Introduction to and Perspectives from the Symposium on Nutrient Disease Relationships: Closing the Scientific Knowledge Gap

Leila G. Saldanha and Mary Ann Johnson

Scientific Consultant, Alexandria, VA and *Department of Foods and Nutrition, University of Georgia, Athens, GA

ABSTRACT The U.S. Congress through the Nutrition Labeling and Education Act of 1990 authorized the use of health claims on food labels. These claims describe the relationship between a substance or a disease and a health-related condition. In addition, Congress directed the U.S. FDA to apply a significant scientific agreement standard in approving these claims. Since 1990, the FDA has approved several health claims, but has also denied claims that did not meet this standard. The purpose of The Nutrient Disease Relationships: Closing the Scientific Knowledge Gap symposium was to provide researchers with perspectives to keep in mind when designing studies that examine the relationship between a nutrient and a disease or health-related condition, to help close the scientific knowledge gap for nutrient-disease relationships of scientific, consumer, and public health interest.


KEY WORDS: • health claims • nutrient/disease relationships

The Institute of Medicine (IOM) in 2002 published a report entitled Evolution of Evidence for Selected Nutrient and Disease Relationships (1). The report, commissioned by the FDA, asked the IOM to appoint an expert panel to review selected diet and health relationships identified as important in the 1989 Diet and Health: Implications for Chronic Disease Risk report and to determine the extent to which subsequent scientific evidence from peer-reviewed literature agreed with the preliminary conclusions reached in the report (2). The Nutrition Labeling and Education Act (NLEA) identified 10 diet and health relationships for initial consideration, and the FDA utilized the 1989 Diet and Health report as the basis for evaluating these relationships (3). On the basis of criteria established by the IOM expert panel, the change in confidence in a positive association increased for 3 nutrient-disease associations, decreased for 3, and remained unchanged for 5 other associations evaluated by the panel. Key findings presented in the Evolution of Evidence for Selected Nutrient and Disease Relationships report included the following: 1) confidence in nutrient-disease relationships can change, often in an unexpected direction; 2) no pattern of evidence clearly predicts change in the confidence of relationships, particularly those initially deemed uncertain or promising; and 3) large randomized trials have the greatest effect in changing the level of confidence in a nutrient-disease relationship. Given the significance of these findings, this symposium was structured to provide researchers with perspectives to keep in mind when designing studies that examine the relationship between a nutrient and a disease or health-related condition. The symposium also reviewed 2 nutrient-disease relationships and identified research required to close the gap in our scientific knowledge about these relationships.

The symposium consisted of 3 presentations and a panel discussion. The first presentation, by Joanne Lupton, focused on how evidence-based systems work and how research studies attempting to show the relationship between a food/substance and a disease are evaluated. Lupton emphasized that evidence-based systems designed to evaluate the strength of relationships between foods, food substances, and nutrients and health outcomes are used to set the Dietary Reference Intakes and the Dietary Guidelines, as well as by professional societies, such as the American Dietetic Association, the American Heart Association, and the American Diabetes Association, to establish position statements.

The next presentations by Gerald Combs and Ishwarlal (Kenny) Jialal provided a critical review of the science and scientific knowledge gaps related to 2 nutrient-disease relationships, selenium and cancer and vitamin E and heart dis-
ease. Combs noted that the body of research on the role of selenium in cancer prevention is more consistent in animal tumor and cell culture models than in observational studies. Further, only a limited number of the clinical intervention trials were designed in a way that would lend them to the evidence-based review type system to substantiate health claims for foods. For example, some trials were conducted in “diseased” populations (e.g., hepatitis B surface antigen-positive), whereas others were among populations considered malnourished. Combs recommended that future research focus on determining the chemical forms of selenium in foods and tissues, the status markers for selenium that are relevant to cancer, and the minimal dose that can safely and efficaciously decrease cancer risk.

Jialal and Devaraj reviewed several randomized control trials that examined the efficacy of vitamin E for primary and/or secondary prevention of cardiovascular disease. The authors noted that there appears to be a greater protective effect of vitamin E when it is provided in the \textit{d}-\alpha-tocopherol rather than the \textit{dl}-\alpha-tocopherol form. Confirming this finding may explain the conflicting results of randomized control trials on the effects of vitamin E in primary and secondary prevention of cardiovascular disease.

In the panel session, Paula Trumbo presented the FDA’s evaluation of the selenium and cancer and vitamin E and heart disease health claims. The FDA reviewed these 2 nutrient-disease relationships, but health claims were denied because the FDA concluded that significant scientific agreement among qualified experts did not exist to support these relationships. Trumbo presented the rationale for this decision and why a qualified health claim was permitted for selenium and cancer but not for vitamin E and heart disease. In 2003, under a new system, the FDA started permitting a new category of claims termed qualified health claims that did not meet the significant scientific agreement standard authorized under NLEA (4). Panelist Victor Fulgoni presented a food industry perspective on health claims. Priorities of the food industry include consumer-relevant nutrition and health messages that are scientifically substantiated. Fulgoni emphasized the need for appropriately designed trials that would satisfy the evidence-based regulatory frameworks.

Ideally, these proceedings will encourage research efforts designed to support the health benefits of foods and dietary supplements to consumers. The potential health benefits are enormous, especially for products targeted toward the major causes of morbidity and mortality in the United States. Heart disease kills >700,000 Americans annually, accounting for 29% of all deaths, and \~66% of heart attack patients do not make a complete recovery (5). Cancer kills >560,000 Americans annually, and about one-third of cancer deaths are related to poor nutrition, physical inactivity, obesity, or other lifestyle factors and thus could be prevented (5). Evidence-based regulatory frameworks can stimulate product innovation and give consumers additional healthful choices in the marketplace (4). Such health claims will provide consumers with scientifically supported information about the health and nutritional benefits of foods and dietary supplements.

LITERATURE CITED