

17 Improving Communication About New Food Technologies

David Greenberg and Mary Graham

The debate about genetically engineered crops provides an early warning signal that the U.S. public is apprehensive about the benefits and risks associated with new food technologies. It also indicates that the national regulatory system that is charged with ensuring clear communication about food health and safety has difficulty navigating these issues when technology is leaping ahead. Much more is at stake as manufacturers begin to produce foods that claim to prevent or fight specific diseases. Foods offering health benefits constitute one of the fastest-growing segments of the retail market. The first foods designed specifically to fight diseases have already reached grocery shelves. The next generation of disease-fighting foods could offer huge benefits to public health, but they are likely to be intertwined with unfamiliar issues of effectiveness and safety. Public confusion could either block those benefits or underrate problems associated with these technologies.

There is an immediate need to address the public's confusion while longer-term strategies gain ground. The proliferation of health-related foods and supplements has already filled grocery aisles with a cacophony of claims. Federal rules that control such claims are based on categories that may no longer reflect market trends. But regulatory change will take time to accomplish. Rules are designed to change slowly in

David Greenberg is a doctoral candidate at MIT and holds a graduate research fellowship from the National Science Foundation. Mary Graham is a fellow at the Kennedy School of Government at Harvard and the Georgetown University Law Center. Reprinted with permission from Issues in Science and Technology, Greenberg and Graham, "Improving Communication About New Food Technologies" Summer 2000, pp. 42–48. Copyright 2000 by the University of Texas at Dallas, Richardson, TX.

order to provide stability. In the interim, government, business, and other expert groups can take three steps to assist consumers. First, they can broaden public disclosure of the bases for disease-fighting claims and government decisions. Second, they can standardize terms and specify hierarchies of known effectiveness and safety to provide guidance to consumers. Third, they can use information technology, which is also leaping ahead, to provide the public with road maps through the maze of issues raised by our expanding knowledge about food and health.

New Doubts About Food

The sudden volatility of issues surrounding genetically altered crops is an important indication of confusion about new food technologies. In general, Americans have a reputation for being more enthusiastic about new technology and more trusting of government protections than are consumers in Europe, where recent scares concerning “mad cow” disease and contamination of Belgian food with dioxin (neither of which had anything to do with genetic engineering) have heightened fears. Until 1999, U.S. consumers seemed to be living up to that reputation. The U.S. public has demonstrated its acceptance of genetically engineered medicines for more than a decade. For the past five years, foods produced from genetically altered crops have been commonplace on grocery shelves. By 1999, about 70 million acres of transgenic crops were under cultivation in the United States. A recent survey by the International Food Information Council found that 60 percent of the nation’s processed food included genetically engineered ingredients. But suddenly, after protests by a variety of activist organizations in 1999, 30 U.S. farm groups have warned their members about the economic risks of planting such crops, and companies such as Frito-Lay and Nestle banned genetically engineered crops from their products in response to customer confusion.

New advances in food technology are part of a long-term shift in the market from foods that prevent nutritional deficiencies toward foods that are capable of reducing risks of specific chronic diseases—a shift that has complicated the task of communicating with the public about health-related benefits and risks. In the first part of the 20th century, foods were enhanced mainly to make up for what was missing in the average diet. Goiter, rickets, scurvy, and other illnesses caused by dietary deficiencies were relatively common in the United States. To pre-

vent them, milk was fortified with vitamin D, cereal grain with vitamin B, and flour with other nutrients. After World War II, when such deficiencies were no longer widespread, attention turned instead to the relationship between diet and reducing risks from chronic illnesses, especially heart disease and cancer. Together, those two diseases are responsible for more than a million deaths a year in the United States.

As advances in science established links between consuming certain foods and reducing the risks of disease, companies produced and promoted familiar ingredients for their health benefits. By 1990, nearly a third of food advertising dollars was spent on health-related statements. In the past several years, ads and labels have informed shoppers that calcium-fortified orange juice can help ward off osteoporosis; that low-sodium foods can help reduce high blood pressure; that foods with added folic acid can help pregnant women prevent spina bifida and other neural tube birth defects in their children; and that products with added soluble fiber, such as oat bran or psyllium, can help reduce the risk of heart disease. In addition, hundreds of brand extensions for healthy foods have been introduced. The postwar growth in consumer choice, which saw an increase in the number of shelf items from 1,500 in 1951 to 40,000 in 1999, reached the arena of foods with specific health benefits.

