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Articles Highlighted

Cultured Human Taste Cells

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Examination of single taste cells by molecular, biochemical, or physiological methods is severely hampered by their short lifetime. This is particularly true for human taste cells, which are not available ad libitum. Thus, the possibility to culture human taste cells for prolonged time would greatly facilitate in vitro investigations of human taste cell functions. Ozdener et al. now describe a method for isolating cells from human fungiform papillae obtained by biopsy and maintaining them in culture for more than 7 months. The cells remain viable and resemble acutely isolated taste cells regarding various functional properties. The cultured cells express taste marker and signaling proteins including α-gustducin, neuronal cell adhesion molecule, phospholipase C-β2, or glutamate–aspartate transporter. When challenged with umami, sweet, or bitter stimuli, they display elevated levels of cytosolic calcium suggesting that native signaling pathways are at least partly active. Thus, the reported protocol may be useful for studies on the proliferation, differentiation, and physiological function of human taste cells.

Corticotropin-Releasing Factor-Mediated Alarm Pheromone Responses in Male Rats

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Chemical signals govern important aspects of mammalian behavior. When food-shocked male rats release a volatile, water-soluble alarm pheromone from the perianal region that acts through the vomeronasal system of recipient rats to aggravate stress-induced hyperthermia, increase defensive as well as risk assessment behaviors, and enhance acoustic startle reflex. However, effects of this alarm pheromone on social behavior remained unknown so far. Kobayashi et al. now examine the effect of the perianal secretions on rat sexual behavior. When a pair of subjects has been exposed to the preparation, various components of male but not female sexual behavior were altered. Preexposure of male but not female rats to the preparation induced similar behavioral alterations. The data suggest that the alarm pheromone suppresses male sexual behavior specifically. The actions of the alarm pheromone were dose dependently blocked by a specific antagonist of corticotropin-releasing factor suggesting that this hormonal pathway plays an important role in alarm pheromone-mediated sexual behavior.

Physiological Actions of Novel Cooling Compounds

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The ability to elicit cooling sensation is a much sought after property of many pharmaceutical and oral care products. The prototypical compound, menthol, enhances cooling-evoked responses of peripheral cold fibers and cold-evoked responses of neurons in trigeminal subnucleus caudalis (Vc). The cooling effects of menthol appear to be mediated by transient receptor potential (TRP) channel M8, which also responds to temperatures less than 25 °C. Klein et al. now investigate the molecular and cellular basis of the strong cooling sensation elicited by 2 novel menthol derivatives. They found that the 2 compounds are much more potent than menthol in activating human TRPM8 in cell-based assays. Both compounds also robustly stimulated calcium responses in subpopulations of cultured rat trigeminal and dorsal root ganglion neurons, the majority of which was also sensitive to menthol and/or agonists of other TRP channels. Moreover, in vivo recordings demonstrated the ability of both compounds to excite cold-sensitive neurons of the Vc. Both of the novel menthol derivatives reduced the responses of Vc neurons to noxious heat, whereas one also enhanced their responses to cooling. Thus, the novel compounds have useful properties for oral care application and provide additional molecular tools to investigate the neural responses of cold sensation.

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