24) Oscillations in Blood Pressure in Spontaneously Hypertensive rats by Radiotelemetry. Kazutoshi Komatsu, Hiroshi Kawamura, Michinobu Hatano and Kuniaki Otsuka* Second Department of Internal Medicine, Nihon University School of Medicine, Tokyo 173 and Department of Medicine, Tokyo Women's Medical College, Daini Hospital, Tokyo 116*.

(Purpose) The effect of environmental alteration have been investigated on the circadian rhythm of blood pressure in rats. However, the technic of chronic catheterization provides disruption of normal behavior, resulting in stress-induced artifact. Furthermore, maintaining patency of the catheter is difficult for long period of time. A new system has been developed which consists of an implantable radiotelemetry device, receiver and computer-based data acquisition system. This system allows us chronic monitoring blood pressure without stressors, usually associated with conventional system. Therefore, with this radiotelemetry system, we could study oscillations in blood pressure, heart rate and locomotor activity in free moving spontaneously hypertensive rats (SHR). **(Method)** Three male SHR and one age-sex matched Wistar-Kyoto rat (WKY) were monitored using the Dataquest III system (DataSciences, Minnesota, USA). Sensors for blood pressure (BP), heart rate (HR) and activity were implanted i.p. with an arterial catheter tips placed inside the abdominal aorta. The rats were transferred to plastic cages in an acoustic isolation cabinet lighted with a white fluorescent light (10W). A small fan of the cabinet ventilated fresh air with low level background white noise. Food and water were available ad libitum. Blood pressure, heart rate and activity were sampled and stored every 5 minutes to personal computer (J3100GT, TOSHIBA). Lighting schedule was changed. 1) 12:12 hour light-dark schedule. The light was kept on from 6:00-18:00 or 18:00-6:00. 2) Constant dark schedule. 3) Constant lighting schedule. Each lighting schedule continued for at least one week. 48-hour time series data was analyzed by the maximum entropy method (MEM) and the cosinor method using the personal computer (PC9801VX, NEC).

(Results) 1) Three parameters (BP, HR and Activity) in dark phase were significantly greater than those in light phase (SAP; 168.3 ± 0.7 vs. 157.5 ± 0.7 mmHg $p < 0.0001$ HR; 354.2 ± 2.8 vs. 306.2 ± 2.1 beats/min $p < 0.0001$ Activity; 15.9 ± 1.1 vs. 7.2 ± 0.8 $p < 0.0001$). There were positive correlation between three parameters. Especially, blood pressure was closely correlated with heart rate in light-dark schedule. 2) Three parameters were analyzed by the maximum entropy method (MEM) in light-dark schedule. MEM power spectrum disclosed the sharp peak suggesting a circadian rhythm in three parameters. 3) Three parameters were fitted by 24-hour cosine function similarly. There was no phase lag of circadian rhythm between three parameters. Acrophase of three parameters were seen in dark phase. 4) Under constant lighting schedule, heart rate and activity kept circadian rhythm. However, oscillation of blood pressure indicated infradian rhythm, but not circadian rhythm in SHR and WKY. 5) Under constant dark schedule heart rate and activity kept circadian rhythm. However, rhythm of blood pressure indicated ultradian rhythm. **(Conclusion)** Blood pressure, heart rate and activity were synchronized to 12:12 hour light-dark schedule and resolved circadian rhythm. However under constant lighting or dark schedule blood pressure didn't preserved circadian rhythm. Other parameters kept circadian rhythm. These data indicate possibility that the oscillator of blood pressure differs from those of heart rate and locomotor activity.