, a genetic marker of recent neuronal activity, was quantified in the trigeminal ganglion of experimental mice and compared to that of control mice. It was found that experimental mice had significantly more TrkC neurons expressing c-fos, indicating that TrkC neurons were activated upon touch stimulation. These data support the hypothesis, implicating that TrkC neurons play a role in mechanosensation. Understanding TrkC neurons is a vital step in understanding somatosensation as a whole and will facilitate the development of treatment for disorders involving the tongue.

Awards Won:

First Award of $5,000

American Physiological Society: First Award of $1,500