

FUNCTIONAL MOBILITY OF TASTE RECEPTORS AND THE BLOOD SUGAR RESPONSE

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A relationship is demonstrated between the level of mobilization of the taste receptors and the blood sugar response to taking food. The level of receptor mobilization was lowered by 38% 10 min after eating, when the blood sugar concentration was raised by 33%. Activity of the taste receptors showed a further increase of 35% 1.5 h after taking food, while the blood sugar had then fall by 18%. The existence of this reciprocal relationship suggests that the humoral background of the body influences to some extent the mobilization and demobilization of the taste receptor apparatus.

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The use of the functional mobility [8] has provided a new technique for the investigation of the taste receptors of the tongue and the study of their effector function [5]. Investigations [2, 3, 6, 7, 10] have confirmed a relationship between activity of the taste receptors and the functional state of the alimentary tract. This phenomenon has been called the gastro-lingual reflex.

Besides reflex influences, humoral factors also play an important role in the regulation of the activity of all systems. The possibility of humoral influences evidently cannot be ruled out in regulation of the reactions of taste receptors [4, 9].

The object of the present investigation was to study the humoral background of the body during manifestation of the effector function of taste receptors. A parallel investigation was made of the mobilization of the taste papillae of the tongue and the blood sugar concentration in relation to the taking of food.

EXPERIMENTAL METHOD

Observations were made on 10 clinically healthy women aged from 17 to 36 years.

Function of the taste papillae of the tongue was investigated by the functional mobility method [5, 8]. Solutions of food substances, namely sugar (44.4%) and common salt (26%), slightly stained with tasteless culinary fuchsin, were used as stimuli.

The solutions were applied to individual fungiform papillae of the tongue. In the course of the experiment 4 papillae were investigated and 12 tests were carried out on each, making a total of 48 determinations of sensitivity. The number of positive responses was a measure of the functional mobility of the taste receptors.

The tests were carried out in a fasting state and 10 min and 1.5 h after taking food. The blood sugar concentration was determined at the same time by the Hagedorn-Jensen method. Altogether 2880 tests of sensitivity to sugar and salt and 60 determinations of the blood sugar were made.

EXPERIMENTAL RESULTS

The fasting level of mobilization of the taste receptors was high: 42 ± 2.6 (the number of positive responses) or 87%.

Meanwhile the blood sugar concentration fluctuated from 81 to 94 mg% (mean 88 ± 5.2 mg%).

The level of mobilization 10 min after taking food fell to 26 ± 2.9 , i.e., by 16 ± 11.8 or by 38% ($P < 0.01$), while the blood sugar concentration increased to 117 ± 10.4 mg%, i.e., by 29 ± 1.9 mg% or by 33%

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($P < 0.001$). Activity of the taste receptors 1.5 h after eating was further increased to 35 ± 4 , i.e., by 10 ± 1.4 or by 35% ($P < 0.001$), while the blood sugar fell to 96 ± 7.1 mg%, i.e., by 22 ± 4.2 mg% or by 18% ($P < 0.001$).

A reciprocal relationship was thus observed between the blood sugar concentration and the level of mobilization of the taste receptors.

The results obtained by the study of the functional mobility of the taste papillae of the tongue before and after the taking of food agree fully with those published previously [1, 5].

The reciprocal relationship demonstrated between the functional mobility of the taste papillae and the blood sugar concentration suggests that humoral factors as well as reflex influences may act on the taste receptors of the tongue.

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