The Effects of Aging on the Expression of Tyrosine Hydroxylase mRNA in
Adrenal Medulla of Spontaneously Hypertensive Rats.

Toshio Kumai, Masami Tanaka, Tomonori Tateishi, Minoru Watanabe, Hironori Nakura,
and Shinichi Kobayashi. Department of Pharmacology, St. Marianna University School
of Medicine, Kawasaki 216.

We had reported that the expression of tyrosine hydroxylase (TH) mRNA in adrenal medulla of spontaneously hypertensive rats (SHR) was significantly increased than that of Wistar Kyoto rats (WKY). TH is the rate-limiting enzyme of catecholamine synthesis. Thus, these increased TH mRNA expression of SHR may contribute to the development of hypertension of SHR. The present study investigated the effects of aging on expression of TH mRNA level in adrenal medulla of SHR and WKY.

Methods; Male SHR and WKY (5, 10, 25 weeks old) were used. Systolic blood pressure (BP) was measured by tail cuff method in conscious rats. Norepinephrine (NE) and epinephrine (Epi) were measured by HPLC-ECD method. TH activity was measured by synthesis of DOPA from L-tyrosine. Total RNA was extracted in adrenal medulla, and then TH mRNA levels were measured by dot blot (total RNA ;6 μ g). The rat TH cDNA (1.2 kb) were used as probe.

Results; ① BP BP of SHR and WKY were increased according with aging. BP of 5 weeks old SHR and WKY were significantly no difference, whereas, BP of 10 and 25 weeks old SHR were significantly higher than that of WKY. ② Catecholamine levels NE and Epi of SHR were increased according with aging, but not WKY. NE and Epi of 5 weeks old SHR and WKY were significantly no difference, whereas, NE and Epi of 10 and 25 weeks old SHR were significantly higher than that of WKY. ③ TH activity TH activity of 5 weeks old SHR and WKY were significantly no difference, on the other hand, TH activity of 10 and 25 weeks old SHR were higher than that of WKY. ④ TH mRNA level The ratio of TH mRNA/ β -actin mRNA of SHR were increased according with aging, but not WKY. The ratio of TH mRNA/ β -actin mRNA of 5 weeks old SHR and WKY were significantly no difference, on the other hand, the ratio of TH mRNA/ β -actin mRNA of 10 and 25 weeks old SHR were significantly higher than that of WKY.

Discussion; These results suggested that the development of hypertension of SHR were concerned with the increased expression of TH mRNA, concomitant with increased TH activity, NE and Epi levels in adrenal medulla.