Localization of mRNA level and Activity of Tyrosine Hydroxylase in Spontaneously Hypertensive Rats. Toshio Kumai, Masami Tanaka, Minoru Watanabe, Chie Matsumoto, Chika Sekine, and Shinichi Kobayashi. Department of Pharmacology, St. Marianna University School of Medicine, Kawasaki, 216.

We previously reported that the norepinephrine levels of abdominal aorta and mesenteric artery in spontaneously hypertensive rats (SHR) were higher than those of Wistar Kyoto Rats (WKY), however, its mechanism is still unclear. Tyrosine hydroxylase (TH) is the rate-limiting enzyme of catecholamine synthesis. The present study investigated the localization of TH mRNA level and TH activity in WKY and SHR.

Methods; Male SHR and WKY (27-36 weeks old) were used. Systolic blood pressure was measured in conscious rats by the tail-cuff method using electro sphygmomanometer (PS-100, Riken Kaihatsu, Co., Tokyo). TH activity and TH mRNA of adrenal medulla, celiac ganglion, abdominal aorta and prostate in WKY were examined. Moreover, TH activity and TH mRNA level of adrenal medulla in SHR were compared to those of WKY. TH activities were measured by the method of Nagatsu et al. TH mRNA levels were measured by northern blot and dot blot.

Results; ① TH mRNA band identified approximately at the region of 1.8 Kb. TH mRNA were detected in adrenal medulla and celiac ganglion, but not in abdominal aorta and prostate. TH mRNA, as well as TH activity, of adrenal medulla was greater intensity than that of celiac ganglion (TH activities, adrenal medulla: $204.40 \pm 19.27 \text{ ng/g/hr}$, $N=6$, celiac ganglion: $3.20 \pm 0.32 \text{ ng/g/hr}$, $N=3$) ($P<0.01$). ② Systolic blood pressure of SHR ($191.13 \pm 3.76 \text{ mmHg}$, $N=6$) was significantly higher than that of WKY ($139.57 \pm 2.19 \text{ mmHg}$, $N=6$) ($P<0.01$). TH activity of adrenal medulla in SHR ($401.14 \pm 56.78 \text{ ng/g/hr}$, $N=6$) was significantly higher than that in WKY ($204.39 \pm 19.27 \text{ ng/g/hr}$, $N=6$) ($P<0.01$). TH mRNA level of adrenal medulla in SHR ($14.52 \pm 3.60 \text{ cpm}/\mu\text{g RNA}$, $N=6$) was significantly higher than that in WKY ($4.42 \pm 0.83 \text{ cpm}/\mu\text{g RNA}$, $N=6$) ($P<0.05$).

Discussion; These results suggested that the hypertension of SHR may be related to the high activity of TH due to the high level of TH mRNA in adrenal medulla, which activates catecholamines synthesis.