9) Electrocardiogram and Arrhythmias in Rats. Noboru Saito*, Toshio Ozawa*, Kazuo Nojima** and Hiroyoshi Takatsuji***. *Department of Geriatrics, Kochi Medical University, **Department of physiology, Kochi Medical University, *** Division of Experimental Service, Kochi Medical University, Nankoku, Kochi 781-51

We have recorded electrocardiogram (ECG) in rats, and succeeded in the productions of bradyarrhythmias by N₂ or H₂ inhalations in the anesthetized rats.

Male 7 Wistar kyoto rats (WKY) aged 7.1±2.3 months (M±SD), 5 stroke-resistant spontaneously hypertensive rats (SHRSR) aged 5.8±0.6 months and 7 stroke-prone SHR aged 7.1±0.4 months were anesthetized with intraperitoneal injection of 10% urethan solution in the dosis of one ml per 100g body weight. ECG of rats was recorded in supine positions using needle electrodes. Limb leads and chest leads such as V₁ to V₆ were recorded, in which V₁ was the inner side of third intercostal space and V₄ fourth intercostal space at left mid-clavicular line.

Blood pressure levels through the catheter into carotid artery, respiration curves by chest movements and ECG were recorded simultaneously on polygraph (Nihon Koden). Gas such as N₂ or H₂ was inhaled into the noses from gas bombe under constant pressure for about 20 to 30 seconds.

With respects to ECG, one female WKY aged 24 months showed normal findings, while one female SHRSR aged 20 months LVH and myocardial ischemic patterns of ST horizontal depressions in I, aVL or V₆, indicating diagnostic values of rat ECG. There was a significant correlation (r=0.83) between PQ intervals and aging in 38 male or female rats aged 4.5 to 29 months of three strains.

With respects to arrhythmias, almost all rats showed ST-T elevations, blood pressure lowerings and frequent respirations immediately before bradyarrhythmias by gas inhalations. When bradyarrhythmias occurred, gas inhalation was stopped. After stopping, systolic blood pressure levels tended to elevate until the peak. Respirations suspended transiently and then reappeared. ECG showed various arrhythmias and then returned to sinus rhythm. After sinus rhythm blood pressure levels and respiration curves returned to the previous states. For example in one male SHRSR aged 7 months, systolic blood pressure levels were lowered from 313±26mmHg to 93±12mmHg by gas inhalations, elevated to the peak of 362±16mmHg after gas stopping and returned to 325±25mmHg. Concerning to the occurrences of arrhythmias by gas inhalations, sinus arrest, sinoatrial block, second or third degree of AV block and nodal contractions were found frequently. Especially third degree of AV block occurred in 100% of SHRSR, in 80% of SHRSR and in 28.6% of WKY. Therefore, it was concluded that PQ intervals of ECG tended to prolong by aging, and that advanced degree of AV block occurred most often in SHRSR.

	Gas	WKY	SHRSR	SHRSP
Cases		7	5	7
Sinus arrest	N ₂	42.9	40	14.3
(%)	H ₂	28.6	60	14.3
Sinoatrial block	N ₂	28.6	20	42.9
(%)	H ₂	28.6	20	42.9
Second degree	N ₂	85.7	100	100
of AV block (%)	H ₂	42.9	80	57.1
Third degree	N ₂	28.6	80	100
of AV block (%)	H ₂	28.6	80	100
Ventricular premature	N ₂	100	40	85.7
contractions (%)	H ₂	42.9	40	42.9

N₂: N₂ inhalation, H₂: H₂ inhalation