46) Usefulness of Microdialysis System for Continuous Assay of Plasma Norepinephrine and Epinephrine under Stress Situation in SHR. Yoichiro Matsui, *Tomoe Nakata, *Sadayuki Sato, **Souichiro Sekiya, **Takeshi Tsutsumi and **Hirofumi Osada. Department of Physiology, Showa University School of Dentistry, Tokyo 142, *Department of Clinical Physiology, Kanagawa Prefectural College, Yokohama 241, **Division of Cardiology, Showa University Fujigaoka Hospital, Yokohama 227.

The level of plasma catecholamine (CA) is changeable as a result of various physiological factors and experimental procedures. Therefore, the change of plasma CA level should be monitored continuously throughout the entire course of experiment, including before, during and after a stress situation in the same animal. However, there has not been any reports of the continuously recording method of plasma CA level for long lasting period in the same animal.

The purpose of this paper is to examine the usefulness of a microdialysis technique in combination with HPLC-ECD system in order to measure continuously the basal levels and the stress-induced responses of norepinephrine (NE) and epinephrine (EP) in plasma of SHR and WKY.

Experiments were carried out on male SHR and WKY aged 16 weeks. The animal was initially anesthetized with urethane (450 mg/kg)-chloralose (45 mg/kg). To minimize movements, the animal was immobilized with gallamine triethiodide (20 mg/kg), and artificially respired. A coaxial microdialysis probe (molecular cut off 20,000 Da) was inserted into the jugular vein and perfused with saline. The dialysate was collected continuously every 20 min into a sample tube. The concentrations of NE and EP in the dialysate were measured by the HPLC-ECD system. A bipolar stimulating needle electrodes were inserted into the foot pad of hind limbs and constant current pulses (1 ms, 5 mA and 1 Hz) were applied for 20 min as a foot shock stress.

The assay system provided high sensitivity; the detection limit of NE and EP was only 1 pg. The recovery rate of the microdialysis probe was almost constant for long lasting dialyzation in the jugular vein. These findings provide that the microdialysis method with the HPLC-ECD system is useful for measuring continuously the basal levels and the stress-induced responses of plasma CA throughout the entire course of experiment without any change in the recovery rate of the probe.

The basal NE levels of SHR and WKY gradually increased within first 120 min and remained at a constant level for long period. The basal EP levels of both rats decreased to a critical detection level within 120 min. The average NE levels at constant phase were 4.7 pg/sample for SHR and 2.1 pg/sample for WKY, respectively. As the recovery rate of the probe did not change for long intravenous dialysis, the average basal levels of plasma NE can be estimated to be 278 pg/ml for SHR and 126 pg/ml for WKY, respectively. These values seem to be comparable with the level of plasma NE obtained by other method of CA assay, although a direct comparison cannot be made easily.

When the foot shock stress was applied to the animal, the NE response of SHR was greater than that of WKY. The increased NE level returned to the control level within 40 min after the secession of stress. However, when the basal NE level was extremely low, the responsiveness of plasma NE to the stress was poor even in SHR. These results suggest that the plasma NE response to stress are profoundly affected by various factors, probably reflecting the difference of animal condition and sympatho-adrenal activity by anesthetic condition or of the basal pool size of CA storage.