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# A Comprehensive Analysis of the Genes Correlated with the Palatability of Salt in Zinc-Deficient Animals

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Summary

The essential trace element zinc is involved in the activities of various enzymes. Therefore, a lack of zinc results in the collapse of internal regulatory mechanisms and causes various impairments. In rodents, a dietary deficiency of zinc alters the palatability of foods. Zinc deficiency enhances the palatability of salt, and this phenomenon can be observed soon after the administration of a zinc-deficient diet.

In this study, by using DNA microarray, we performed a global analysis of the gene-expression profiles in the livers of rats with zinc deficiency. Male Sprague-Dawley (SD) rats aged 4 weeks were divided into 2 groups: a zinc-deficient group fed a zinc-deficient diet and a pair-fed group fed a zinc-sufficient diet. We ensured that rats of both groups consumed equal amounts of food. Liver and thalamus samples were obtained from all rats, and cRNA samples were prepared for use in the DNA microarray analysis. Our results strongly suggest that the lack of dietary zinc markedly affects the gene-expression profiles in liver as well as in thalamus. It was a significant finding that the change of food could affect the gene expression patterns in the brain.

We also performed *in situ* hybridization analyses to detect the expression of taste-signaling molecules in the taste buds of zinc-deficient rats in order to ensure that the number of taste buds and the function of the taste receptor cells were not affected. Judging from the expression patterns of taste bud-specific markers, the difference between the zinc-deficient and pair-fed rats was not marked.