Effect of Sesamin on Lipid Metabolism in SHRSP Fed Safflower Oil Fatty Acids as a Lipid Source. Hiroshi Ogawa¹, Kazunobu Kawata², Masatuna Tasaka¹, Tetsuo Murakami² and Hajime Yoshizumi². ¹Department of Hygiene, Kinki University School of Medicine, Osaka 589; ²Department of Food Science and Nutrition, Kinki University, Nara 631 JAPAN.

INTRODUCTION: In the preceding paper, we have reported that sesamin, one of lignans existed in the sesame oil, exerts a favorable effect on the serum and liver cholesterol metabolism of SHRSP. Taking account of the physiological function of sesamin reported by Shimizu *et al.* (J Am Oil Chem Soc 66: 237, 1989), there is a possibility that the composition of fat source could influence the lipid-regulating effect of sesamin. In the present paper, we used olive oil which is rich in monounsaturated fatty acid (oleic acid, 18:1 n-9) and safflower oil which is rich in polyunsaturated fatty acid (linoleic acid, 18:2 n-6) as fat source, and investigated the difference of efficiency of the diets on lipid metabolism in the serum and the liver of SHRSP in the presence or in the absence of sesamin.

MATERIALS AND METHODS: A ether-defatted SP diet (Funabashi Farms, Kyoto) containing 5% olive oil by weight was used as control diet. Experimental diets were prepared by the addition of 4% safflower oil and 1% olive oil to the ether-defatted SP diet with or without sesamin (1.0%) by weight. Thirty-week-old male SHRSP were used with free access to the diet and water. After 5 weeks of feeding, whole blood was obtained from the abdominal aorta under light ether anesthesia after fasting overnight, then the liver was immediately excised. Serum lipoprotein fractions were separated by stepwisely density-gradient ultracentrifugation (TL-100, Beckman). Liver lipids were extracted according to the method of Folch *et al.* The contents of cholesterol (CH), phospholipid (PL), triglyceride (TG) and apolipoproteins (apoA-I, A-IV, B and E) were measured by the same method as mentioned in the previous paper. The activities of cholesterol 7 α -hydroxylase (7 α -hydroxylase) and acyl-CoA:cholesterol acyltransferase (ACAT) in the liver microsomes were determined by the HPLC methods mentioned elsewhere.

RESULTS AND DISCUSSION: There was no significant difference in blood pressure and the incidence of cerebrovascular diseases among the three experimental groups. In the serum of safflower oil group, compared with the control group, the content of TG significantly decreased without affecting lipid contents in the liver, which was associated with the decreases in CH, PL and TG contents in the VLDL fraction and the decrease in TG content in the HDL fraction. This result suggests that moderate intake of linoleic acid may decrease the synthesis and/or secretion of VLDL in the liver.

In the case of the safflower oil diet with sesamin, the concentrations of serum CH, PL and apolipoproteins A-I, A-IV, B and E significantly increased, while no change in serum TG level was observed, compared with the other two groups. These changes were due to the large increase of HDL subfractions, apoE-HDL and apoA-I-HDL, judging from the increases in CH, PL and apoA-I contents in the HDL fraction and the increase in apoE content in the LDL and HDL fractions. In the liver of SHRSP fed the safflower oil diet with sesamin, the relative weight and PL content were significantly higher, whereas TG content was significantly lower in comparison with the other two groups. In addition, the hepatic microsomal ACAT activity was also markedly lower than the other two groups. These results are in good agreement with our previous report, and those indicate that a possible change of linoleic acid metabolism could be partly responsible for the effectiveness of sesamin. Consequently, we confirmed the beneficial effect of sesamin on the serum and liver lipid metabolism. However, further study will be necessary to elucidate the effect of sesamin on the liver lipid metabolism.