

A Calcium-Receptor Agonist Induces Gustatory Neural Responses in Bullfrogs

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Abstract The effect of calcium-sensing receptor (CaR) agonists on frog gustatory responses was studied using glossopharyngeal nerve recording and whole-cell patch-clamp recording of isolated taste disc cells. Calcimimetic NPS R-467 dissolved in normal saline solution elicited a large transient response in the nerve. The less active enantiomer of the compound, NPS S-467 induced only a small neural response. The EC_{50} for NPS R-467 was about 20 μ M. Cross-adaptation experiments were performed to examine the effect of 30 μ M NPS R-467 and 100 μ M quinine on the gustatory neural response. The magnitude of the R-467-induced response after adaptation to quinine was approximately equal to that after adaptation to normal saline solution, indicating that the receptor site for NPS R-467 is different from the site for quinine. NPS R-467 (100 μ M) also induced an inward current accompanied with conductance increase and large depolarization in two (13%) of 15 rod cells, and a sustained decrease in outward current and small depolarization in six (40%) other rod cells. NPS S-467 (100 μ M) induced a sustained decrease in outward current and depolarization in five (50%) of 10 rod cells. Another calcimimetic cinacalcet (100 μ M) induced an inward current accompanied with conductance increase in three (27%) of 11 rod cells. The results suggest that NPS R-467 induces neural responses through cell responses unrelated to a resting K^+ conductance decrease.

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