Hypertension is responsible for brain catecholamine which modulated by androgen and estrogen. Toshio Kumai, Yoshiko Masubuchi, Masami Tanaka, Minoru Watanabe and Masanao Hirai. Department of Pharmacology, St. Marianna University School of Medicine, Kawasaki, 216.

Introduction: Previous works have shown that intrinsic opioids are inhibited by naloxone administration, in consequence, norepinephrine (NE) and (DA) are increased and systolic blood pressure (BP) enhanced. These results indicate that there is a sex difference in controlling system to the BP through the central opioid-catecholamine (CA) neurone system; androgen act to decreasing system in male, while estrogen act to increasing system in female. Present study examined that effect of castration on the mechanisms of release of CA from brain in SHR.

Method: SHR, male and female, originated Kyoto Wistar(WKY) were maintained under controlled animal house (23±1°C, 55±5%) and fed with CE-2 (CLEA, Tokyo) and water ad libitum. Orchiectomy or ovariectomy were made at 4 weeks old (W) and experiments performed on 55-80 W. BP was measured by tail-cuff method (RIKEN PS-100) in conscious rats. Cerebrum was resected into cerebral cortex, hippocampus, thalamus and hypothalamus due to Glowinski method. These tissues were preincubated with Krebs-Ringer buffer (pH 7.40) at 37°C for 15 min and then incubated with potassium ion (K+) or tyramine (Tyr) consisting of desipramine (1μM) as uptake 1 inhibitor and corticosterone (8μM) as uptake 2 inhibitor, at 37°C for 20 min. CA released into the incubation medium were extracted with oxidized alumina procedure and then estimated in HPLC (Waters).

Results: Cerebral cortex; in stimulation of K+, NE level was increased in male but not changed in female in the castrated group (Cast) as compared with intact group (Int) and dopamine (DA) level was significantly increased in male but not changed in female in the Cast as compared with Int (and so on), and in stimulation of Tyr, NE level was not changed both in male and female in the Cast and DA level was increased in female but not changed in male in the Cast, and there was significantly increased in male than that of female in the Int. Hippocampus; in stimulation of K+, NE level was increased in female but not changed in male in the Cast and DA level was increased in male but not changed in female in the Cast, and there was increased in male than female in the Int, and in stimulation of Tyr, both in levels of NE and DA were increased in female but not changed in male in the Cast and no-sex difference was found in the Int. Thalamus; in stimulation of K+, NE level was not changed both in male and female in the Cast and male was increased than female in the Int and DA level was unchanged in male but lowered in female in the Cast and female was increased than male in the Int, and in stimulation of Tyr, NE level was lowered in male but not changed in female in the Cast and DA level was increased in female but not changed in male in the Cast and no-change was found in the Int. Hypothalamus; in stimulation of K+, NE level was significantly lowered in male and contrarily, increased in female in the Cast and DA level was not changed in male and lowered in female in the Cast and female was higher than male in the Int and in stimulation of Tyr, NE level was not changed both in male and female in the Cast and DA level was not changed in male but increased in female in the Cast and no-sex difference was found in the Int.

Discussion and Summary: (1) In male, androgen facilitates release of NE from hypothalamus and orchiectomy-induce reduction of BP coincidently, the NE-release is retarded. (2) In female, ovariectomy-induce reduction of BP contrarily, the NE-release is enhanced suggesting lack of estrogen lead to an increase in intrinsic NE and this, in turn, inhibits BP because the sensitivity of postsynaptic receptor is enhanced by estrogen. (3) It is suggesting that the mechanismus of control of BP by hypothalamic NE is regulated with different actions between androgen and estrogen.