

Salt-loading Increased the Levels of Neuronal Nitric Oxide Synthase and Vasopressin gene in Salt-sensitive Dahl Rat

Hiroshi Yamashita, Izumi Shibuya, Yoichi Ueta and Ryota Serino

Department of Physiology, School of Medicine, University of Occupational and Environmental Health, Japan.

summary

Dahl salt-sensitive (S) rats given a high salt diet developed hypertension. The concentrations of plasma arginine vasopressin (AVP) in hypertensive Dahl S rats were significantly increased in comparison with those in Sprague-Dawley (SD) rats and Dahl salt-resistant (R) rats on a high salt diet. AVP mRNA in the paraventricular (PVN) and the supraoptic nuclei (SON) of SD, Dahl S and Dahl R rats on a high salt diet was significantly increased in comparison with those on a normal diet. The levels of AVP mRNA in the PVN of hypertensive Dahl S rats were significantly increased in comparison with levels in SD and Dahl R rats on a high salt diet. The levels of neuronal nitric oxide synthase (nNOS) mRNA and NADPH-diaphorase activity in the PVN and SON of hypertensive Dahl S rats were greater than those in Dahl R rats on a high salt diet. The development of hypertension was suppressed by treatment with nicardipine and captopril. The nNOS mRNA in the PVN and SON of Dahl S rats given a high salt diet was not upregulated by treatment with nicardipine, while the nNOS mRNA in salt-loaded Dahl S rats was greater upregulated by treatment with captopril to a greater than without the antihypertensive drug. These results suggest that the synthesis of NO, as well as AVP in the PVN and SON, is markedly upregulated by salt loading in hypertensive Dahl S rats and the upregulation of expression may be influenced by the hypertensive state.