35) Comparative Studies of Relaxation in Vascular Smooth Muscles of SHRSP and Other Species by Ca Removal. Nozomu Kurozumi*, Keiichi Shimamura**, Tomoko Shimada**, Hideo Miyake**, Satoru Sunano**, Kozo Okamoto**. *Dept of Plastic Surgery, Kinki University School of Medicine, **Research Institute of Hypertension, Kinki University, Osaka-fu 589.

Considerable variations among the relaxation of various types of vascular smooth muscles have been presented. Frequently, the differences in the relaxation extend to variations within a given species, such as between WKY and SHRSP rats. Between these two types of rats, relaxation differences may be brought about by differences in the activity of Ca regulatory systems. The relaxations of K-depolarized vascular smooth muscles in response to Ca removal were examined to search for possible causative factors in relaxation differences.

Portal veins and aortae from SHRSP and WKY of 3 - 6 months age and from guinea pigs were used. Systolic blood pressure of WKY and SHRSP was 131.9 ± 12.0 mmHg and 241.5 ± 21.5 mmHg, respectively. Longitudinal strips of portal veins and helical strips of aortae were placed in organ baths containing modified Tyrode's solution kept at 37° c and bubbled with 95 % O₂ - 5 % CO₂. Responses were recorded isometrically with a force-displacement transducer. After equilibration for 1 hr, K contractures were induced by exchanging normal Tyrode's solution for high K-Tyrode's solution containing various concentrations of Na. The high K solution was then changed with a Ca-free media which had the same composition of Na and K as the contracting solution with or without EGTA. The time course of relaxation in the vessels was recorded and analyzed.

Differences in vascular wall thickness could not be a causative factor of the relaxation time differences between portal veins and aortae from guinea pigs. The relaxation period of the portal vein after Ca removal was less than 10 minutes, while that of aorta was over 60 minutes. The difference was too large to explain by differences in wall thickness, which were about 150 μ m in portal vein and 175 μ m in aorta, respectively. This holds true for the differences in portal veins and aortae from SHRSP and WKY as well. In comparisons between WKY and SHRSP rats, rate of relaxation induced by Ca removal were slower in SHRSP. Analysis of the relaxation curve of portal veins revealed that curves had three components. The 1st component of contraction in SHRSP portal vein obtained soaking in Ca-free, Na 12, K-Tyrode's solution was not significantly different from that of WKY portal vein. However, this component was easily effected by the existence of EGTA and became greater in degree in the presence of EGTA. This indicates that the 1st component may be related to loosely bound Ca. Relaxation from Ca removal occurred at a faster rate as the Na concentration of K-Tyrode's solution increased. This result suggests involvement of Na in the Ca efflux of portal veins in both the WKY and SHRSP. The 1st component of contraction of portal veins from SHRSP increased when Na concentrations of K-Tyrode's solution increased.

Regarding aortae, wide variation in the pattern of relaxation made it difficult to analyze the relaxation curves, though a tendency of slower relaxation in SHRSP was observed.

Thus, slower relaxation in response to Ca removal and greater influences of Na in relaxation was demonstrated in SHRSP. The difference in the 1st component of the contractions may be a cause of differences in relaxation.