

Proteomic identification of stress biomarkers from serum proteins for evaluation of functional food

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Functional foods are recently remarked for the prevention of stress-related diseases and the development of such foods is more desired for the maintenance of human health. However, the molecular biomarkers are required for the evaluation of the developed foods. We focused on “stress-induced gastric ulcer” as a model of stress-related diseases, and developed a hydrolyzed pork meat (HPM), probably useful as a functional food, which can prevent the disease caused by excess stress. In order to identify stress-induced gastric ulcer-related biomarkers, we analyzed the serum proteins from HPM-fed and -unfed rats before and after stress treatment by proteomic approaches. Proteins from each serum were fluorescence-prelabeled and applied to two-dimensional difference image gel electrophoresis, and the protein spot volumes obtained were statistically analyzed by Decyder software program. Of over 2,000 protein spots detected, approximately 100 spots were 1.5-fold changed or more before and after stress treatment in a rat with stress-inducing gastric ulcer. So far, we successfully identified several protein species of these stress marker candidates by MALDI-TOF/TOF-MS. When compared to the HPM-fed rat before and after stress treatment, some of the protein spots on the gel became obviously smaller in HPM-fed rat than HPM-unfed rat. These proteins may be useful as stress biomarkers for the evaluation of HPM as well as for diagnosis of gastric ulcer.

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