

## Role of dopamine in salt-sensitive and non-salt sensitive hypertension

Manabu Yoshimura, Masato Nishimura, Tadashi Nakanishi, Hakuo Takahashi\*

Department of Clinical Laboratory and Medicine  
Kyoto Prefectural University of Medicine, Kansai Medical University\*

Cardiovascular and renal responses to excess intake of salt are variable in each individual. Blood pressure responses to excess intake of salt are not uniform, increasing in some subjects but not increasing in other. Analyzing the pathogenesis of salt-induced hypertension, the patients of essential hypertension or DOCA/salt hypertensive rats were divided into two groups from the amplitude of blood pressure response to salt loading. Analyzing the endocrine and biochemical parameter from these two groups, the present studies were figured out the characteristic factors of salt-sensitive hypertension.

Clinically, the patients of essential hypertension were divided into two groups from the difference of blood pressure responses to high salt diet, such as salt sensitive (SS) and non-salt sensitive (NSS) patients. Fifteen patients of essential hypertension were classified into two groups, SS and NSS patients from the tentative criteria with 10% increase of mean blood pressure with the load of high salt diet from low salt diet. The SS patients showed the reduced urinary sodium excretion, the retention of sodium into body and poor suppression of aldosterone release in response to salt loading as compared with those of NSS patients. Decreased dopamine excretion from the kidney in response to high salt diet was one of major factors for natriuresis in SS patients, and poor natriuresis due to lack of renal dopamine production caused the retention of sodium and fluid which elevated blood pressure.

To demonstrate the animal model of salt sensitive and non-salt sensitive hypertension, DOCA/salt hypertensive rats were classified into two groups, such as high sensitive (HS) and low sensitive (LS) rats to DOCA/salt loading from the tentative criteria of 160 mmHg in systolic blood pressure. High-sensitive rats had the characteristic pattern, such as the enhancement of urinary excretion of noradrenaline and plasma aldosterone concentration. These dynamic change of parameters in high-sensitive rats of DOCA/salt rats was similar to those of salt sensitive patients in essential hypertension.

The clonological study of urinary excretion of renal dopamine (urinary free dopamine) and endothelium derived relaxing factor (EDRF) or nitric oxide (NO), urinary excretions of free dopamine and NO were increased during the prehypertensive stage. These results suggested that renal dopamine and endothelial NO played an important role for antagonizing against the elevation of blood pressure.

Based on both clinical and animal studies, it was found that blood pressure responses to salt loading were variable in individual patients or animals, and that salt sensitive patients or animals showed the characteristic pattern of sodium retention. Intensity of renal Na handling activity plays an important role for differentiation of salt sensitivity to hypertension.