

Elucidation of Dietary Factors Which Alleviate Salt-Sensitive Blood Pressure Increases Across Generations

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Summary

[Background] Salt intake increases the risk factor of hypertension, which is a risk factor for cerebrovascular disease and total mortality. In addition to salt, maternal malnutrition has been linked to the risk of hypertension in offspring, and high-protein diet can increase blood pressure and kidney damage in Dahl salt sensitive (DahIS) rats. However, the effects of changes in nutritional status at specific life stages on blood pressure and renal injury have not been fully elucidated. In this study, we aimed to comparatively analyze the effects of feeding high-protein diets on blood pressure and renal injury in salt-sensitive hypertensive rats at the adult or fetal/lactating stages.

[Methods] DahIS rats were used for the experiment. At the 9 weeks old, rats were fed either normal protein (NP) diet containing 18% casein, 8% NaCl containing NP (NPHS) diet, high protein (HP) diet containing 30% casein, or 8% NaCl containing HP (HPHS) diet for 3 weeks. Other rats were fed NP or HP diet during the mating and lactating periods, and all pups weaned at 4 weeks of age were fed HP diet until they reached 9 weeks old, then the diets were switched to HP or HPHS diet for another 3 weeks. During the high salt diet period, systolic blood pressure and 24-hour urinary protein excretion were measured.

[Results] Feeding a high-salt diet significantly increased systolic blood pressure regardless of the timing of feeding the HP diet. Urinary protein excretion also increased with feeding a high-salt diet, but the urinary protein excretion was higher in the HPHS group fed HP during maturity than in the NPHS group. On the other hand, the urinary protein excretion was lower in the HPHS group fed HP during fetal and lactation than in the NPHS group.

[Conclusion] These results indicate that the effect of feeding a high-protein diet on renal damage may vary depending on the life stage.