Recently, companies have taken another step by introducing familiar foods with disease-fighting ingredients derived from substances that were not previously eaten. In May 1999, a subsidiary of Johnson & Johnson began marketing Benecol margarine, which contains stanol esters from pine trees as a cholesterol-lowering ingredient. Lipton's Take Control spread includes a similar substance. The Swiss pharmaceutical company Novartis is working on foods that contain a substance derived from wood pulp that is supposed to lower cholesterol. Although they are not challenging the effectiveness of these products, some consumer groups have questioned their safety for specific segments of the population. They have pointed to the absence of long-term studies proving that such ingredients are safe for pregnant women when taken in larger doses than recommended or when eaten in combination with other drugs or supplements.

The proliferation of products that add dietary supplements to familiar foods raises more confusing issues. Dietary supplements are defined as products containing vitamins, minerals, herbs, or other substances that do not constitute ordinary foods in themselves. To capitalize on

public perception of their health benefits, some companies are suggesting that chewing gum containing phosphatidylserine will improve concentration, that juices with kava added can reduce anxiety, that soups with echinacea can boost the immune system, or that candies with antioxidants can help the heart. However, a recent position paper published by the American Dietetic Association (ADA), a prominent organization representing nutrition professionals, concludes that for “the majority of these products, the evidence for their structure/function claims is currently limited, incomplete, or unsubstantiated.” These claims are particularly problematic because health risks associated with consumption of large quantities of these substances in various forms are little understood. Studies have recently shown possible harmful effects of consuming antioxidants indiscriminately, for example. Such evidence highlights the need for better communication about what is known and what is not known about the health effects of supplement-food mixtures.

Increasing Complexity

The next step is foods that are bioengineered specifically to prevent or slow the progress of disease. The convergence of two scientific advances creates the potential for customers to choose from a variety of familiar foods aimed at specific diseases for which they are at risk. The successful mapping of the human genome, now virtually complete, will make it possible to test individuals for genetic conditions linked to chronic diseases such as diabetes, heart disease, or cancer. At the same time, advances in understanding of the genetic structure of plants and animals open the way for researchers to discover or design foods that help prevent or treat those diseases. These potential health benefits, which ultimately could include a broad shift in health care from treatment toward prevention, as well as questions about effectiveness and safety, will be unfamiliar to most shoppers.

These foods are on their way to market. Next year, Monsanto will begin the phased introduction of products containing two new “vitalins,” ingredients that promote vitality by reducing risk of disease. One is a cholesterol-lowering compound that will initially be produced by conventional means and sold in pill form and may later be included in foods that are genetically engineered. The other is a product that helps reduce blood pressure and that may be introduced initially in bars

and shakes. Still in research labs are genetically engineered fruits and vegetables to fight diseases such as cancer, osteoporosis, and cholera. Edible vaccines for diseases such as hepatitis B are in clinical trials. As these technologies progress, the clear distinction between foods and drugs—a distinction that both the public and the regulatory system have relied on—is beginning to break down.

These advances are moving quickly enough that businesses are already restructuring to bring to them to market. In December 1999, Monsanto, which has been a leader in the genetic engineering of crops, merged with Pharmacia & Upjohn, a major pharmaceutical company. In February 2000, Novartis launched a joint venture with the Quaker Oats Company to develop foods with specific health benefits. The market for foods that offer such benefits is estimated at \$15 billion to \$17 billion and is projected to grow at a rate of at least 10 percent a year. Juan Enriques and Ray A. Goldberg have predicted the future path of these corporate changes in the March 1999 issue of the *Harvard Business Review*. In response to the life sciences revolution now beginning, they suggest that “the boundaries between many once distinct businesses, from agribusiness and chemicals to health care and pharmaceuticals to energy and computing, will blur.”

Ultimately, however, the customer is king. Whether and how fast such advances reach supermarket shelves depends entirely on public acceptance. Recent experience in marketing disease-fighting foods suggests that the road to such acceptance may not be smooth. In November 1999, Kellogg stopped test-marketing its “Ensemble” line of foods after only nine months, while reaffirming its commitment to continue to develop such foods. The line included frozen foods, cereals, and pastas that were enhanced with psyllium to help reduce the risk of heart disease. The makers of Benecol margarine announced recently that they would redirect promotion of the product toward physicians rather than the general public. It is not clear whether these decisions reflected customers’ reaction to the products’ relatively high prices or to confusion about their benefits.

