Promotion of Omics-Based Research of Functional Food

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Abstract :

The understanding of mechanisms underlying the effects of nutritional alterations as well as consumption of functional food factors is still an issue of priority in nutrition and food science. Very promising strategy to accomplish this would be exhaustive quantification of biological molecules, as called transcriptomics, proteomics, and metabolomics, whose target molecules are mRNAs. proteins, and metabolites, respectively. In mv presentation the effectiveness of such 'omics' approach, especially of transcriptomics, for food and nutrition science will be discussed. In these studies, global gene expression analyses were performed using animals consuming different diets or cultured cells treated with food factors. In many of such studies the amount of information is extremely large and hard to manipulate. We are in good cooperation with informaticians; it enables us to effectively analyze and interpret data. Our group has constructed and is maintaining a database specialized in "omics" data and relating publications in the field of food and nutrition science (Nutrigenomics Database, http://www.nutrigenomics.jp). For the effective comparison and interpretation of omics data, the response at the omics level to the alteration of basic nutritional conditions should be useful as reference data. We are currently accumulating such reference information. Among such attempts, the alterations of transcriptome and proteome of rat liver in response to mild caloric restriction will be shown. These results also provided with the information on possible mechanism underlying the beneficial effects of caloric restriction. In regard to a specific food factor, I will briefly show our result on the transcriptome analyses of the anti-diabetic effects of sov isoflavone.