

Behavioral and neurophysiological study on the salt preference in rats

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Summary

Capsaicin is a major component of red pepper and causes irritation sensation in the mouth. One of the physiological actions of capsaicin is said to reduce NaCl preference, but little is known about the effect of capsaicin on a basic taste sensation by the taste nerve such as chorda tympani nerve. The present experiment was demonstrated in order to clarify the effect of chronic feeding of capsaicin (0.014% in the diet) on the preference to NaCl solution and on the chorda tympani nerve sensitivity to NaCl in SD rats and spontaneously hypertensive rats (SHR).

Experiment 1: Preference test. Four weeks old, male SD rats and SHR were used for the preference test. The dietary protein level (purified whole egg protein) was set at 5% and 10%, and fed to both strains of rats with or without capsaicin (8 experimental groups totally). Each group consists of 5 rats, and reared together in a big wire-mesh cage with 4 bottles of test solutions (deionized water, 0.5%, 0.9%, and 1.4% NaCl solutions).

Experiment 2: Electrophysiological study. After finishing the preference test, the rats were used for the chorda tympani nerve recording under Nembutal and urethane anesthesia.

Experiment 3: Blood pressure monitoring. Eight weeks of male SHRSP (Stroke-prone SHR) were used for the systolic blood pressure monitoring during the feeding of experimental diet (1% NaCl) under the free access to deionized water only.

The results obtained were as follows:

1. Capsaicin had a reducing effect on the preference to NaCl solutions under the 5% protein diet of SD and SHR, and under the 10% protein diet of SHR.
2. The salt preference increased greatly by a low (5%) protein diet in both SD rats and SHR.
3. It was suggested that chronic feeding of capsaicin diet increased the sensitivity to NaCl solutions.
4. Dietary capsaicin had a blood pressure-lowering action to SHRSP after 3 weeks of feeding.