Recent surveys have shown that more than two-thirds of shoppers usually choose foods for health reasons and read food labels most of the time. Findings by HealthFocus, Inc., a consumer survey firm, also indicate that 78 percent of shoppers are looking for foods that reduce the risk of disease. However, 47 percent report that they don’t believe many health claims on packages, even though nearly three quarters under-

stand that laws require that such information be accurate. Mistrust matters. Shoppers may lose opportunities to improve their health or may make choices that speed the progress of disease or create other risks.

As more products proclaiming health benefits are introduced, grocery aisles are becoming a wilderness of confusing claims. Enhanced foods whose health benefits have strong scientific support—that low-fat high-calcium foods may reduce the risk of osteoporosis, for example; or that psyllium-containing foods may reduce the risk of coronary heart disease—share shelf space with soups laced with St. John’s wort “to promote a healthy mood,” an “herbal brain power cereal,” and snacks that contain an herb called cat’s claw touting unsupported longevity increase. In its recent position paper, the ADA concludes that “the proliferation of claims on a variety of products has created an environment of confusion and distrust among health professionals and consumers.”

Are Rules Adequate?

Some current confusion also stems from growing problems with the system of national rules that is intended to ensure that the public receives clear and truthful information about the benefits and risks of food products. For nearly 100 years, the federal government has overseen communication by companies to shoppers about food characteristics related to human health. In the 1990s, Congress passed three major laws in an effort to keep pace with changes in health sciences, marketing of food and supplement products, and consumer demands. By the end of the decade, however, the adequacy of government rules was being questioned by industry, consumer groups, and government officials themselves. Advances in products blurred even newly created regulatory categories, and some evidence indicated that some of the subtle distinctions among permitted claims on which government rules were built were meaningless to consumers.

First, Congress passed the Nutrition Labeling and Education Act (NLEA) of 1990 in response to companies’ unprecedented and sometimes unsubstantiated statements about foods’ disease-fighting properties. The law required that disease-fighting claims, also known as health claims, be preapproved by the U.S. Food and Drug Administration (FDA) and meet a standard of “significant scientific agreement.” It also mandated more complete nutritional information on product labels. Louis Sullivan, then secretary of the Department of Health and

Human Services, praised the law as ending “The Tower of Babel” in supermarket aisles.

Second, responding to pressure from the dietary supplement industry, Congress in 1994, passed the Dietary Supplement Health and Education Act. This law allowed “structure-function” claims for supplements without prior approval by FDA, meaning that companies were not required to submit scientific evidence to the agency. Such claims link ingredients to the healthy working of the body or body part rather than to disease prevention, stating, for example, that echinacea in pill form can “contribute to a healthy immune system.”

In 1997, Congress passed a third law, the Food and Drug Administration Modernization Act, which allowed companies to bypass FDA approval for disease-fighting claims by gaining the endorsement of federal research agencies. Claims would be allowed if approved by “a scientific body of the United States Government with official responsibility for public health protection or research directly relating to human nutrition.”

These laws provided some needed clarity. After the passage of the NLEA, some surveys indicated that the public was less confused about health labels and one study showed that companies used the law’s rules to promote healthier products. But they also produced unintended consequences. They left room for companies to go forum-shopping within the regulatory system by choosing among alternative routes by which to market the same compound. In at least one respect, they also may have added confusion about how much scientific evidence existed to back claims. Some research has suggested that consumers find claims concerning improved body structure or function (which requires no evidence to be submitted to the FDA) to be indistinguishable from claims concerning disease prevention (which require substantial support).

Benefits and Risks

The availability of many more disease-fighting foods in the next several years will also increase the importance of communicating clearly about the benefits and risks of genetic engineering. So far, genetic engineering has been debated in the context of productivity gains for farmers rather than health gains for consumers. Soon, however, the marketing of new compounds that claim substantial health benefits will raise such issues in a different context. New compounds to combat specific chronic diseases can also be created by conventional

means. But the use of genetic engineering can make it possible to produce them more quickly, in larger quantities, and therefore ultimately at lower cost to consumers.

