Nutritional Genomics and Proteomics in Cancer Prevention

Introduction

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These proceedings are the culmination of information shared at a conference entitled "Nutritional Genomics and Proteomics in Cancer Prevention" that was convened on September 5 and 6, 2002, at the National Institutes of Health in Bethesda, MD. The conference was designed to highlight molecular mechanisms by which several nutrients may influence cancer prevention and to provide genomic and proteomic models that may be useful for future nutrition investigations.

The emerging area of nutritional genomics and proteomics in cancer prevention is increasingly recognized as a significant component of a health-related research program. The manuscripts included in this supplement are intended to summarize the current state of knowledge, identify gaps in the knowledge and encourage the use of genomic and proteomic approaches in future nutrition research. We believe that these proceedings will serve as a stimulus of research to advance the field of nutrition and cancer prevention. Moreover, it is our hope that new knowledge will evolve in this field and be applied toward the promotion of human health and cancer prevention.

Information sharing began at the conference with overviews about individual responsiveness to the diet, genetically modified animal models and gene profiling. The program continued with presentations that focused on the importance of nutritional genomics in various cancer processes and the involvement of nutritional proteomics in cancer prevention. A variety of dietary constituents including (-) epigallocatechin-3-gallate (EGCG), indole-3-carbinol, genistein, butyrate, resveratrol, selenium, retinoic acid, vitamin D, vitamin E and lipids were discussed in terms of their impact on various cancers such as breast, prostate, and colon cancer. Overall, the presentations made at the conference showcased alterations in transcriptional, translational and post-translational events caused by variations in the intake of essential and nonessential nutrients and how these changes are linked to apoptosis, cell cycle control, cell signaling, nuclear regulation and hormonal homeostasis. The manuscripts within this supplement support the wealth of evidence that diet is intrinsically linked with human cancer risk and tumor behavior. The multiple sites of interaction between diet and cancer have made progress toward elucidating molecular mechanisms extremely challenging. Unraveling the effects of dietary constituents on genes and their encoded proteins is essential for identifying those who will and will not benefit from intervention strategies.

One of the many benefits of this conference was that it brought together individuals from various disciplines with the goals of encouraging collaboration, stimulating active discussion and promoting the exchange of ideas for further research involving genomics, proteomics and nutrition. The Nutritional Science Research Group of the Division of Cancer Prevention at the National Cancer Institute is developing strategies that will promote research to advance the understanding of mechanisms and targets for bioactive food components in cancer prevention. Additional outcomes of the conference include the proceedings in this Journal supplement and an executive summary, which is available online (http://www3.cancer.gov/prevention/ngpcp2002/index.html). Discussions about opportunities and challenges for future nutrition research in cancer prevention are listed in the appendix of this Journal supplement. It is our hope that various individuals and groups will utilize these suggestions to advance this area of investigation.

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