Effect of Spirulina on Salt Sensitive Hypertension

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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.