

## A Maternal High Salt Diet Enhances Salt Sensitivity of Offspring - Effects of Feeding Period and Dietary Sodium Level in Dams on Cardiovascular Function in Offspring -

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### Summary

The fetal environment—the mother's condition and environment—has important effects on the offspring's cardiovascular system. Previously, we demonstrated that offspring of spontaneously hypertensive rats (SHR) fed a high-salt (4% NaCl) diet during gestation and lactation have lower blood pressure, impaired vasodilation in response to nitric oxide (NO), and left ventricular systolic and diastolic dysfunction, compared with offspring of SHR fed a control diet (grant No., 1231). However, it is unclear whether the sensitivity of the offspring cardiovascular system to a high maternal salt intake is greater during gestation or during lactation. Therefore, in this study, we investigated the influence on arterial and cardiac function of a maternal 6% NaCl diet during gestation only, compared to the effects of high salt intake during both gestation and lactation. Additionally, the degree of the dysfunction was compared to that produced by a maternal 4% NaCl diet during gestation and lactation, as shown in previous study.

SHR were exposed to either a maternal 6% NaCl diet or a control maternal diet (0.3% NaCl) during gestation and during the suckling period (HH and NN group), and a third group was exposed to a high-salt maternal diet only during gestation (HN group). After weaning at 4 weeks of age, male offspring were given a diet containing 0.3% NaCl for 8 weeks. Adult offspring in HN and HH group had lower blood pressure compared with that of NN group. Nitroprusside-induced vasodilation in aortas of HN and HH group was impaired. The extent of the dysfunction in HH group was the same as in HN group, and was greater than that observed in the group fed 4% NaCl diet during gestation and lactation. Left ventricular contractile and diastolic functions were reduced in HH group compared to NN group, and tended to decrease in HN group. The cardiac dysfunction observed in HH group was of a similar degree compared with that induced by the maternal 4% NaCl diet.

These results demonstrate that a maternal high-salt intake, especially during gestation, is a predisposing factor for disturbance of the cardiovascular system in offspring. This study suggests that the impairment of vasodilation depends on the level of salt in the maternal diet, and restriction of salt intake during lactation is effective to prevent a portion of cardiac dysfunction in offspring.