4) Evaluation of the New Rat Tail Blood Pressure Determining System. Takushi X. Watanabe, and Hirofumi Sokabe. Department of Pharmacology, Jichi Medical School, Tochigi-ken 329-04.

INTRODUCTION Most of the rat tail blood pressure (BP) determining systems detect BP when the tail pulses reappear during the tail cuff deflation. The difficulty of these systems exists in that the rats move when the pulses reappear. The new system detects BP when the pulses disappear during the cuff inflation, as reported by Leenen and De Jong (1971). By this system the rats do not move, and the determination became considerably easier than before. We have evaluated the new system.

METHODS Male normal rats of HOS®: Donryu strain (DON), 10-13 weeks of age, and male spontaneously hypertensive rats (SHR), 10-13 weeks of age, F40-41 from the colony of the Department of Pharmacology, Jichi Medical School, were used. Heart rate (HR) and BP were determined by the new system (Natsume KN-210). The rat was prewarmed in the box at 50 °C for 3 min and placed in the holder. The rat tail was passed through the occluding cuff and the photoelectric pulse detecting sensor was attached on the tail distal to the cuff. Tail pulses were counted for 6 seconds and indicated as HR in digit. Cuff pressure was then increased until the tail pulses disappeared. The pressure at that point was automatically indicated as BP in digit. The values were printed out automatically after the determinations. Mean BP was determined, for comparison, through a cannula inserted into the abdominal aorta via femoral artery 2-10 days before, by an electronic system (Century Technology CP-01, Star Medical PA-011 and Natsume KN-260). Tail BP was also determined in the rats anesthetized with pentobarbital sodium (50 mg/kg, ip) after prewarming for 5-10 min. Aortic BP curve was recorded by an electronic system (Statham P23Gb, Star Medical PA-011 and Nihon Kohden RJG-4024) without damping through a cannula made from a G16 or G18 needle in the anesthetized rat. Antihypertensive drugs used were propranolol (100 mg/kg), hydralazine (4 mg/kg), K-351 (10 mg/kg), prazosin (20 mg/kg) and captopril (100 mg/kg). All drugs were given orally by a gastric tube.

RESULTS AND DISCUSSION Stable values of HR and BP were obtained from 2 to 5 min after prewarming under the condition indicated above in both DON and SHR rats. In unanesthetized rats, tail BP were higher than mean BP determined simultaneously. The differences were 25 ± 2 mmHg (n=8) in DON, and 34 ± 4 mmHg (n=8) in SHR, respectively. In anesthetized rats, tail BP was also higher than mean BP measured immediately after the indirect determination. The differences were 31 ± 2 mmHg (n=3) in DON, and 38 ± 6 mmHg (n=4) in SHR, respectively. These values were approximately equal to two third of pulse pressure (29 ± 1 mmHg (n=3) in DON, and 37 ± 2 mmHg (n=4) in SHR), determined in anesthetized condition after laparotomy. The results indicate that tail BP determined by the present model of the new system is rather close to the maximum BP, but not to the mean BP which used to be obtained by the conventional system of indirect determination. However, the problem to set the detecting point at either the maximum or mean BP remains to be discussed further.

Correlation of tail and mean BP was also examined after the drug treatments, because discrepancies existed between two values in the previous results. Good correlations were obtained in DON ($r=0.963$, $n=48$, $p<0.01$), and SHR ($r=0.923$, $n=48$, $p<0.01$), indicating that BP values determined directly and indirectly accord each other even after the drug treatments.