Thrombotic Tendency of Pial Vessels in SHRSP/Izm, Studies with He-Ne Laser-induced Thrombus Formation Technique. Takanori Noguchi¹⁾, Yasuto Sasaki¹⁾, Junji Seki²⁾ and Junichiro Yamamoto¹⁾ ¹⁾Laboratory of Physiology, Faculty of Nutrition, Kobe Gakuin University, Kobe 651-21, ²⁾Department of Biomedical Engineering, National Cardiovascular Center Research Institute, Suita 565.

SHRSP has been shown to have severe hypertension and high incidence of stroke. Although hypoaggregability of washed platelets has been reported in SHRSP, cerebral infarction and thrombosis in the cerebral vessels have been frequently observed after autopsy. Therefore, we have studied the thrombotic tendencies of SHRSP/Izm in the pial vessels with He-Ne laser-induced thrombus formation technique.

WKY/Izm, SHR/Izm and SHRSP/Izm were purchased from the Disease Model Cooperative Research Association. Rats were fed Japanese chow from Funabashi farm and given water ad libitum. Blood pressure of each rat was measured by tail-cuff plethysmography every other day. Rats at 4 and 16 weeks of age were used for measurements of red cell velocity and thrombotic tendency in the pial vessels. After anesthesia with pentobarbital (60mg/kg), the animals were tracheotomized and ventilated artificially. Polyethylene tubings were inserted into both femoral arteries and from one of the tubings blood pressure was measured and the other was used for collecting blood samples to measure blood gases and pH. Closed cranial window was formed on the center of right parietal bone. Red cell velocity was measured by the fiber-optic laser-Doppler anemometer microscope and then beam of He-Ne laser was irradiated on the pial arterioles and venules with diameters from 20 to 40 μm repeatedly for 10 sec and 20 sec interval until formation of occlusive thrombus. The number of laser pulses required for formation of occlusive thrombus was used for the index of thrombotic tendency in each strain. Blood sample was collected from abdominal aorta for the measurement of whole blood platelet aggregation and blood cell counts.

Blood pressure, thrombotic tendency, red cell velocity and whole blood platelet aggregation were not changed among the three strains of rats at 4 weeks of age. Blood pressure was increased significantly in SHR/Izm and SHRSP/Izm at 16 weeks of age. Numbers of laser pulses, red cell velocities and wall shear rates in SHR/Izm and SHRSP/Izm were significantly decreased comparing with those of age-matched WKY/Izm. Hypoaggregability of platelets in SHRSP/Izm was observed when low concentration of collagen was used for the agonist but not at high concentration.

These results suggested that in spite of hypoaggregability of platelets, high thrombotic tendency in SHRSP/Izm at 16 weeks of age might be resulted from low wall shear rate which reduced synthesis of nitric oxide and PGI₂ in the endothelium, causing acceleration of platelet adhesion onto the injured endothelial cells.