- 41) Influences of blood pressure and age on the tension oscillation of aortae of spontaneously hypertensive rats. Satoru Sunano, Fumiko Sasaki*, and Keiichi Shimamura. Research Institute of Hypertension*, and Faculty of Pharmacy, Kinki University, Osaka 589 Japan.

Vascular smooth muscles of hypertensive animals often exhibit tension oscillation in the absence of stimulants or in response to the application of stimulants. In the present experiments, influences of blood pressure and age of animals on the rate of occurrence of the tension oscillation were examined. Spontaneously hypertensive rats (SHR), stroke-prone SHR (SHRSP), malignant SHRSP (M-SHRSP) and control normotensive Wistar Kyoto rats (WKY) were used. Blood pressure of animals was higher in the order of WKY < SHR < SHRSP < M-SHRSP. Ring preparations (1.0mm wide) were made from thoracic aorta and tension changes were measured in a modified Tyrode's solution. The preparations were stimulated by applying high concentration of noradrenaline (10^{-5} M) or by applying acetylcholine (10^{-5} M) to the preparations precontracted in the presence of 5×10^{-7} M noradrenaline.

Preparations from WKY exhibited marked tension oscillations superimposed on the elevation of the basal tension in response to the stimulation by noradrenaline. The tension oscillation was blocked by verapamil (10^{-6} M). In endothelium-removed preparations, the contraction by noradrenaline was potentiated but no tension oscillation was observed. In preparations from younger SHR, tension oscillations similar to that of WKY were observed. The tension oscillation was less prominent in the preparations from aged SHR. In the preparations from SHRSP and WKY, the tension oscillation was less prominent even when the preparations were obtained from younger animals. Thus, the decrease in the rate of the occurrence of the tension oscillation with age was steeper in the preparations from rats with higher blood pressure.

Acetylcholine, applied during the course of noradrenaline-induced contraction, induced marked relaxation in the preparation from WKY. The relaxation was impaired as the age of the rats increased. The increase in the relaxation was steeper in the preparation from rats with higher blood pressure. Acetylcholine also induced tension oscillation in the preparation from WKY. The rate of the occurrence of the tension oscillation was smaller in the preparation from aged hypertensive rats. The decrease was more prominent in the preparation with higher blood pressure.

The tension oscillations observed in the present experiment are thought to be initiated by certain factor(s) released from endothelium. The release of the factor(s) is reduced age-dependently in the preparation from hypertensive rats. Age- and blood pressure-dependent impairment of the endothelium is the rate determinant factor of the impairment and thus the decrease of the rate of the occurrence of the tension oscillation.