

Expression analysis of G protein alpha subunits in mouse taste cells responsible for sweet and umami taste.

Ryusuke Yoshida¹, Aya Miyauchi¹, and Yuzo Ninomiya¹

¹Section of Oral Neuroscience, Graduate School of Dental Science, Kyushu University, Japan

Sweet and umami taste are mediated by G-protein coupled receptors, T1Rs. T1R3 combines with T1R2 to form a sweet taste receptor and with T1R1 to form an umami taste receptor. Tastant binding to sweet and umami receptors activates heteromeric G protein, α -gustducin, and subsequent stimulation of phospholipase C β 2, production of IP₃, increase in [Ca²⁺]_i, and activation of TRPM5. This cascade leads to depolarization of taste cells. However, mice lacking α -gustducin gene showed diminished but not abolished neural and behavioral responses to sweet and umami substances, suggesting that other G α subunits contribute to sweet and umami taste responses. In this study, we identified α -gustducin expressing cells and T1R3 expressing cells using transgenic mice, which express green fluorescent protein under control of gustducin and T1R3 promoter, respectively, and examined the expression of G α subunits in these cells by using multiplex single cell RT-PCR. Our results demonstrated that many gustducin expressing cells and T1R3 expressing cells also expressed G α 11, G α 14, G α i2, G α q, and G α s. These G α subunits may contribute to sweet and umami transduction in taste cells.