A May 2000 report by the National Research Council (NRC) that focused on the pest-protected crops provides a starting point for more general understanding of the benefits and risks of foods produced using genetic engineering. The report, which produced a broad consensus among experts with diverse perspectives, emphasized the importance of assessing each product individually rather than generalizing about benefits and risks of genetic engineering. It found general benefits from pest-protected crops in reductions in application of chemical pesticides and in acreage under cultivation and no evidence of risks to human health from allergens or increased toxicity from crops currently on the market. But the report also noted the potential for undesirable side effects and urged further research. Finally, the committee recommended a “more open and accessible regulatory process to help the public understand the benefits and risks” of genetic engineering.

Interim Steps Needed

Changes are under way in the regulatory system to adapt to new products and advancing technologies. But fundamental change will be slow. Government rules are designed to evolve incrementally, because businesses and consumers rely on their stability. Even incremental change is made difficult by the complex regulatory structure that has grown up over decades in response to separate problems. The FDA is not the only agency that makes rules concerning food and human health. The Federal Trade Commission, the Department of Agriculture, the Environmental Protection Agency, and other agencies regulate food products under separate laws.

In the interim, government, businesses, public interest organizations, and other expert groups can take steps to improve consumers’ understanding of these issues. They can disclose to the public the bases for disease-fighting claims and the bases for regulatory decisions. They can create standard terminology and construct categories that help guide consumers toward accurate judgments. Finally, they can foster the use of the growing power of computers and the Internet to provide the public with road maps through this maze of issues.

Increasing Disclosure

Greater transparency concerning what is known and what is not known about new disease-fighting foods and how government decisions are made is an essential building block to establish public trust of new food technologies. Without such information, the public is vulnerable to extreme reactions each time research results are released or an unusual incident occurs. Broad disclosure is a stabilizing force not because most shoppers read scientific studies or government decision papers, but because those who act as intermediaries in disseminating information do. In its report on the safety of crops that are genetically modified for pest protection, for example, the NRC argued for greater transparency in governmental processes because “the credibility of the regulatory process and acceptance of products of biotechnology depend heavily on the public’s ability to understand the process and the key scientific principles on which it is based.” Other experts have recommended more complete public disclosure of scientific findings related to product claims. An advisory group convened in 1998, by the Harvard School of Public Health and the International Food Information Council Foundation, including representatives from medicine, industry, and journalism, recommended that all communicators, including government, business, and the press, report more information about study design, credibility, and the context of findings when alerting the public to health issues.

The federal government has taken some steps in this direction. In May 2000, for example, FDA announced that it would propose several measures to increase public access to information about genetically modified foods. These include proposed mandatory disclosure of intent to market a food from a bioengineered plant at least 120 days before marketing, as well as public access to FDA’s comments on the proposed product. It will also issue draft labeling guidance for companies that voluntarily label foods to indicate whether ingredients are genetically altered. The purpose of such guidance is to ensure that labeling is truthful and informative.

Creating a Common Vocabulary

If greater transparency improves the information base for decisions, then standardized terminology, common categories, hierarchies of safety

and effectiveness, ranking systems for scientific uncertainty, and endorsements by trusted groups can help consumers make sense of that data. Such guidance can help counter cognitive distortions that interfere with communication of complex information about risks and benefits. Research by psychologists and economists has shown that people use shortcuts to put such information in perspective. Although useful, these shortcuts can prevent rational decisions. Faced with information overload, for example, people may simply ignore important new data. And people react more strongly to small cataclysmic risks than to larger risks with less extreme consequences. One implication of this work is that the form, prominence, and content of information conveyed to the public matter. If people inevitably simplify complex data, the creation of credible categories by knowledgeable authorities can help guide their thinking.

Several authoritative groups have suggested ways of helping consumers make sense of complex information about food and health. For example, the ADA classifies disease-fighting foods on the basis of their type and demonstrated efficacy. Foods that have undergone rigorous clinical trials and have the highest certainty of benefit would be one category. Foods enhanced with potential but not yet proven disease-fighting elements, such as vitamin E for heart disease, would constitute another tier. In a different category would be emerging links between whole foods and food diseases, backed by limited epidemiological or other research (such as black tea with cancer prevention). At the bottom would be foods with the least amount of proof of benefits, such as foods with certain added supplements.

