Electrolytes and Trace Elements in Various Tissues of Spontaneously Hypertensive Rats. Noboru Saito*, G C Abbu* and Yuuko Konishi**.

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This study is to clarify the changes of electrolytes and trace elements in some tissues of hypertensive rats, which are influenced by aging.

Methods As female adult rats aged 7 months, 9 stroke-prone spontaneously hypertensive rats (SHRSP), 15 stroke-resistant SHR (SHRSR) and 10 Wistar Kyoto rats (WKY) were used, while 13 SHRSP, 6 SHRSR and 4 WKY were used as female old rats aged 21.5 months. Experiment 1 Myocardium, groin skeletal muscle, kidney, brain and liver were removed under anesthesia with intraperitoneal urethane solution. Ash materials were prepared with concentrated nitric acid under heating. Calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), zinc (Zn), iron (Fe), copper (Cu) and selenium (Se) were measured by atomic absorption spectrophotometry. Experiment 2 Cellular supernatant fraction was obtained after ultra-centrifuging at 100,000 G for 20 min.

Results Experiment 1 In old SHRSR, Ca/Mg ratio was higher in myocardium as compared to adult SHRSR. Fe of skeletal muscle and kidney, Ca of kidney, and Ca/Mg ratio increased significantly, while Zn of kidney and liver decreased. In comparison among these tissues of adult rats, Ca was more in skeletal muscle and brain. Mg was more in skeletal muscle and liver. Ca/Mg ratio was highest in brain and lowest in myocardium. Zn and Fe were more in liver. Se of various tissues decreased in old WKY and SHRSP as compared to adult ones. In comparison between adult SHRSP and WKY, Se of serum, liver and myocardium decreased in old SHRSP. Among various tissues, Se was more in kidney, and then in liver and myocardium. Among three strain rats, liver Se of adult SHRSP and SHRSR were less than those of adult WKY. Liver Na and K decreased in old WKY as compared to adult WKY. Brain Na and K were more in adult WKY. Experiment 2 Using cellular supernatant fraction, Ca increased, Mg decreased and Ca/Mg ratio increased in some tissues of old rats as compared to adult rats. Ca were more in kidney, brain and skeletal muscle of adult WKY, while Mg were more in skeletal muscle and less in brain, resulting in higher ratio of Ca/Mg in brain. Among adult rats of three strains, brain Mg decreased in SHRSP as compared to WKY, resulting in higher ratio of Ca/Mg.

Summary In old rats of three strains Ca increased, Mg decreased, Ca/Mg ratio increased, Se decreased, Zn tended to decrease and Fe tended to increase as compared to adult rats in various tissues. In hypertensive rats the decrements of Mg and Se with higher Ca/Mg ratio were found as compared to normotensive rats in some tissues.