35) Abnormal responses to the vasoconstrictor agents in isolated aortas from SHRSP, especially in relation to aging. Yumi Yoshimura, Noriko Murakami, Hiromichi Yamanishi, Atsuko Niwa, and Aritomo Suzuki. Department of Pharmacology, Kinki University School of Medicine, Osaka-fu 589.

It is well known that many factors participate in the development and maintenance of high blood pressure in SHR. Also, it is reported that the abnormal responses to vasoconstrictor agents may be a cause of hypertension of SHR. But, it is little unsettled whether the abnormal response is the heredity or is the second by the high blood pressure. Thus, in the present study, we investigated the responses to the some vasoconstrictor agents, noradrenaline, angiotensin II, prostaglandin E-2 and F-2 alpha, K^+ and Ca^{++} in the isolated aortas from SHRSP at younger and older ages, and also compared them with those from WKY.

Materials and methods: Either sex of SHRSP and WKY at 1.5, 3, 6 and 12 month (M) old was used. The rats were anesthetized with ether, and then the aorta was isolated. The preparation was cut spirally (20 mm in length and 3 mm in width) and was hung in the Magnus' instrument containing Locke solution maintained at 30°C. The change of tonus was recorded isometrically. A resting tension was 1.0 g. In the experiment of Ca^{++} -induced contraction the preparation was exposed to the Ca^{++} -free medium at 1 hour and the Ca^{++} was added to the high K^+ and Ca^{++} -free medium.

Results and discussions: The contractions by K^+ and Ca^{++} were larger in SHRSP than in WKY at the ages tested. The difference increased in accordance with aging. It is clarified that the contraction induced by K^+ is due to Ca^{++} entry and Ca^{++} release, and that the contraction induced by the exogenous Ca^{++} is maintained only by Ca^{++} entry. Thus, the results obtained here suggest that the increased Ca^{++} entry and Ca^{++} release exist in SHRSP at 1.5 M and that the increase was strengthened in accordance with aging. It is thought that the increased membrane permeability to Ca^{++} and the Ca^{++} release from membrane are the heredity and are accelerated by the extremely high blood pressure. The responses to noradrenaline and angiotensin II in SHRSP at 1.5 M were almost the same as those in WKY at 1.5 M. But the contractions gradually reduced in accordance with the aging in SHRSP, and the contractions in WKY increased with the aging. Thus, the contractions in SHRSP at 3, 6 and 12 M were smaller than those in WKY. It is thought that the reactivities to noradrenaline and angiotensin receptors were not different between SHRSP and WKY at 1.5 M, and that the decreased reactivities to receptors are produced by the second factor, including the extremely high blood pressure. But it is unclear whether these changes are due to the decreased receptor contents or the decreased Ca^{++} availability. The contractions produced by prostaglandin E-2 and F-2 alpha were not different between SHRSP and WKY at 1.5, 3, 6 and 12 M. Thus, it is clear that the prostaglandin receptor is not affected by the second factor. From these results obtained here, the following conclusions are obtained: (1) the increased Ca^{++} entry and Ca^{++} are the hereditary and is accelerated by the second factors, (2) the decreased reactivities to receptors are produced by the second factors, and (3) the changed reactivities to receptors are not always produced in the all receptors.