

Polymorphism in a gustatory gene that regulates salt preference in *Drosophila melanogaster*

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Summary

The tastes are classified into sweet, bitter, salty, and sour in animals. The sodium chloride (NaCl) is a major tastant that induces salty taste. In rats, it is well known that there is the difference of preference for NaCl between strains. Although many inbred rats strains typically ingest significantly more the isotonic NaCl solution than water, Fischer-344 rats avoid the NaCl solution in preference for water. However, It is not clear whether the difference in the taste reactivity to NaCl is caused by genetic difference.

In this study, we intended to analyze the NaCl preference mechanisms using *Drosophila melanogaster*. Preference for the 50mM NaCl solution over water was examined in 14 wild-type strains of *Drosophila* by the two-choice feeding test. We found that six strains showed high-preference for NaCl, eight strains no-preference. Flies in the high-preference group preferred to ingest solutions with the concentration between 10 and 50 mM and avoided solutions with higher concentrations, whereas those in the no-preference group did not prefer salt solutions at any concentrations and avoided solution with concentrations 100 mM or higher.

We examined whether the difference in the preference for NaCl is due to genetic difference or not. The results suggested that the difference was due to the single gene on the second chromosome. Furthermore, we found the gene that controls the NaCl preference locating between 36C2 and 37B10 by the precisely genetic analysis. When we obtained 16 lines by which each P-element is inserted between 36C2 and 37B10 and examined the salt preference of the lines and theirs parental strain, we found that the salt preference of two lines, KG05889 and KG03741, were lower than other P-element inserted lines and parental line. The insertion of the P-element in KG05889 and KG03741 disrupted the expression of CG15151. We conclude that CG15151 is essential for salt preference of *Drosophila*.