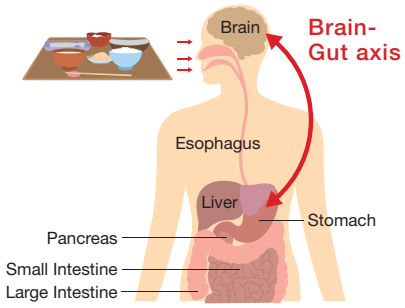
Umami taste

The history of "umami taste" started in 1908. Professor Kikunae Ikeda of the School of Science at Tokyo Imperial University (currently the School of Science at Tokyo University) was inspired from the words of Professor Hiizu Miyake, the dean of the School of Medicine at Tokyo Imperial University, "good taste promotes digestion." Professor Ikeda discovered that L-glutamate in konbu (sea tangle) extract (soup stock of sea tangle) had a characteristically good taste, which he named "umami taste." This was stated in his scientific paper in the "Journal of The Tokyo Chemical Society" published in 1909. Later, the Society for Research on Umami Taste was established in 1982 and proposed to use "umami" as a scientific term because an English term did not exist.

Since the 1990s, umami has been gaining attention as one of the five basic tastes (sweet, bitter, salty, sour and umami taste).

New applications of umami substances

Umami substances not only add umami taste to foods but also increase their flavor and thereby improve the appetite. Recent studies suggest that these substances play an important role in the selection, ingestion, digestion/absorption and metabolism of foods that are essential for life. Therefore, umami substances are expected to improve the quality of life (QOL) for people around the world and are assumed to have various applications.

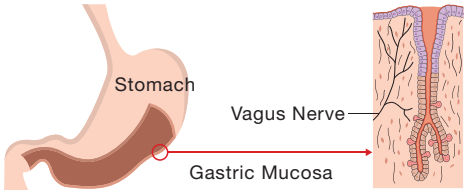


Mechanisms of detecting umami substances in the digestive tract

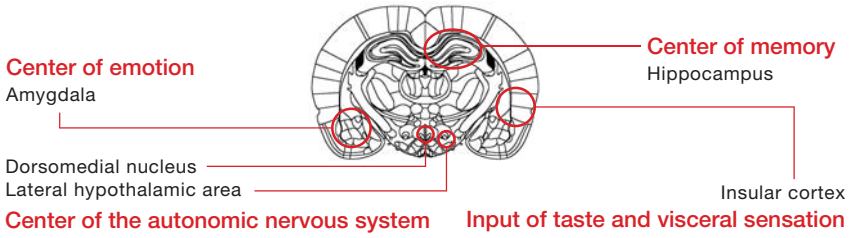
Amino acids are known to induce visceral sensations in the stomach and intestine via activation of the vagus nerve. Recent studies in rats indicate that, among the 20 amino acids that composes proteins, the gastric vagal afferent nerves specifically respond to glutamate＊1. Signals are transmitted from the gastric vagal afferents to the insular cortex, limbic system, and hypothalamus that regulates food intake, digestion/absorption and metabolism. Thus, an umami taste not only affects food intake but also digestion. The mechanism by which the brain recognizes this taste and the effective use of substances with an umami taste as a trigger for digestion are being studied worldwide.

＊1 Reference: Uneyama H, Niijima A, SanGabriel A, et al: Luminal amino acid sensing in the rat gastric mucosa. Am J Physiol Gastrointest Liver Physiol 291: 1163-1170, 2006

The vagus nerve contains sensory fibers that transmit information on food in the stomach and small intestine to the brain. Information on glutamate intake perceived at the surface of the digestive tract is transmitted to the brain via this nerve.



With the use of functional MRI, information on the presence of glutamate in the digestive tract is transmitted to the nucleus in the insular cortex, as well as to the hippocampus, amygdala and hypothalamus, leading to regulation of the appetite, digestion/absorption and metabolism.



Umami substances promote digestion

In the 1990s, the Russian Academy of Sciences published a number of reports on the digestion-enhancing effects of substances with an umami taste＊2. When substances with an umami taste (including glutamate) were added to dog food, gastric secretion was promoted. Further, when monosodium glutamate was added to the food of patients with chronic atrophic gastritis and impaired digestive function, gastric secretion was improved. Recent studies in human have suggested the possibility that glutamate modulates the transit of food from the stomach to the intestine, in proportion to its nutritional value ingested and thereby increases the efficiency of digestion.

＊2 Reference: Vasilevskaia LS, Rymshina MV, Shlygin GK.. Effect of glutamate and combined with inosine monophosphate on gastric secretion. Vopr. Pitan. 1993; (3): 29-33.