1) Relation between Glutathion Peroxidase in Erythrocytes and Development of Stroke in SHRSP. Tetsuo Murakami, Masahiko Soga and Hajime Yoshizumi. Department of Food and Nutrition, Faculty of Agriculture, Kinki University, Nara-shi 631

The authors demonstrate that the activity of GSH-Px in erythrocytes of SHRSP decreased before the TBARS levels in serum was elevated (Murakami et al., Jap Heart J 30: 603, 1989). The change of the GSH-Px activity in erythrocytes may be used as a biochemical sign for foreknowledge of development of cerebral stroke lesion in SHRSP. The present study was designed to investigate the correlation between the value of GSH-Px activity in erythrocytes and extent of cerebral change.

METHODS (Experiment 1) Male or female SHRSP of hypertensive stage with the blood pressure of over 230 mmHg were used. After sacrificing rats at various activity levels (15 to 30 units/ml blood) of GSH-Px, the existence of cerebral lesion were confirmed by autopsy. (Experiment 2) Sixteen weeks-old male SHRSP showing blood pressure over 230 mmHg were used and were fed stock chow diet. When the GSH-Px activity in erythrocytes was lowered to 25 to 22 units/ml blood, these rats were divided into 3 groups: the first group was fed control diet (Funabashi sp) continuously, the second group was given fish diet (22% as crude protein) and the third group was administered with Hydralazine, an antihypertensive agent. Drinking water containing 60 mg Hydralazine/liter was given *ad libitum* with control diet. (Experiment 3) In NaCl loading experiment, SHRSP were 20 to 40 weeks-old male rats and were fed stock chow diet (Funabashi sp). For NaCl loading, drinking water containing 1% NaCl was given *ad libitum* instead of tap water. When GSH-Px activity in erythrocytes lowered to 25 to 22 units/ml blood, diet was switched from stock chow diet to experimental diet, fish diet, Se diet (Na_2SeO_3 , 5 mg Se/kg), Mg diet (MgO , 6 g/kg) or Ca diet (CaHPO_4 , 9g/kg); 1% NaCl loading was continued after the diet switch. Blood pressure and GSH-Px activity were measured once a week during treatment. Autopsy was performed soon after natural death.

RESULTS (1) In order to examine whether lowered of GSH-Px activity is caused by incidence of cerebral stroke lesion, existence of cerebral stroke was examined in SHRSP sacrificed at various levels of GSH-Px activity. When the GSH-Px activity was lowered to lower than 22 units/ml blood, incidence of stroke lesion in SHRSP was so high as 98%. (2) SHRSP fed continuously control diet showed markedly low GSH-Px activity and died within 24 days. When the GSH-Px activity of SHRSP was lowed to 25 to 22 units/ml blood, the diet was switched to the fish diet or the hydralazine administration was started. GSH-Px activity of these SHRSP returned to 32 to 35 units/ml blood after 3 weeks, the life-span was markedly elongated. On the other hand, in the group receiving the experimental treatment after the GSH-Px activity was lowered to 20 units/ml blood, the recovery of activity was not found and there was no increase in life-span. (3) In the group receiving continuous loading of 1% NaCl with control diet, lowering of activity and reduction of body weight were observed and most rats died within 10 days; in these rats the incidence rate of cerebral stroke lesion was 100%. The Se diet, Ca diet and Mg diet which were used by switching from control diet had no effect on the recovery of GSH-Px activity, but the activity in SHRSP in which diet was switched to fish diet returned to 30 units/ml blood after 2 weeks.

DISCUSSION Lowering of GSH-Px activity in erythrocytes was found to be closely related with incidence of stroke lesion in SHRSP. Such lowering of GSH-Px activity caused by cerebral stroke could be returned to normal level by improvement of proteinous nutrient or antihypertensive treatment at a proper time. These results indicate that the GSH-Px activity in erythrocytes may serve as an indicator of incidence of stroke lesion.