53) Dietary Effect on Central Blood Pressure Regulation. Yasuo Nara, Yukio Yamori, and Walter Lovenberg* Japan Stroke Prevention Center, Department of Pathology, Shimane Medical University, Izumo 693 and Biochemical Pharmacology, Hypertension-Endocrine Branch, NHLBI, NIH, Bethesda, Md 20014*.

INTRODUCTION We previously reported that high fish protein diet attenuated the development of severe hypertension and decreased the incidence of stroke in stroke-prone SHR (SHRSP) (Jap Heart J 19, 1978). The fish protein contains a large amount of methionine, which is metabolized to taurine through cysteine in vivo. In this study, we examined the effect of methionine, cysteine and taurine administration on the development of hypertension in SHR.

MATERIALS AND METHODS One group was given the standard diet (Funahashi F II) and the other groups were given the diet containing 1.5% (W/W) methionine or 1.2% (W/W) cysteine (equimolecular to methionine). The experiments were started at the age of 1.5 months and continued until natural death. In the taurine experiment, Wistar-Kyoto (WK), stroke-resistant SHR (SHRSR) and SHRSP were separated into two groups. One group received tap water to drink and the other group received water containing 3% (W/V) taurine. Blood pressures were observed from 1 month to 3.5 months after birth. Endogenous taurine and the amount after taurine administration were measured using an amino acid analyzer. Cystic acid decarboxylase activity was measured in livers and brains of three strains.

RESULTS AND DISCUSSION In SHRSP, methionine significantly lowered blood pressure, however, cysteine had not such an effect; blood pressures at the age of 150 days were 219 ± 5 , 242 ± 8 and 248 ± 5 in methionine-treated, cysteine-treated and control SHRSP. The incidence of stroke was decreased in methionine group (43%), while no effect was observed in cysteine-treated group (88%) in comparison with non-treated control group (89%). Difference in these effects between methionine and taurine may due to the amount incorporated into the brain, because Oldendorf reported that the incorporation of methionine in brain was about 5 times the incorporation of cysteine (Am J Phys 221:1629, 1971). The taurine effect was observed in SHRSP and SHRSR, although the effect was not so marked in the latter; blood pressures 2 months after taurine administration were 178 ± 4 , 172 ± 4 and 125 ± 3 mmHg in SHRSP, SHRSR and WK, respectively. The endogenous contents of taurine in the liver (3.44 ± 0.92 $\mu\text{mole/g}$) and the serum (0.094 ± 0.011 $\mu\text{mole/ml}$) were significantly decreased in SHRSP compared to the amounts in the liver (7.77 ± 1.13 $\mu\text{mole/g}$) and the serum (0.170 ± 0.034 $\mu\text{mole/ml}$) in WK. The liver and the serum of SHRSR contained an intermediate amount of taurine (5.11 ± 0.95 $\mu\text{mole/g}$ and 0.138 ± 0.013 $\mu\text{mole/ml}$, respectively). The cystic acid decarboxylase activities of the liver and brain were similar in all three strains. Taurine levels in animals treated with taurine were increased in the brain but not in other tissues examined. After the administration of taurine; per cent increase in comparison with the mean control levels were 7.6, 9.1, 25.0 and 33.1 in telencephalon, cerebellum, diencephalon and lower brain-stem, respectively. These results indicated that dietary taurine decreased the blood pressure in SHRSP, probably by affecting the central blood pressure regulation.

SUMMARY Methionine and taurine attenuated the development of severe hypertension in SHRSP. However cysteine had not such an effect. Methionine also decreased the incidence of stroke in SHRSP (43%) in comparison with the incidences in cysteine-treated and control SHRSP (88 and 89%, respectively). Methionine or taurine may reduce the blood pressure by modulating central blood pressure regulation.

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