- ABSTRACT -

An immunohistochemical study of the expression of kainate receptors in rat taste buds.

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We had presented evidence which demonstrates that glutamate–like immunoreactivity is present in a subset of taste cells in the rat. Based on those results, kainate receptor immunoreactivity was shown in fungiform, circumvallate, foliate papillae of the rat. In this study, the expression of kainate receptors using transmission electron microscope and co-localization of kainate receptors and α-gustducin with confocal laser scanning microscope (CLSM) in the taste bud of the rat circumvallate and foliate papillae was presented.

For immunoelectron microscopic study, goat anti-KAR1 antibody was used as a primary antibody and immunogold conjugated donkey anti–goat IgG as a secondary antibody. For CLSM study, goat anti–KAR1 antibody and rabbit anti–α–gustducin antibody was used as primary antibodies, and Cy3-conjugated donkey anti–goat IgG and fluorescein isothiocyanate (FITC)-conjugated goat anti–rabbit IgG were used as secondary antibodies.

By using immunoelectron microscopy, taste cells expressing immunogold in taste buds were mainly found in Type II, light cells. They were spindle–shaped, with electron–lucent cytoplasm and large round nuclei, but lack dense granules in apical cytoplasm. Interestingly, immunogold were also found in Type I, dark cells. Little or no label was present in the microvilli of taste cells near the taste pore. By using CLSM, KAR1 and α–gustducin expression were found all taste buds of circumvallate and foliate papillae of the rat. Cells expressing α–gustducin were also expressing KAR1, however some cells showed only KAR1 except α–gustducin. The number of labeled cells in circumvallate and foliate papillae was around ten and there were no statistical differences between circumvallate and foliate papillae or KAR1 and α–gustducin expressing cells (P > 0.05).

In conclusion, we speculate that KAR1 would exist in taste receptor cells, however it is obscure that KAR1 is involved directly in the transduction of the taste sensation. KAR1 is expected to relay the function of the glutamate to taste receptor cells.

Key Word: kainate receptor, α–gustducin, glutamate, taste bud, immunoelectron microscopy
Student Number: 2000-31167