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Effect of Spirulina on Salt Sensitive Hypertension

Yuka Ishihara[1], Nobuko Tominaga[1], Osamu Hayashi[2], Kyoko Ishii[2], Masami Nishina[1]

[1] Saitama Medical University, [2] Kagawa Nutrition University

Summary

We investigated the interrelationship between hypertension and several metabolic pathways, and beneficial effects of phycocyanin against hypertension. The previous study has demonstrated that phycocyanin prevents hypertension in a spontaneously hypertensive/NIH-corpulent rat. In this study, we used a salt-sensitive hypertension model (DIS/Eis) rat and compared metabolites in sera of the rat fed the food including 8%, 4% and 0.3% NaCl, respectively. Moreover we investigated the effects of phycocyanin against the hypertension in the rat which was fed phycocyanin with the food.

The 0.3% food did not affect blood pressure of the rat while the 8% and 4% food increased it. As a result, the 8% and 4% food caused to the rat hypertension. Phycocyanin did not affect against the hypertension of DIS/Eis rat induced with 8% and 4% NaCl, respectively.

Capillary electrophoresis mass spectrometry with time-of-flight (CE-TOFMAS) analysis identified 224 metabolites from the serum of the DIS/Eis rat. The analysis showed that 11 metabolites were present in significantly ($p < 0.05$) lower concentrations in the DIS/Eis rats (4% and 8% NaCl), than in the DIS/Eis rat (0.3% NaCl). A multivariate statistical technique, principal component analysis, was used to process the data from CE-TOFMAS. The compounds of positively and negatively high loading in principal component including Asparagine, Citrulline, Imidazole-4-acetic acid, Histidine, Hydroxyproline, Ornithine, Proline, Glycine, 5-Hydroxylysine, Methionine and Pipecolic acid were involved in Urea cycle and Lipid metabolism, and those related amino acid metabolisms.

These results suggest that the metabolic-pathways in above the metabolisms are closely related to salt-sensitive hypertension.