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19/MHS02/132

NURSING

PHYSIOLOGY 212

200LEVEL

ASSIGNMENT

ELUCIDATE THE PATHWAY IN TASTE

Taste is the sensation of flavor perceived in the mouth and throat on contact with a substance.

Five main types of taste

SALTINESS

Saltiness is a taste produced by the presence of sodium chloride (and to a lesser degree other salts). The ions of salt, especially sodium (Na+), can pass directly through ion channels in the tongue, leading to an action potential.

Sourness

Sourness is the taste that detects acid .

Sweetness

Sweetness Sweetness is produced by the presence of sugars, some proteins and a few other substances. Sweetness is often connected to aldehydes and ketones which contain carbonyl group. Sweetness is detected by a variety of G protein coupled receptors coupled to the G protein found on the taste buds. At least two different variants of the "sweetness receptors" need to be activated for the brain to register sweetness. The compounds which the brain senses as sweet are thus compounds that can bind with varying bond strength to several different sweetness receptors. The differences between the different sweetness receptors is mainly in the binding site of the G protein coupled receptors. The average human detection threshold for sucrose is 10 Milli moles per liter.

Bitterness

Bitterness is the taste which detects bases. Bitterness, like sweetness, is sensed by G protein coupled receptors coupled to the G protein. Many people find bitter tastes to be unpleasant; many alkaloids taste bitter, and evolutionary biologists have suggested that a distaste for bitter things evolved because it enabled people to avoid accidental poisoning. The bitterest substance known is the synthetic chemical, marketed as the trademarked Bitter [2], discovered in 1958. benzoate is a white, odorless solid used as an aversive agent, and can be an additive that prevents accidental ingestion of a toxic substance by humans, particularly children, and by animals. It is commonly used on denaturing ethanol. The synthetic substance (PTC) tastes very bitter to most people, but is virtually tasteless to others; furthermore, among the tasters, some are so-called "super tasters " to whom PTC is extremely bitter. This genetic variation in the ability to taste a substance has been a source of great interest to those who study genetics. In addition, it is of interest to those who study evolution since PTC-tasting is associated with the ability to taste numerous natural bitter compounds, a large number of which are known to be toxic. Quinine, the anti-malarial prophylactic, is also known for its bitter taste and is found in tonic water. Bitter taste receptors are known specifically as T2R's (taste receptors, type 2). They are identified not only by their ability to taste for certain "bitter" ligands, but also by the morphology of the receptor itself (surface bound, monomeric)[3].

Savoriness (Umami)

Savoriness is the name for the taste sensation produced by the free glutamates commonly found in fermented and aged foods. In English, it is sometimes described as "meaty" or "savory ". In the Japanese, the term umami is used for this taste sensation, whose characters literally mean "delicious flavor ." Umami is now the commonly used term by taste scientists. The same taste is referred to as in Chinese cooking. Savory is considered a fundamental taste in Japanese and Chinese cooking, but is not discussed as much in Western cuisine.

Examples of food containing these free glutamates (and thus strong in the savory taste) are parmesan and roquefort cheese as well as soy sauce and fish sauce. It is also found in significant amounts in various unfermented foods such as walnuts, grapes, broccoli, tomatoes, and mushrooms, and to a lesser degree in meat. The glutamate taste sensation is most intense in combination with sodium. This is one reason why tomatoes exhibit a stronger taste after adding salt. Sauces with savory and salty tastes are very popular for cooking, such as tomato sauces and ketchup for Western cuisines and soy sauce and fish sauce for East Asian and Southeast Asian cuisines. Since not every glutamate produces a savory-like taste sensation, there is continuing investigation into the exact mechanism of how the savory taste sensation is produced.

The additive monosodium glutamate (MSG), which was developed as a food additive in 1907 by, produces a strong savory taste. Savory is also provided by the nucleotides 5’-inosine monophosphate (IMP) and 5’-guanosine monophosphate (GMP). These are naturally present in many protein-rich foods. IMP is present in high concentrations in many foods, including dried skipjack tuna flakes used to make dash, a Japanese broth. GMP is present in high concentration in dried shiitake mushrooms, used in much of the cuisine of Asia. There is a synergistic effect between MSG, IMP and GMP which together in certain ratios produce a strong umami taste. A subset of savory taste buds responds specifically to glutamate in the same way that sweet ones respond to sugar. Glutamate binds to a variant of G protein coupled glutamate receptors.

The sensitivity of taste in mammals varies due to quantitative and qualitative differences in the structure of the taste perception organs. Gustatory perception is made possible by the peripheral chemosensory organs, i.e., the taste buds, which are distributed in the epithelium of the taste papillae of the palate, tongue, epiglottis, throat and larynx. Each taste bud consists of a community of ~100 cells that process and integrate taste information with metabolic needs. Mammalian taste buds are contained in circumvallate, fungiform and foliate papillae and react to sweet, salty, sour, bitter and umami stimuli. The sensitivity of the taste buds for individual taste stimuli varies extensively and depends on the type of papillae and the part of the oral cavity in which they are located. There are at least three different cell types found in mammalian taste buds: type I cells, receptor (type II) cells and presynaptic (type III) cells. This review focuses on the bio physiological mechanisms of action of the various taste stimuli in humans. Currently, the best-characterized proteins are the receptors (GPCR)

Three nerves carry taste signals to the brain stem: the chorda tympani nerve (from the front of the tongue), the glossopharyngeal nerve (from the back of the tongue) and the vagus nerve (from the throat area and palate). In addition, the trigeminal nerve carries signals from the touch / temperature / pain system. Taste signals combine in the brain stem areas involved in arousal (i.e. from sleep) then with smell signals in the brain to produce the sensation of flavor.

