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Articles highlighted

A ‘transition zone’ for gustatory and mechanosensory processing in the mouse nucleus tractus solitarius

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Taste signaling crucially involves ATP released from oral taste buds and P2X2/P2X3 purinergic receptors present on afferent sensory fibers which terminate in the central rostral nucleus tractus solitarius (NTS). A number of somatosensory trigeminal neurons devoid of P2X2 expression terminate in the lateral rostral NTS. Breza and Travers now analyzed P2X2 receptor expression on afferent nerve endings in the mouse rostral NTS in order to segregate gustatory from mechanosensory responsive regions. By combining electrophysiological recordings with electrolytic lesions and immunohistochemical analysis of P2X2 receptors they describe a transition zone in the rostral NTS, where orosensory responses change from gustatory to mechanosensory in a medial to lateral direction. Moreover, they found that rostrally located gustatory neurons had receptive fields in the anterior oral (AO) cavity whereas gustatory neurons of the caudal part of the rostral NTS had receptive fields in the posterior oral cavity (PO). The location of the mechanosensory neurons also varied with respect to their receptive fields, with neurons at the lateral border of the P2X2 terminal field having their receptive field in the AO. In contrast, mechanosensitive neurons with PO receptive fields were found within the P2X2 terminal field along with gustatory neurons and transitioned to mechanosensory only outside the P2X2 terminal field.

Sampling the body odor of primates

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Like other mammals, primates use chemical signals for various aspects of their social communication. These signals include non-volatiles and volatiles present in or emitted from various kinds body secretions. Primate body odors are commonly sampled with untreated cotton swabs or with cotton swabs cleaned by different methods and analyzed by gas chromatography of vaporized compounds coupled to mass spectrometry (GC-MS). Birkemeyer et al now assessed the suitability of a frequently used sampling method for collecting body odors for GC-MS analysis of volatile organic compounds (VOCs). They found that sampling material and protocols affected the outcome of the analyses. In particular, swab-based sampling of body odor exhibited considerable contaminations introduced by swab material, cleaning, and extraction. Analysis of body odors from rhesus monkeys, which, like humans, have no scent glands, revealed that proper analytical performance is indispensable for automated data evaluation and that swabs are more appropriate for collecting semivolatiles rather than VOCs. Therefore, the authors recommend sampling volatile compounds with thermodesorption tubes.

Temperature effect on umami taste

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The effects of temperature on the perceived sweetness of sucrose have been studied comparatively well in humans and it was found that sweetness tends to increase with temperature. The observed heat sensitivity of the transient receptor potential channel M5, which is a crucial component in sweet, umami, and bitter taste signaling cascades, suggested that this channel is the primary cause for the thermal sensitivity of sweet taste and might also render umami and bitter taste heat sensitive. Indeed, investigations in animals have revealed that activities of the chorda tympani nerve and central gustatory neurons elicited by umami stimuli varied as a function of temperature. In contrast, temperature dependence of umami taste has not been studied in humans. Green et al now demonstrate that in subjects who were sensitive to monopotassium glutamate (MPG) umami intensity decreased with cooling at the tongue tip and in the whole mouth. However, cooling did not affect the rate of adaptation on the tongue tip. Whereas temperature shifts elicited similar effects on MPG or monosodium glutamate (MSG)-evoked umami taste at the tip of the tongue, they induced different effects in the whole mouth. Moreover, unlike perceived umami taste, saltiness of both MPG and MSG increased with cooling. Thus, temperature can affect sensitivity of umami and salty tastes of glutamate in opposite directions and the magnitude of these effects can vary across stimuli and site of assessment. Finally, lactisole failed to block umami taste at any temperature supporting previous data showing that the inhibitor did not block responses of the umami receptor to all agonists.

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