A *BioNutritional Encyclopedia* published in May 2000, using researchers from the Baylor College of Medicine, uses five categories of color ranking to classify scientific support for statements about the health benefits of food ingredients or supplements. “Strong statements” are those that are widely accepted and include at least one rigorous clinical trial published in a well-respected journal. “Substantial statements” signify mixed but adequate agreement supported by biochemical or animal studies and some clinical experiments. “Limited statements” are backed by suggestive but not definitive conclusions about health. “Minimal statements” are supported only by preliminary information, and “no scientific evidence” refers to claims that are unsupported by conventional research standards. Paul Lachance, executive director of the Nutraceuticals Institute at Rutgers University and an advisor to the project, believes that it is the first of its kind to categorize

the strength of science behind supplement claims. The project's advisory board includes representatives from industry and consumer groups. General Nutrition Corporation, a health food and supplement chain, will carry copies of the book in its stores.

Likewise, simple hierarchies can provide guidance to customers about product safety. Edward Groth, a senior scientist at Consumer's Union, has emphasized the importance of earning public trust by communicating "what we know, what we don't know, and what we can't know through scientific methods." Groth's hierarchy groups situations in which clear science and much data ensure safety; in which data suggest safety parameters but justify precaution; in which no consensus yet exists; in which emerging risks are apparent; and in which the nature of risk cannot yet be understood.

Long-term regulatory change may be moving in the same direction. The FDA recently considered establishing a new category that would allow companies to market food products that claim health benefits supported by "emerging science." This claim would have allowed potentially beneficial information to be presented to consumers on labels while more rigorous testing was in progress. Although no consensus was reached, the effort underscores the growing recognition of the need to present fast-changing knowledge about benefits in ways that the public can trust.

Employing Information Technology to Answer Customers' Questions

Information technology can layer information, customize answers, and show the size and shape of uncertainty. When it works well, it will give any shopper access to knowledge that was previously the province only of experts. Now that computer power and the Internet are no longer tied to desks or laptops, they may offer the best hope for providing quick, specific, and understandable information to respond to each consumer's needs. At least in the short term, the use of the Internet to improve communication about disease-fighting foods also raises difficult issues of limited access and further confusion caused by the multiplication of partisan voices. But government, industry, and private groups have begun to use it in a positive way to further disclosure of accurate information and to provide needed guidance to consumers. To cite a few examples of such nascent efforts, the Center for Nutrition Communication at Tufts University has developed a Nutrition Naviga-

tor (www.navigator.tufts.edu) that rates more than 800 nutrition-related sites for accuracy, depth, and usability according to clear guidelines, and provides links to each of them. The U.S. Department of Agriculture and the National Academy of Sciences' Institute of Medicine maintain on the Web a searchable database of articles on dietary supplements. Also, the *BioNutritional Encyclopedia*, available on line at (www.biovalidity.com) allows consumers to search by food ingredient, by disease type or bodily system, or by ingredient type. It also posts potentially dangerous interactions associated with each substance.

Scientific advances, business innovations, and changing consumer preferences are creating unprecedented potential for the development of new foods to counter chronic diseases, but they are also creating unprecedented potential for paralyzing confusion as shoppers wrestle with unfamiliar benefits and risks. The jumble of health-related claims about products now on grocery shelves does not provide a promising basis for further progress. Better communication with the public is essential to reaping what may turn out to be very significant improvements in public health as a result of advancing food technologies and providing foreknowledge of risks. Ultimately, shoppers' decisions are the only ones that matter. Understanding consumers' concerns and responding to them in ways that promote informed choices will help avoid the kind of extreme swings in public reaction that have so far characterized the introduction of genetically altered crops. Improvements in communication cannot wait for changes in national rules governing health claims, which are inevitably incremental. Broadening disclosure, providing simple categories to guide consumer choices, and harnessing the emerging power of the Internet can help further public understanding of fast-changing technologies. As foods begin to offer serious potential for preventing or fighting diseases, we cannot afford to continue lurching from scare to scare.

Recommended Reading

- American Dietetic Association, "Position of the American Dietetic Association: Functional Foods," *Journal of the American Dietetic Association* 99 (1999): 1278-1285.
- H. V. Fineberg and S. Rowe, "Improving Public Understanding: Guidelines for Communicating Emerging Science on Nutrition, Food Safety, and Health," *Journal of the National Cancer Institute* 90, no. 3 (1998): 194-199.

Edward Groth III, "Science, Precaution, and Food Safety: How Can We Do Better?" Discussion Paper for the U.S. Codex Delegation (Yonkers, N.Y.: Consumers Union, February 2000).

Committee on Genetically Modified Pest-Protected Plants, National Research Council, *Genetically Modified Pest-Protected Plants: Science and Regulation* (Washington, D.C.: National Academy Press, 2000).