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EDITORIAL

Editorial

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Dietary factors are involved either directly or indirectly in several human disorders. There is increasing evidence that certain mutation-related diseases (e.g., phenylketonuria) can be prevented by avoiding exposures to a recognized dietary risk factor, while many others (e.g., scurvy) can be prevented by intake of adequate amounts of specific nutrients that are required for essential metabolic reactions and/or by fortifying the defense mechanisms of the host organism. The identification of bioactive food components that affect human health conditions has been recently investigated using "-omic" technologies such as genomics, proteomics, metabolomics and transcriptomics. This discipline of nutritional science, called "nutrigenomics", is defined as the application of high-throughput genomic tools to study the interactions between bioactive dietary components and the genome, and is, therefore, a multidisciplinary science combining nutritional research with functional genomics. A wide variety of phytonutrients have been found to influence the expression of distinct set of genes, and for some of them, the underlying cellular and molecular mechanisms have been elucidated.

Nutrigenomics is also linked to nutrigenetics, which is the study of the genetic basis of the different individual response to the same nutritional stimulus. Thus, there are some variations in the susceptibility of specific foods among and within populations with similar dietary patterns. Such individual and racial differences in the risk of specific types of diseases, especially cancer, are mainly due to polymorphisms in distinct sets of genes. Single nucleotide polymorphisms (SNPs) in specific genes can influence the metabolic response to diet. It is interesting to note that the majority of genetic polymorphisms and dietary patterns that influence one type of pathogenic conditions (e.g., inflammation) also affect the risk of other disorders, such as obesity and cardiovascular disease.

Dietary optimization based on nutrigenomic and nutrigenetic approaches will provide useful information about the biological effects of food components, and also about the functional consequences of genetic variance in determining risks of some metabolic disorders. Such information will aid in preventing specific metabolic disorders, degenerative diseases and certain forms of cancer by formulating *personalized* diets that take into account not only the nutritional status but also the genotype of individuals or of a given population, as a whole.

In recognition of such future developments of nutrigenomics, the Ministry of Science and Technology (MOST) of the Republic of Korea has supported a national project on Biofoods and Food Components. A group of scientists participating in this program organized a symposium on February 14, 2007. The title of the symposium was "Genes & Nutrition: New Era of BioFood", and the venue was Korea Food Research Institute. In a period of exciting advancement of science in the area of nutrigenomics and nutrigenetics, the symposium provided the audience with state-of-the-art information regarding the novel physiologic effects of some dietary components with proven health effects and the underlying molecular and cellular mechanisms of such effects. Approximately 250 food scientists,

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dietitians, pharmacists, and clinicians participated in the symposium that provided an excellent forum introducing the latest advances in this exciting and rapidly growing field of research.

Out of the input from the Editors-in-Chief of the Journal Genes and Nutrition, 12 articles (1 review and 11 research papers) were earmarked for inclusion in this special issue.

The success of the symposium is due to the tremendous contributions from many dedicated scientists who have been involved in the aforementioned project. The organizers express again their deep appreciation for the generous support from the Ministry of Science and Technology through the Korea Science and Engineering Foundation (KOSEF).